
**“PHYTOCHEMICAL AND PHARMACOLOGICAL
STUDIES ON LEAVES, ROOTS AND STEM
BARKS OF FIVE PERENNIAL PLANTS”**

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For the award of the degree of



Doctor of Philosophy
In the Faculty of Ayurveda

By
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April 2021

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Signature of the Research Scholar

Mr. Ajit Chandrashekar Lingayat

LIST OF ABBREVIATIONS USED

Sh.S	Sharangdhar Samhita
B.P	Bhavaprakash
I.A.E.C	Institute Animal Ethical Committee
API	Ayurvedic Pharmacopoeia of India
ASU	Ayurved Siddha Unani
LOD	Loss on Drying
Std	Standard drug (Ibuprofen)
Cot	Control
Ayu	Ayurved
%	Percentage
±	Plus-Minus Sign
Q.S	Quantity Sufficient
R.I	Refractive Index
Sp.Gr	Specific Gravity
NMT	Not more than
NLT	Not less than
BR	Bilwa root
BS	Bilwa stem bark
BL	Bilwa Leaf
AR	Agnimanth root
AS	Agnimanth stem bark
AL	Agnimanth Leaf
PR	Patala root
PS	Patala stem bark
PL	Patala Leaf
SR	Shyonak root

SS	Shyonak stem bark
SL	Shyonak Leaf
GR	Gambhari root
GS	Gambhari stem bark
GL	Gambhari Leaf
BPR	Bhruhatpancha root (Combination of selected plant roots)
BPS	Bhruhatpancha stem bark (Combination of selected plant Stembarks)
BPL	Bhruhatpancha Leaves (Combination of selected plant Leaves)
SEM	Standard Error mean
HPTLC	High performance thin layer Chromatography
HPLC	High performance Liquid Chromatography
wt	Weight
CH	Carbohydrate
RS	Reducing sugar
MONO	Monosaccharide
PS	Pentose sugar
HS	Hexose sugar
PR	Protein
AA	Amino acid
ST	Steroids
GL	Cardiac Glycosides
AG	Anthraquinone glycosides
FL	Flavonoids
AL	Alkaloids
TP	Tannin & Phenolic compound
W.H.O	World Health Organization
+ve	Positive
-ve	Negative

SD	Standard deviation
NMPB	National medicinal plants board
SOP	Standard operative procedure
a	$P < 0.001$
b	$P < 0.01$
c	$P < 0.05$
O	Edema
I	Inflammatory infiltration
M	Macrophages
G	Granulation tissue
F	Fibroblast
C	Collagen formation

ABSTRACT

Background of the study

Selected five perennial plants contains Bilwa, Agnimanth, Patala, Shyonak & Gambhari root is main part used in equal proportion and generally administered in the form Kashayai.e aqueous extract. In Ayurvedic classical these plants are prescribed for in shotha i.e. anti-inflammatory activity in single or in combinations²²⁻²⁶.

Selected five plants are utilized either single or combinations in 712 formulation out of 9458 formulation reported in Bharat Bhaishajya Kalpana²⁷. There is huge demand of these plants in Ayurvedic formulation. Roots is main part use these plants. Due to exploitation of roots, harvesting of roots improperly plants will die and due to perennial in nature the required mature root development required long time. Due to these reasons among five plants Patala (*Stereospermum suaveolens* (Rox.) DC.) Shyonak (*Oroxylum indicum* (L.) Vent.) listed under endangered²⁸. Other three plants also facing the same situation. Still among endangered plants roots are exploited and plants become extinct hence to meet present and future demand alternate is required to preserve this plants. Keeping this intention if other plant parts such as stem bark or leaves possess similar activity then we can use them as alternative for roots of these plants without hampering the activity of drug in single or combination use.

Objectives of the study

1. Collection of plants parts i.e. Roots Leaves and stem bark from natural habitat.
2. Pharmacognostic study of collected plants parts
 - a) Macroscopic study collected parts.

b) Microscopic study collected parts.

3. Preliminary Phytochemical study of collected plants parts
4. Anti-inflammatory study of Kashayas(aqueous extracts) of collected plants parts
5. Anti-inflammatory of Kashayas(aqueous extracts) of formulation.
6. HPTLC Study.

Material & Methods:

- Plant materials Roots, Leaves & Stem barks of Bilwa, Agnimanth and Gambhari were collected as per Standard Operative Procedure given by National-medicinal-Plants Boards from Narsingpur, Belagavi and Patala & Shyonak were collected from Rahuri Maharashtra.
- Kashayas of individual plant parts & their combinations were prepared in Department of Rasashastra & Bhiashajya Kalpana KAHER`s Shri. B.M.K. Ayu. College Belagavi.
- Analytical study of plant parts & kashayas of individual plant parts & their combinations were carried out in AYUSH permitted ASU-DTL of CRF at KAHER`s Shri. B.M.K. Ayu. college, Belagavi.
- HPTLC Analysis of kashayas of selected plant parts individual and their combinations were done at Natural remedies Bangalore
- Quantitative Phytochemical studies total tannin by UV & flavonoids by HPTLC were done at Natural remedies Bangalore.
- Experimental studies Acute & Sub acute anti-inflammatory were done in Animal experimentation laboratory of KAHER`s Shri. B.M.K. Ayurved Mahavidyalaya, Belagavi.

Results & Discussion:

Bilwa, Agnimanth, Patala, Shyonak and Gambhari are five perennial plants described in Ayurvedic classics for the treatment of Shotha i.e. inflammatory conditions. Root aqueous extract of these plants generally prescribed or utilized in Kashaya form, either in single or combined.

The present study focused on Bhruhatpanchmoola group i.e on five perennial trees, namely Bilwa (*Aegle marmelos* (L.) Corr.) belonging to Rutaceae Gambhari (*Gmelina Arborea* Linn.), Agnimanth (*Clerodendrum phlomoidis* L.f.) Belonging to Verbenaceae family and Shyonaka (*Oroxylum indicum* (L.)Vent) and Patala (*Stereospermumsuaveolens* (Roxb.) DC) Bignonaceae family.

Among these plants Shyonaka (*Oroxylumindicum* (L.)Vent) and Patala (*Stereospermum suaveolens* (Roxb.) DC.) listed under endangered species and also other plants facing the same situations. To meet present need and requirement in future of roots these plants alternative required. Hence if it is prove that other parts of these plants such as stem barks or leaves possess similar activity then we use them alternative for roots. With this intention acute and sub-acute anti-inflammatory study was planned representative of shothghna property.

Collection of plants parts i.e. roots, leaves and stem barks from natural habitat as per season recommended classical instruction as roots were collected in grishmarutu (May 2016), leaves varsharutu (July 2016) and stem bark sharadrutu (September 2016) as per guidelines given by national medicinal plants board. Bilwa, Agnimanth and Gambhari were collected from the natural habitat of Belagavi Karnataka where as Shyonak and patala plants were collected from natural habitat of Rahuri Maharashtra. Authenticated by the experts of Central Research Facility

AYUSH approved ASU drug testing laboratory of KAHER`s Shri. B. M. K. Ayurved college Belagavi.

Macroscopic characters such as colour, odour, taste, shape texture etc. noted. In microscopic examination the different cells and their contents were observed. Physicochemical analysis of collected plants parts were done according to Ayurvedic Pharmacopeial methods and compared with quality standards available for plants whereas which where quality standards are not available the methods repeated for three times the mean values taken as reference standards.

Phytochemical analysis were done for selected plants in water and alcohol extracts. Carbohydrate, Reducing sugars, Tannins and flavonoids were detected in selected plants water extracts whereas in alcohol extracts that steroids alkaloids, monosaccharide were observed.

Preparation of Kashayas (Aqueous Extract)prepared as per classical reference of Sharangdhar Madhyam Khanda2/1 by mixing one part of coarse powder of drug with sixteen parts water, boiled and reduced to 1/8th portion. Combinations of plants coarse powder of roots, stem barks and leaves of Bilwa, Agnimatha, Shyonak, Patala and Gambhari was prepared by mixing in equal proportion of individual drugs coarse powders.

Evaluation done by sensory of kashsyas comparable observation between the parts for selected plants. Physicochemical analysis of kashayas only specific gravity and pH of Kashsya comparable with in selected plants. Total solid content was varies due to dissolve content was varies due to particle sizes, nature of materials and decoction procedure.

Phytochemical analysis of kashsyas were comparable, observed similarity presence of carbohydrate, Proteins, amino acids, pentose sugars, tannins, Flavonoids in within the selected plants parts kashsyas.

Quantification of Phytochemicals as Total Tannin and Phenols where tannic acid as reference standard and Total Flavonoids where Quercetine was reference standards. Results were between roots and stem bark were comparable where as in leaves observed at slightly higher side than roots and stem barks. HPTLC fingerprinting analysis showed similarity in separation of phytochemicals in common mobile phase condition.

Combination of Roots, Combination of stem bark, Bilwa Root and Stem bark, Gambari root and stem bark, Patala root and stem bark was able to reduce the edema at post 3 hours indicating its role potentially on prostaglandins

In Acute Anti-inflammatory study it was observed that the findings of roots BPR, BR, AR, PR, SR, GR groups and stem bark BPS, BS, GS, PS groups were comparable in reducing inflammation. Hence BPS, BS, PS, GS, BR, AR, PR, SR, GR may be used in the place of BPR. Among individual plants roots Bilwa, Patala and Gambhari may be replaced with respective plant stembark as similar findings were seen in the study.

Sub-Acute inflammation Histopathology results in present study showed that, test group has comparative results against standard drug. But in mean granuloma weight it is observed significant difference in test drugs compared to standard drug ibuprofen. Kashaya treated groups managed to hasten the process of repair and not allowing the inflammation to be sustained.

Conclusion:

Roots of individual plants and stem of three plants of BPR may be substituted for roots in acute inflammation inhibitory activity. Individually Bilwa, Agnimanth, Patala, Shyonak or Gmabhari roots have same degree of shown inhibition of acute inflammation when compared to combination of all five roots. Hence, either of one may be used instead of combination of roots which will help in conservation of plants. Stem barks of BPR showed statistically equitable acute anti-inflammatory effect which can be considered to replace stem barks with roots. Similarly, the individual stem barks of Bilwa, Patala and Gambhari have shown equivalent acute anti-inflammatory effect against combined stem bark. Whilst, In Sub-acute inflammatory condition combination of roots or stem bark of BPR could not show statistical antagonizing effect indicating its lesser role in anchoring sub-acute inflammatory process.

Key words: Ayurved Bilwa (*Aegle marmelos* (L.) Corr.), Agnimanth (*Clerodendrum phlomidis* L.f.) Patala (*Stereospermum suaveolens*(Rox.) DC.) Shyonak (*Oroxylum indicum*)L.) Vent.) Gambhari (*Gmelina arborea* Linn.), Carrageenan, acute anti-inflammatory study, forigen body, sub-acute anti-inflammatory study, Bhruhat panchmoola, Dashmoola,

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1. INTRODUCTION

Humans have been exploring every possible chance to cure the ailments sustained during evolution since ancient times. Ayurveda remains to be one of the oldest medical systems for health care and plants are one of the major armories in treating human health issues. Several plants used in Ayurveda have been proven conventionally to have medicinal values and Ayurveda is gaining interest in the present world¹. Medicinal plants have also vital roles in other traditional healthcare systems such as Siddha, Homeopathy, and even in Allopathy system².

Various indigenous plants have been and are used for the diagnostics, prevention, removal of physical and mental illnesses. Since ancient times India has witnessed usage of herbal drugs and more frequently in rural parts². Herbal drugs or Plants are used either as a whole plant or any of its specific parts like leaves, root, stem bark, flower, and seed. Plant products like gum, resin, latex, or excretory products are also used³.

Presently, inclination and interest for plant-based drugs, consumer products, and cosmetics are increased and are being manufactured and used throughout the world in medicine considering the increasing side effect & toxicity due to uncontrolled usage of synthetic drugs like antimicrobials and anti-inflammatory drugs, etc.⁴

The pharmaceutical industries which manufacture therapeutically important compounds are dependent on raw plant-based materials. Medicinal plants across the world are collected from wilds, forests, and hilly areas. Mountains and hills are rich with various rare species of medicinal plants⁵. However, a large population of medicinal plants still remains unknown for their probable medicinal activities and pharmacological values.

As per the data released by IUCN around 34,000 species of plants in the world are facing threat and the priority task for a botanist is to conserve these plants by in situ or ex situ genetic resources⁶. Usually, Conservation has taken attention mainly for 4 categories (food, industrial crops, timber, and forages). Notice towards medicinal plants is none or sporadic. Constant deforestation and plants being utilized for medicinal preparation by the drug-manufacturers and the commercial industries has resulted in a gradual decrease of several of the plant species population from their respective habitats⁷. Hence a need arises to conserve the medicinal plants and their genetic diversity through agricultural or commercial cultivation parallelly to inhibit their extinction and to fulfill their demand in the industries. In situ conservation of these sources single-handedly cannot fulfill the huge increasing requirements of the pharmaceutical industry. It is, therefore, essential and need of time to develop, cultural methods to propagate medicinal plants in suitable climatic regions. Commercial cultivation regarding these plants will restrict the continuous exploitation from their indigenous sources and will in turn conserve medicinal plants biodiversity. It is systematic initiations that is necessary for medicinal plant cultivation & conservation for endangered species⁸.

Isolation, purification, *in vivo* or *in vitro* evaluation, and clinical studies of the active compounds in medicinal plants is the growing field for research. These aspects of the studies are essential to promote the search for new medicines for several ailments. The result of the pharmacological investigation is either authentication of an already identified traditional drug or discovery of a new drug.

India has a rich source in terms of plant resources⁹ and it is estimated that roughly 25,000 functional herbal formulations are used in folk medicine, such as Ayurveda among the rural communities in India. In our country, there are more than

1.5 million medical practitioners of traditional medicines, who utilize medicinal plants for preventive, and curative applications. Moreover, around seven thousand eight hundred herbal drug-preparing companies of India, which annually consume around two thousand tons of plants¹⁰.

Traditional medicine is also named as "alternative medicine", "complementary medicine" or "ethnomedicine" by WHO¹¹. In 2008, the International Congress of WHO in Beijing, China have admitted and acknowledged Traditional Medicine and the importance of herbal medications, which play a major role in healthcare management worldwide especially in low-income countries including Sub-Saharan Africa¹². They further emphasized that plant derivatives and active compounds ought to be investigated based on further research and innovation (WHO, 2008). WHO has also passed a number of resolutions towards a reaction to rebirth attention in the study & use in traditional remedy in health heed and identification of signs of medicinally healing plants to the health systems¹³.

As a follow-up action, medicinal plants have become a prime focus of intense research indeed, to find out their traditional indications, by studying their pharmacological effects. The existing and upcoming huge market for minimally processed medicinal plant products in particular in budding countries is also giving inspiration to this research focus. The herbal medications in many raised countries are regularly taken as OTC medications & herbal supplements as supplements for wellbeing. The health establishment and heads in developing nations are determined to opt for different forms of traditional remedies seriously & discover options in the main health system¹⁴. The transformed awareness in herbal remedies is probable to persist in the future due to increasing population, cost-effectiveness, and change in attitude towards alternative therapy¹⁵.

Escalating awareness about an alternative system of medicine used for prevention & therapeutics of diverse illnesses also raises concern to the security of the medicinal plants parallelly¹⁵. WHO reported 80% of the rural residents utilize nearby accessible medicinal plants for their primary healthcare requirements. About 90% of the therapeutically efficacious plants are found in the wild¹⁶.

In Ayurveda, Plant-based ingredients are widely used in the preparation of medicine and are in use in clinical practice other than minerals and metallic-based ingredients for the manufacturing of medicines. As per classical reference, these plant ingredients may use individually or in combinations. Different dosages of these preparations like juices, pastes, decoctions, syrups, infusions (Hot and cold), self-generated alcohols etc. are mentioned and the choice of these drugs either single or combinations and their various forms will be based on the strength of disease and patient.

Charaka Samhita has mentioned various groups which contain plant ingredients having similar properties known as Ganas. Shothahara, Jeevaneeya, Brummaneeya, Lekhneeya, Bhedaneeya, Sandhaneya, Deepaneeya, Varnya, Kanthya, Hrudya, Triptighna, Arshoghna, Kshthaghna, Kriminghna, Kandughna, Vishaghna, Stanyashodhan, Shukrajanan, Sukrashodhan, Snehopaga, Swadopag, Virechanopag, Asthapanopag, Anuvasnopag, Shirovirechanopag, Trushnanighrahan, Hikkanihgrahan, Sangraheeya, Pureeshaviranjaneeya, Mutrasangraheeya, Mutraviranjaneeya, Mutravirechaneeya, Shwasahar, Sothahar, Jwarahar, Shramahar, Sheetaprashman, Udarprashman, Angamardaprashman, Shula prashman, Shonitasthapan, Vedanasthapan, Sanjnasthapan, Prajasthapan, Vayasthapan. Ten plants are explained in each Ganas along with specific therapeutic actions¹⁷.

Among these shothahar gana possess shothaghna property, indicated in inflammatory conditions. The ingredients explained in shothahar gana are Bilwa (*Aegle marmelos* (L.) Corr.), Agnimanth (*Clerodendrun phlomidis* L.f.) Patala (*Stereospermum suaveolens*(Rox.) DC.) Shyonak (*Oroxylum indicum*) L.) Vent.) Gambhari (*Gmelina arborea* Linn.) Shalaparni (*Desmodium gangiticum* (l) DC.) Prushnaparni (*Uraria picta* (Jacq.) Desv.exDC) Bhruhati (*Solanum indicum* Lam.) Kantakari (*Solanum xanthocarpum* L.) Gokshur (*Tribulus terrestris* L.) known as Dhashamoola^{18,19}.

Dashmoola is a group of two sub-group namely Bhruhatpanchmoola and Laghupanchmoola. Each component drugs have the medicinal properties and are frequently used in other formulations or as single drug.

SushrutaSamhita also deals it by the name of Mahatpanchmoola in its Sutra-
sthan 38/68. The name as Mahatpanchmoola is synonymous to Bhruhatpanchmoola which indicate the habit of the plants (all are tree) showing them bigger in appearance. The roots of these plants viz., Bilwa (*Aegle marmelos* (L.) Corr.), Agnimanth (*Clerodendrun phlomidis* L.f.) Patala (*Stereospermum suaveolens*(Rox.) DC.) Shyonak (*Oroxylum indicum* L.) Vent.) and Gambhari (*Gmelina arborea* Linn.) are reported as Bhruhatpanchmoola in combined form²⁰. The word Bhruhatpanchmoola was again very well mentioned in Bhavprakash under Guduchyadivarga (29/30). The composition is said to be used as Kapha-vatashamaka (which cures Kapha-vata linked ailments i.e Anti-inflammatory and analgesic effect)²¹.

1.1 Need and Background of the study:

Selected five perennial plants are roots of Bilwa, Agnimanth, Patala, Shyonak & Gambhari as main part taken in equal proportion and generally administered in the form of Kashaya i.e aqueous extract. In Ayurveda, these plants are prescribed for shotha i.e. anti-inflammatory activity in single or in combinations²²⁻²⁶.

Selected five plant roots are utilized either single or in combinations in 712 formulations out of 9458 formulations reported in Bharat Bhaishajya Kalpana²⁷. There is a huge demand for these plants in Ayurvedic formulations. Roots are the main part used of these plants. Due to continuous exploitation of roots, improper harvesting of roots leading to perishing of plants, and they being perennial in nature the required mature root development is time-consuming. Due to these reasons among five plants, Patala (*Stereospermum suaveolens*(Rox.) DC.) and Shyonak (*Oroxylum indicum* (L.) Vent.) are listed under endangered speices²⁸. The other three plants are also facing the same situation. Still, among endangered plants roots are exploited and plants become extinct hence to meet present and future demand alternate source is required to preserve these plants. Keeping this intention if other plant parts such as stem bark or leaves if possess similar activity then we can use them as an alternative for roots of these plants without hampering the activity of the drug in single or combination use. Hence with this objective, the present study is taken up.

1.2 Justification for the study:

- ✓ This comparative study would be the first of its type that shall give a better understanding of the efficacy of the other parts of the plant under comparable ambient circumstances.
- ✓ This study may substantiate the use of stem bark or leaves that can be used in lieu of roots that help the conservation of these plants.
- ✓ The study may also help to recognize the quantity of other parts to be used to replace roots and maintain the efficacy of the formulation
- ✓ It is proposed to produce comparative scientific and statistical data that shall form the basis of further in-depth study.

1.3 Objectives of the study:

1. Collection of plant parts i.e. Roots Leaves and stem bark from natural habitat.
2. Pharmacognostic study of collected plants parts
 - a) Macroscopic study collected parts.
 - b) Microscopic study collected parts.
3. Physico-chemical study collected plant parts.
4. Preliminary Phytochemical study of collected plants parts
5. Anti-inflammatory study of Kashayas(aqueous extracts) of collected plants parts
6. Anti-inflammatory of Kashayas (aqueous extracts) of formulation.
7. HPTLC Study

2. REVIEW OF LITERATURE

Medicinal plants have many important role in curing different of ailments including chronic and acute diseases. Most common and vital medical characteristics of the plants are anti-Inflammation, anti-biotic, anti-parasitic, anti-leukemia, sugar levels modulators, anti-atherosclerosis, anti-hypersensitivity, wound healing.²⁹

2.1.1 Bilwa: (*Aegle marmelos* (L.) Corr.)^{22,30-33}

Botanical Classification:

Class : Dicotyledonae

Sub class : Polypetalea

Series : Disciflorae

Natural order: Geraniales

Family : Rutaceae

Genus : *Aegle*

Species : *marmelos* (L.) Corr



Synonyms:

Amarkosh: Bilwa, Trishshakhapatra, Patrashreshta,

Charaka Samhita: Atmanglya, Vatasar, Kantaka, Kantakanthya, Goharitak,

Gandhapatra, Gandhaphala, Tripatra, Shandilya, Shivam, Shriphala, Shiven

Sushuruta samhiata: Same as Amarkosh

Ashtanga Hridaya: Same as Sushurutasamhiata

Dhanvantari nighantu: Arimeda, Karkata. Gandhagarbh, Gandhapatra, Shivadruma,

Madanpal Nighntu: Kantaki

Raj Nighntu: Shalya

Kaidev Nighthntu :Grathila

Bhavaprakash Nighthntu: Shri

Rasapanchaka:

Rasa: Tikta, Kashaya ,

Guna: Laghu, Ruksha, ,

Virya: Ushna

Vipaka: Katu

Karma: Kapha-vatashamaka, Gahi, Agnivardhaka, Balya, Pittakara

Botanical Description:

A deciduous armed tree of 8-15 mtrs high. Stem erect/branched , woody cylindrical , solid, with axillary straight single or paired spines. Leaves palmately compound, trifoliate, petiolate, alternate, glans dotted, leaf lets are elliptic, lanceolate with entire margin, glabrous, net veined. Inflorescences cymose, axillary panicle. Flowers pedicellate, bisexual, actinomorphic, complete, penta patulous white colour. Fruit is berry with woody rind, ovoid.

Chemical composition:

Plant is having many important compounds like, Marmelosin, Marmelide, Tannic acid, Marmin, Umbelliferon, Skimmianine, Isoimperation, Isopimpinellin, Marellin, Skimmin, Marmesia, Fatty acid and Essential oil etc. (Database) It is also having some important minerals., viz. P (0.137%), K (0.746%), Ca (0.188%), Mg (0.127%) and Fe (0.007%).

Part used: Root, leaf, stem

Medicinal Properties: The roots sweet in taste, help to reduce temperature due to tridosha, also useful in abdomen pain , heart and kidney problem management. They are effective in balancing of vata, pitta and kapha.

Formulations: Brihatpanchmoolakwath, Bilwadichurna, Bilwapanchak etc.

Dose: 5- 10gm in powder 25-50ml in Decoction

Research Updates:

Riyanto et.al. reported (2002). Two coumarins i.e. auraptene and marmin, were isolated from *Aegle marmelos* (L.) Corr. roots (collected from Indonesia). Antimicrobial activity and cytotoxic activity were assessed with *P. aeruginosa*, *B. subtilis*, *S. aureus*, *C. lipolytica*, *Aspergillu sochraceus*, *S. cerevisiae* and CEM-SS (T-cell lymphoblastic leukaemia) cells. Crude chloroform, methanol extracts showed weak activities against *P. aeruginosa* and *B. subtilis*, forming inhibition zones of 7 cm. Crude petroleum ether extracts were not active. Auraptene and marmin didn't show activity against the microbes. Marmin had a weak cytotoxic activity (IC₅₀ = 22.1 micro g/ml), while auraptene didn't show significant activity against the T-cell lymphoblastic leukaemia cells (IC₅₀>30 µg/ml). However, crude petroleum ether, methanol chloroform extract recorded IC₅₀ values of 22.0, 8.8 and 6.8 µg/ml, respectively.³⁴

Siddique et al. (2010) reported the quality standards of Bilwa *Aegle marmelos* (L.) Corr. leaves. Moisture (0.7433%), ash-content (6.3027%), water-soluble ash (1.2796%), acid-insoluble ash (2.5525%) and resin (0.2100%) respectively. Preliminary phytochemical tests of extracts showed alkaloids, carbohydrates, phenolic compounds etc. saponins and mucilage not detected in petroleum ether, however resins and lipids were detected. In chloroform extract alkaloids, phenolic compounds,

etc were detected. In aqueous extract resins and lipids were absent, while; only lipids not detected in alcoholic extract.³⁵

Mohan et al. (2013) studied the anti-inflammatory activity in hydroalcoholic extract Bilwa leaves in animal. . The PI with indomethacin (49.50%) and Bilwa (34.02%) in carrageenan induced paw edema. Good efficacy seen in Indomethacin. Bilwa leaves shown good efficacy compare to indomethacin.³⁶

Shelke. et al. (2016) reported plant Macro and Microscopic characters of Bilwa leaf. Margin is crenulated, venation horizontally, leaves with thorns . Leaf trifoliate base, leaflets shape varied from ovate to elliptic, size of leaf (3.9 to 11 and 2.4-6.2). Leaf surface preparation with diacytic stomata, trichomes-unicellular, stomatal index (6.8 - 7.5). TS of Bilwa leaf revealed pink colour xylem, red cuticles and blue colour starch. Ash was 16.5% (w/w), water soluble ash was 9.022% (w/w), acid insoluble ash was 2.25% (w/w) and sulphated ash was 3.75% (w/w) was found and Extractives percentage; in chloroform (25% w/w), alcohol (21% w/w), petroleum ether (26.25% w/w), water (29.37% w/w) and foaming index was 100.³⁷

Bolay et al (2016) reported the preliminary phytochemical studies ethanolic extract of the *Aegle marmelos* (L.) Corr. leaves, detected phytochemicals Alkaloids, Saponin, flavonoids, steroids and tannin, Ethanolic extract of *Aegle marmelos* (L.) Corr. used for to investigate castor oil induced antidiarrheal activity. The ethanolic extract showed dose dependent anti-inflammatory and antidiarrheal . Study reported a benefit of *Aegle marmelos* (L.) Corr. in treating inflammatory pain.³⁸

Krishnakanth et al (2017) reported Bilwa analgesic and anti-inflammatory activity in ethanolic extracts and compared with standard (pentazocine) and

(diclofenac) in animal study. Leaf and Fruit Extract at dosage 100mg/kg and 200mg/kg showed activity.³⁹

2.1.2 Aganimantha (*Clerodendrum phlomoidis* L.f.)^{23, 40-43}

Botanical Classification:

Class: Dicotyledonae

Sub class: Gamopetalae

Series: Bicarpellatae

Natural order: Lamiales

Family: Verbenaceae

Genus: *Clerodendrum*

Species: *phlomoidis*L.f



Synonyms:

Samveda: Tarkari, Arani,

Amarkosh: Agnimantha, Jaya, Jayanti, Shriparni, Vaihayantika,

SushrutaSamhita: Vijaya, Tejovriksha,

Dhanvantarinighantu: Ketu, Karnika, Nadayee,

KaidevNighantu: Vanhimoola, Pavak

Rasapanchaka:

Rasa: Tikta, Katu,

Guna: Guru,

Virya: Ushna

Vipaka: Katu

Karma: Kapha-vatashamaka, Shothaghna, Agnidipaka

Botanical description:

It is a small tree reaching upto 9 mtrs height. Leaves ovate or subrhomboid, coarsely crenate, dentate or sub entire, glabrous above more or less puberulous beneath. Base truncate, or sub cordate simple or opposite. Inflorescence: Dichotomus axillary cymes, arranged to form a round terminal panicle. Flowers white or pinkish. Fruit Drupobovoid, black when ripe

Chemical Composition:

Plant contains clerodin, clerosterol, clerodendrin-A, D-mannitol, β -sitosterol, α -d Glucoside and ceryly alcohol, pectolinarigenin, monoglucoside, Palmitic acid, cerotic acid, hispidulin and luteolin

Part used: Root and leaf

Medicinal Uses: Root having bitter-acrid and sweetish taste. It is used as galactagogue, antimicrobial compound and used in hemorrhoids. Bark is useful in temperature and acidity management. Leaf paste is useful in cephalagia and leaf is useful in gonorrhoea regime.

Formulations: Brihatpanchmooladi kwath choorna, Dashmoolarishta,

Dashmoolagrihta, Agnimanth kashaya, Agnimath kalka.

Dose: 12-24gm in decoction.

Recent updates:

Vijayamirtharaj et al (2011) reported that chloroform extract of (*Clerodendrum phlomidis* L.f.) showed significant effect as an anti-inflammatory drug. Results were comparable with standard drug (phenylbutazone). Chloroform extract had anti-inflammatory activity Paw edema induced by carrageenin. two doses

of 400 and 200 mg/kg showed good reduction in paw edema by 26.80% and 34.02 % accordingly, after 4 hours of carrageenan administration⁴⁴

Parekar et al. (2012) Studied the activity of *Clerodendrum phlomidis* L.f. and was compared between dashmoolarishta, a multi-ingredient plant formulation containing (*Clerodendrum phlomidis* L.f.) significant anti-inflammatory activity and inhibition in the carrageenan model and 50.38% inhibition in chronic inflammation model. In peritonitis model, maximum anti-inflammatory activity of 27.32% was seen.⁴⁵

Babu et al (2014) studies leaves of (*Clerodendrum phlomidis* L.f.). The isolation of 3-hydroxy, 2-methoxy sodium butanoate by agnimanth leaves showed the inflammatory inhibitory and anti-arthritic effect.⁴⁶

2.1.3 Patala *Stereospermum suaveolens* (Roxb.DC)^{24, 47-50}

Botanical Classification:

Class: Dicotyledonae

Sub-class: Gamopetala

Series: Bicarpellatae

Natural order: Personales

Family: Bignoniaceae

Genus: *Stereospermum*

Species: *suaveolens* (Roxb.) DC



Synonyms:

Amarkosh: Patala, Tamrapushpi, Bhaveruha, Shwetamahak, Amogha
Charak Samhita: Krishna vrinta, Kumbhi pushpin, Kumbhi, Bhavavrintika,
Raktapushpika,
Sthirgratha, Bhaveruha, Raktapushpika, Shilkumbhi, Sthirgratha,
Dhanvantari Nighantu: Kashmari, Mushkam,
Raj Nighantu: Shilkumbhi
Kaidevnighantu: Kumbhipushpi

Rasapanchaka:

Rasa: Tikta, Kashaya,
Guna: Ruksha, Laghu
Virya: Ushna
Vipaka: Katu
Karma: Raktavikara, Pittatisara, Hridya, Tridoshashamaka.

Botanical description:

A deciduous tree grow up to 50 mtrs height. Young parts are viscous and hairy. Leaves are compound, leaflets are in 3 to 4 pairs. Leaflets broad with acuminate apex, rough on the top, pubescent base shape round and zygomorphic, central nerve are 6-8 pairs with reticulate venation. Inflorescence panicle with viscid hairs. Flowers with long calyx, broad lobes, corolla is dull purple, pubescent outside, limb is oblique, 2-lipped. Lobes are rounded. Fruits are capsule straight, cylindrical, slightly ribbed elevated whitish. Seed with long membranous wing at each end.

Chemical composition:

The plant is having, Lacachol {2hydroxy-3(3methyl-2-butyl)}; 1,4naphtho quinonesterolein (flavone) (plant), 7-glucoronide of dinotin and diometin, 6 Hydroxyloteolin and its 7 galactoside, D glucosulflavone β -sitosterol and n tricontanol (root bark), lapachol, dehydrox- α -lapochone & dehydrotectol (root heart wood), cerylalcohol, oleic, palmitic and stearic acid (root)

Parts used: Root, Root bark, Leaf, Flower and Seed

Medicinal Uses: Root in kapaha, vata ailments, asthma, vomiting, Fever, thirst, inflammation loss of taste, It is anti-cancerous , anti-viral drug. It is useful as appetizer, diuretic expectorant cardio tonic aphrodisiac and tonic. Root is useful in piles hyperacidity, diarrhea, etc.

Formulations: Brihatpanchmooladikwath Churna, Dashmoolarist, Dashmoolagrihta, etc

Dose: 5- 10gm in powder 25-50ml in Decoction.

Recent updates:

Balasubramanian et al.(2010) reported anti-inflammatory study of *Stereospermum suaveolens* (Roxb.DC) (Bignoniaceae) ethanol extract of bark at (400 mg/kg- body weight) observed that carrageenan-, dextran-, and histamine-induced edema reduction . Bark extract (400 mg/kg) showed considerable reduction (34.77%) in granuloma weight in sub acute animal model. Study reveals that action was dose dependent. ⁵¹

Kharat et al. (2012) reported Root bark of patala aqueous extract (125mg/kg) having anti-inflammation activity . Inhibition percentage mean is (23.74) which is

found higher (125mg/kg) dose as compared with the mean percentage inhibition (250mg/kg)&(500mg/kg) which found (14.44) and (19.71) respectively.⁵²

2.1.4 Shyonaka *Oroxylum indicum* (L.) Vent.^{25,53-56}

Botanical Classification:

Class: Dicotyledonae

Sub class: Gamopetalae

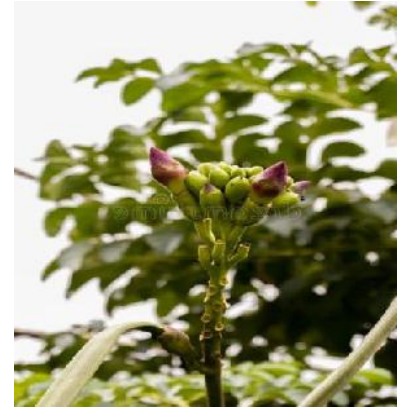
Series: Bicarpellatae

Natural order: Personales

Family: Bignoniaceae

Genus: *Oroxylum*

Species: *indicum* (L.) Vent.



Synonyms:

Charak Samhita: Shyonak, Katambhara, Kutanta, Tuntukam,

Sushruta Samhita: Aralu, Dirghavrinta, Katambhara, Shukanasa,

Haritsamhita: Patha,

Dhanvantari Nighantu: Mayurjangha, Priyajiva,

Raj Nighntu :Nisara, Pitakah, Putinag

Shaligram Nighantu: Kitanashan, Nata, Shallaka,

Rasapanchaka:

Rasa: Tikta, Kashaya, Madhura, ,

Guna:Laghu Ruksha,

Virya: Ushna

Vipaka: Katu,

Karma: Deepana, Tridoshanashaka

Botanical description:

This tree grows upto 40 ft height. Bark with corky lenticels. Leaves pinnately compound. Leaflets ovate or elliptic, acuminate, glabrous, round base. Inflorescence racemes. Flowers with lathery calyx, oblong copanulate. Corolla is purple in colour. Fruit is capsule, straight tapering to both ends. Seeds are winged all around except base.

Chemical composition:

Plant contains Baicelin, its 6-glucoside(tectalin), 7-O- β gentiobiosideamnog 12 flavonoides, 5-hydroxy – 8methoxy 7-o- α -DGlucoronyl- flavon (Oroxylidin), linolic acid myristic, Oleic Plamatic Plamitolic stearicacids(seed).

Part used: Root, leaf, stem. Medicinal Properties: Root barks are used in fever, asthma, bronchitis, vomiting, dysentery, inflammation treatment. The fruit is expectorant, useful in leucoderma. seed having purgative action. Bark is bitter in test used in tonic. Root bark, stem and leavies can be used in nnake bite.

Formulations: Brihatpanchmoolakwath, Dashmoolakwath, Chyvanprash

Dose: 5- 10gm in powder 25-50ml in Decoction

Recent Researches:

Doshi et al .(2012) studied root bark and stem bark kashaya exhibited significant decreased paw edema compared to control. Stem bark suppressed edema around 26.30%, however with roots it was 22.70%. So, stem bark extract of shyonaka can be used as anti-inflammatory drug.⁵⁷

Nagarkar et al (2013) studied comparison of roots of *Aegle marmelos* (L.) Corr., *Desmodium gangeticum* (L.) DC., *Gmelina arborea* Roxb., *Oroxylum indicum* Vent., *Premna optusifolia* R. Br., *Solanum anguivi* Lam., *Solanum virginianum* L., *Stereospermum colais* Mabb. *Tribulus terrestris* L. and *Uraria picta* (Jacq.)Desv.ex DC. The result showed *Aegle marmelos* (28.20%), *Premna optusifolia* (25.78%), *Oroxylum indicum* (24.15%), *Desmodium gangeticum* (26.74%), *Uraria picta* (21.49%) had anti-inflammatory activity at 1.8 ml/kg body weight, in aqueous extract.⁵⁸

2.1.5 Gambhari: *Gmelina arborea* Linn.^{26,59-62}

Botanical Classification:

Class: Dicotyledonae

Sub class: Gamopetalae

Series: Bicarpellatae

Natural order: Lamiales

Family: Verbenaceae

Genus: *Gmelina*

Species: *arborea* Linn.



Synonyms:

Atharvaveda: Kashmarya, Bhadra, Bhadraparni, Rohini.

Amarkosh: Gambhari, Shriparni, Sarvatobhadra, Krishna vrintika, Bhadraparni, Madhuparni,

Charaka Samhita: Kashmari, Shriparni,

Dhanvantarinighantu: Hira, Sarvatobhadra, Vatarohini, Madhurasa

Raj Nighantu: Subhadra,

Shaligram Nighantu: Saphal, Kumari

Rasapanchaka:

Rasa: Tikta, Kashaya,

Guna: Guru,

Virya: Ushna

Vipaka: Madhura

Karma: Shothahara, Tridoshashamaka, Pandunashaka

Botanical Description:

It is unarmed deciduous tree grows up to 50 ft height. Bark is greyish yellow. Branch with white hairs. Leaves ovate shape, acuminate apex, entire glabrous margin above at maturity, petioles are cylindrical glandular.. Inflorescence densely hairy. Flower calyx are long broadly campanulate, densely hairy, petals are brownish yellow. Fruit is drupe ovoid or pyriform, smooth.

Chemical composition:

The plant contains Gmelofuran-a, Furanosesquiterpenoids, Sesquiterpene, Cerylacohol, β -sitosterol, n-octacosanol, Gameinol, Apiosilskimmin-a, Apiofuranosyl-1{1-6} β -dglucopyranosyl; Umbelliferon, n-octacosanal,

Parts used: Root, Bark, Leaf, Flower and Fruit

Medicinal Uses: Roots are used as stomachic, purgation, antimicrobial, appetite inducers; useful in hallucinations, used for abdominal pain, burning sensation, fever and irregular urinary discharges treatment. Leaves used for gonorrhoea, cough, treatment. Flowers are astringent useful in leprosy treatment. Fruits are diuretic tonic, aphrodisiac useful in vata disorders.

Formulations: Brihatpanchmooladikwath Churna, Dashmoolarist, Dashmoolagrihta

Dose: 5- 10gm in decoction.

Recent updates:

Daya et al. (2012) Studied on phytochemical screening, pharmacognostic properties. physicochemical assessment of Gambhari leaf revealed covering uni-multicellular trichome, anomocytic stomata and. Physico-chemical parameters and florescence analysis were studied. It showed presence of phenolic compound, triterpenoid, saponin, protein, steroid, flavanoid and carbohydrates.⁶³

Kulkarniet et al (2013) reported stem bark aqueous extract of Gambhari had inhibition of writhes (84.3%)it was almost similar to standard (ASA) (81.1%). Methanol extract also had better response in writhings at doses of (250 and 500 mg/kg)..⁶⁴

Krishnan et al. (2015) Reported microscopic features of root varies compared with aerial plant part and also composition of phellem and presence of phelloids at various places. Presence of Calcium oxalate crystals was marker and it was found to be 1 – 20% of dry weight of plant. Starch grains abundant in cells of root.⁶⁵

Kaur et al. (2017) reported Methanol extract(500 mg/kg) and its fraction with ethyl acetate (50 mg/kg) exhibited significant anti-inflammatory action. They also proved that novel flavonoid (GM-01) of Ethyl acetate was responsible for action.⁶⁶

Manasa et.al. (2017) studied on Pharmacognostic and Phytochemical screening of Gambhari Leaf reported as Moisture content in leaf was 12.55%. Total ash value was 0.50% and acid insoluble value zero. Extractive value (1.14%) and (11.03%) of aqueous and alcoholic extract respectively. Phytochemical test shown presence of coumarins, steroids, Carbohydrate, Alkaloids, Tannins.⁶⁷

2.2 Bhruhatpanchmoola review^{20,21}

Sushruta Samhita first Ayurvedic literature coined word of Mahatpanchmoola in its Sutrasthan 38/68. The name as Mahatpanchmoola synonymous to Bhruhatpanchmoola was given indicating the habit of the plants (all are tree) showing them bigger in appearance. The roots of plants viz., Bilwa {*Aegle marmelos* (L.)Corr.}, Gambhari (*Gmelina arborea* Linn.), Agnimanth (*Clerodendrum phlomodis* L.f.), Shyonaka {*Oroxlum idicum* (L.)Vent.} and Patala {*Stereosprum suavelens* (Roxb.) DC.} are reported as Bhruhatpanchmoola in combined form. The word Bhruhatpanchmoola was again very well mentioned in Bhavprakash in Guduchyadivarga (29/30). The composition is used as Kapha-vatashamaka (which cures Kapha-vata related ailments).

Rasapanchaka:

Rasa: Tikta, Kashaya,

Guna: Laghu,

Virya: Ushna

Vipaka: Katu

Recent updates:

Junjarwad et al (2011) reported similarity between powder microscopy of stembark Bilwa, Syonaka, Agimantha, Gambhari and Patala Powder of Bilwa root and stem bark showed crystal in fibers, vessels-pitted, starch grains of concentric line. Agimantha stem bark and root powder showed characters like lignified fibres with crystals, starch grains, rectangle shaped cork cells. Shyonaka (*Oroxylum indicum* vent.) stem bark and root powder showed characters like Stone cells, pitted vessels, phloem fibres, lignified cork. Patala root and stem bark powder showed rectangular

shape cork, Fragments, oval to polygonal stone cells with striations and crystals. Gambhari root and stem bark powder revealed pitted lumen stone cells and striations, starch grains oval, crystals of ca-oxalate. Moisture was negligible (0.19%). slightly acidic pH (5.61). Phytochemical analysis showed Alkaloids, Coumarine glycosides, Tannin and Phenolic compounds, Saponin glycosides, Flavonoid whereas, Amines, Resins, Proteins were absent. Histochemical results were same.⁶⁸

Manis et al. studied (2011) and compare anti-inflammatory activity of Brihatpanchamoola Kwatha prepared taking by root bark and stem bark in Carrageenan induced edemapaw model. The test drug administered orally (9 ml/kg body weight animals). Phenylbutazone a standard drug used for comparison. Both the samples of Brihatpanchamoola Kwatha have reported inhibition of paw oedema, however inhibition was significant in stem bark sample treated group. This showed Brihatpanchamoola Kwatha prepared by stem bark samples have significant anti-inflammatory activity. Hence it can be used in the non-availability of root samples.⁶⁹

2.3 Review of Ibuprofen⁷⁰⁻⁷⁴:

Ibuprofen is (2RS)-1[4-(2-methyl propyl) phenyl] propionic acid (BP. 2004). discovered in 1969 as an alternative to Aspirin. Because it causes vomiting, nausea, Gastric discomfort. It is a non-selective inhibitor of COX-1 and COX-2. But weak in action compared to others NSAIDs, it is mainly analgesic and antipyretic action. Its inhibitory actions on cyclo-oxygenases, by inhibiting synthesis of prostaglandins.

Ibuprofen Doses: Anti-inflammatory action at 300 mg with 6-8 hrs or 400-800 mg 3-4 times daily.

2.4 Review on Anti-inflammatory activity⁷⁵⁻⁸⁴:

There are two types of chronic inflammation; specific and non-specific inflammation.

Chronic Non-Specific Inflammation: Characterized by non-specific inflammatory cell infiltration e.g. Chronic osteomyelitis.

Chronic Granulomatous Inflammation: Characterized by formation of granuloma. E.g. Tuberculosis, Syphilis, Leprosy.

Studies revealed that inflammation is mainly occurred by damage of living tissues that cause by infections of various bacteria, virus, fungi, physical agents. Main inflammatory response seen is to localize and remove damaging agents; secondarily, take away accumulated components of damaged tissue that show cumulative effect of healing of hampered tissues, organs, or system.

Inflammatory inhibitory action Mechanisms of actions of medicinal plants as follows:

- Inhibition of 15-Lipoxygenases (LOX)

Enzymes groups of Lipoxygenase (5, 8, 12, and 15 LOX) having main action in different inflammatory conditions. 15-LOX Isomeric enzyme mainly responsible of leukotrienes synthesis by arachidonic acids which is major mediator of various pro-inflammatory cytokines. Inhibition of synthesis of leukotrienes by 15-LOX help in action.

- Inhibition of NOS

Flavonoids from plant sources inhibit nitric oxide (NO) production, thereby down regulating the expression of iNOS. Flavone, amino-substituted flavones also reported as inhibitor of NO production.

- Inhibition of COX

Flavonoids (polyphenols group) act on prostaglandins biosynthesis. Mainly 2 known commonly isomeric forms of COX i.e COX-1 and COX-2. Herbal derived compounds act in the same and showing the inflammatory inhibitory action.

- Phospholipase A2 Inhibition

Arachidonic acid a precursor of the eicosanoids released from the membrane lipids by phospholipase A2, that initiate synthesis of leukotrienes, thromboxanes, and prostaglandins. Stoppage phospholipase, therapeutic agent, that blocks COX and LOX pathways in the arachidonic cascade that observed as effective in inflammatory conditions. Quercetin is also a phospholipase A2 inhibitor.

- Pro-inflammatory cytokines Inhibition

Flavonoids also have role in regulating pro-inflammatory cytokines by either straight away or by induce the synthesis of cellular adhesion molecules or other cytokines

- Pro-inflammatory gene expression Modulation

Herbs and its derived compounds affecting cellular regulation are different protein kinases engaged in one transduction including protein kinase C and mitogen-activated protein kinase. Inhibition of these enzymes, results in regulation of DNA-binding capacity of transcription factors such as nuclear factor-kappa B or activator protein-1, thereby controlling the expression rate of the target gene.

3. MATERIALS & METHOD

- Literary data was collected from Ayurvedic classics, various modern textbooks, dissertations, scientific journals, electronic data etc.
- Plant materials roots, leaves and stem barks of Bilwa, Agnimanth and Gambhari were collected from Narsingpur area, Belagavi and Patala and Shyonak were collected from Rahuri area Maharashtra as per standard operative procedure given by National-Medicinal-Plants Boards New Delhi
- Kashayas of individual plant parts and their combinations were prepared in Department of Rasashastra and Bhiashajya Kalpana KAHER`'s Shri. B.M.K. Ayu. College Belagavi.
- Analytical study of plant parts and kashayas of individual plant parts and their combinations were carried out in AYUSH permitted ASU-DTL of CRF at KAHER`'s Shri. B.M.K. Ayu. college, Belagavi.
- HPTLC Analysis of kashayas of selected plant parts individual and their combinations were done at Natural remedies Bangalore
- Quantitative phytochemical studies were carried-out at Natural remedies Bangalore.
- Acute and Sub acute anti-inflammatory studies were carried out in animal experimentation laboratory of KAHER`'s Shri. B.M.K. Ayurved Mahavidyalaya, Belagavi.

Selection of plants and parts:

- 1) Five perennial plants selected for the study are Bilwa(*Aegle marmelos* (L.) Corr.), Agnimanth (*Clerodendron phlomidis* L.f.), Shyonak (*Oroxylum indicum* L) Vent.), Patala (*Stereospermum suaveolens* (Rox.) DC.) and Gambhari (*Gmelina arborea* Linn.)
- 2) The parts selected for the study are roots, stem bark and leaves.
- 3) Hence roots, stem bark and leaves of Bilwa, Agnimanth, Shyonak, Patala and Ganbhari were taken for the study.

3.1 Collection of plant parts⁸⁶⁻⁸⁷

All plant parts were collected as per Guidelines of National Medicinal Plants Board.

(Photo Plate No.1)

- i) Roots were collected in the month of May 2016 (Grishma Ritu).
- ii) The stem barks in the month of September 2016 (Sharad Ritu)
- iii) The leaves in the month of July 2016 (Varsha Ritu)

Bilwa, Agnimanth and Gambhari plant parts were collected from natural habitat, Belagavi, Karnataka. Patala and Shyonak plants parts were collected from natural habitat, Rahuri, Maharashtra as per National Medicinal Plants Boards Guidelines.

3.1.1 Collection procedure:(Guidelines of national medicinal plants board)

a) Stem bark:

Stem bark of selected plants were collected in Sharad ritu (September). Stem barks collection was done from mature branches by stripping longitudinally partially along the length of stem without disturbing tissue (xylem and phloem) . Then stem bark cut into appropriate sizes and dried under sunlight.

b) Leaves:

The leaves of selected plants were collected in varsha rutu (July). The leaves were collected from herbaceous plants. The plants leaves were not ripped off totally. Some percentage of leaves left for normal physiological processes. Leaves turned pale, infected, deficient and immature were excluded. Collected leaves were initially dried under sunlight then shifted to shade for complete drying.

c) Roots:

The roots of selected plants were collected in Ghrishma rutu i.e. in the month of May roots were collected with minimum required digging with use of suitable tools. Collected roots thoroughly washed and cut into appropriate sizes and dreind under sunlight .

3.2 Quality assessment of plant parts:

3.2.1 Identification and authentication^{22-26,29-44}: (Annxure-1)

Plants and collected plants parts were indentified and authenticated by experts, Central Research Facility, ASU Drug testing Lab. Shri. B.M. K. Ayu. College of KAHER`s Belagavi.

Voucher no: CRF/auth/260-74/2016. Plants and their parts were identified and authenticated on the basis of pharmacopeia standards, floras and Dravyaguna text book.

3.2.2 Macroscopic study⁸⁸: (Photo Plate No.2-4)

The macroscopic study refers to the physical evaluation of the plant materials in terms of colour, odour, shape, surface, fracture, etc.

3.2.3 Microscopic study⁸⁸: (Photo Plate No. 5-9)

Procedure adopted for Examination of Plant parts:

1. Wet samples were cut transversely of appropriate sizes and boiled in a test tube for about 1-3mins
2. Prepared transverse sections were placed on slide
3. Chloral Hydrate was added.
4. Phloroglucinol Five to ten drops and concentrated Hydrochloric acid single drop was added on the section mounted slide.
5. The excessive stain was washed out with acidified alcohol then covered with cover slip.
6. Observed under NIKON MOCRISCOPE with magnification 100x, 200x and 400x

3.3.1 Physicochemical analysis of plant parts⁸⁹: (Ayurvedic Pharmacopeia of India)

a) Foreign Matter:

Procedure:

- Plant material was weighed (100 gm) .
- Spread it out in a thin layer over glass slab.
- Sample was inspected with the unaided eye otherwise with the use 6X lens.
- All visible foreign organic matter completely separated manually.
- Calculate percentage of foreign matter was calculated.

Calculation:

$$\text{Foreign matter \%} = \frac{\text{Weight of foreign matter} \times 100}{\text{Weight the sample (Plant material)}}$$

b) Total Ash Value Estimation:

Procedure

- Coarse sample (2g), was taken in a previously weighed crucible,
- Crucible was incinerated not the exceeding 450 °C, till free from carbon
- Crucible was cooled, and weighed.
- Total ash content of air-dried material was calculated.

Calculation:

$$\% \text{ Total Ash} = \frac{\text{Weight of Ash} \times 100}{\text{Sample weight (Plant material)}}$$

c) Acid insoluble ash:

- Total ash was boiled in 2M hydrochloric acid (25 ml) for 15 min on water bath, then filtered through ashless filter paper.
- Collected insoluble ash on ashless the filter paper then washed by hot water.
- Filter paper in crucible was ignited in a furnace for 1 hour.
- Crucible was cooled in desiccators and then weighed
- Acid insoluble ash was calculated by following formula

Calculation:

$$\% \text{ Acid insoluble ash} = \frac{\text{Ash Weight} \times 100}{\text{Sample Weight (Plant material)}}$$

d) Water soluble extractive:

- Air dried coarse powder (5 gm) was taken
- Then add chloroform water (100ml) of prescribed strength in conical flask
- 25 ml filtrate Evaporate to dryness in evaporating dish (Previously weighed).
- Removed water part at 105 °C and cool then weigh the residue
- Calculate the percentage of Water soluble extractive following formula

Calculation:

$$\text{Water soluble extract} = \frac{\text{Residue Weight} \times 100}{\text{Sample Weight(Plant material)}}$$

Alcohol Soluble Extractive:

Procedure:

- Air dried coarse powder (5gm) was taken .
- Ethanol(100 ml) was added, shaken for 6 hrs and allowed to stand for 18 hrs
- Evaporated of the filtrate in evaporating dish.
- Removed alcohol part at 105⁰C and cool then weigh the residue
- Alcohol soluble extractive percentage Calculated as follows

Calculation:

$$\text{Alcohol soluble extract} = \frac{\text{Residue Weight} \times 100}{\text{Sample Weight (Plant Material)}}$$

3.3 Preliminary Phytochemical Screening of plant parts⁹⁰:

Water soluble and Alcohol soluble Extracts were used for phytochemical screening (Practical pharmacognosy).

The following Phytochemicals screened:

- Carbohydrates:
- Reducing Sugars:
- Monosaccharides:
- Hexose Sugars:
- Proteins:
- Amino Acids:
- Tannins and Phenolic Compounds:
- Steroids:
- Cardiac Glycosides:
- Anthraquinone Glycoside:
- Flavonoids:
- Pentose Sugar:
- Alkaloid

3.4 Preparation of Kashayas(Aqueous Extract)⁹¹: (Sharangdhar Madhyam

Khanda2/1) (Photo Plate No. 10)

- Kashaya(Aqueous Extracts) was prepared by mixing one part of coarse powder of drug with sixteen parts water, boiled and reduced to 1/8th portion (Sha Ma 2/1).
- Single drug coarse powder of all plant parts was prepared in pulverizer (Clit Mill – 7.5 HP Motor) with mesh size 40-60.

- Combinations of plants coarse powder of roots, stem barks and leaves of Bilwa, Agnimatha, Shyonak, Patala and Gambhari was prepared by mixing in equal proportion of individual drugs coarse powders.

The following are the individual coarse powders

1. Bilwa root coarse powder
2. Agnimanth root coarse powder
3. Patala root coarse powder
4. Shyonak root coarse powder
5. Gambhari root coarse powder
6. Bilwa stembark coarse powder
7. Agnimanth stembark coarse powder
8. Patala stembark coarse powder
9. Shyonak stem bark coarse powder
10. Gambhari stem bark coarse powder
11. Bilwa leaves coarse powder
12. Agnimanth leaves coarse powder
13. Patala leaves coarse powder
14. Shyonak leaves coarse powder
15. Gambhari leaves coarse powder

The following are the prepared combination coarse powders

1. Selected plants Roots Coarse powder (BPR)
2. Selected plants stembark Coarse powder (BPS)
3. Selected plants Leaves Coarse powder (BPL)

Procedure of Kashaya preparation:

➤ Soaking:

- 100 gm coarse powder of test drug was taken in stainless steel vessel
- Potable water (1600 ml) was added .
- Kept for soaking for overnight

➤ Boiling

- Vessel containing soaked mixture was boiled on gas burner
- Boiling was done on moderate fire with intermittent stirring.
- Boiling was done till water reduced to 1/8th portion (200 ml)

➤ Filtering and storage

- Cooled Kashaya was filtered.
- Filtrate was stored in a sterilized vessel.

Note: Total single 15 kashayas and 3 Plant parts combination kashayas were prepared.

Table No. 8 Test Drug Kashayas used in study – Total 18

Test Drug	Roots	Stem Barks	Leaves
Bilwa	Root (BR)	Stem bark (BS)	Leaves (BL)
Agnimanth	Root (AR)	Stem bark (AS)	Leaves (AL)
Patala	Root (PR)	Stem bark (PS)	Leaves (PL)
Shyonak	Root (SR)	Stem bark (SS)	Leaves (SL)
Gambhari	Root (GR)	Stem bark (GS)	Leaves (GL)
Combinations	Bhruhatpanch roots (BPR)	Bhruhatpanch Stem bark (BPS)	Bhruhatpanch Leaves (BPL)

3.5 Quality assessment of kashayas⁹²: (PROTOCOL FOR TESTING ASU Drugs published by Ministry of AYUSH)

3.5.1 Organoleptic evaluation: Evaluation done by sensory profiles refers to observation by colour, odour and taste.

3.5.2 Physicochemical study of Kashaya:

Total Solids:

- Specified quantity of the kashaya was weighed in previously weighed dish.
- Tared dish was placed on water bath, to remove water portion
- Heated on a water bath till the residue becomes dry.
- Dried in an oven at at 105°C.
- Cooled in desiccator and weighed

Calculation:

$$\text{Total solids} = \frac{\text{Residue weight} \times 100}{\text{Sample Weight}}$$

Specific Gravity:

- Dry empty pycnometer with stopper was weighed
- Distilled water was filled in pycnometer then, inserted the stopper on it, and air bubbles were removed by tapping.
- Dried all the sides of pycnometer and then weighed the full pycnometer.
- Weight of the water was measured
- Same procedure was repeated for the kashaya.

Calculation:

$$\text{Specific Gravity} = \frac{\text{Wt of the kashaya}}{\text{Wt of the Water}} \times 1$$

pH Value: Values are reported in results.

- Sample was poured into a 100 ml beaker.
- pH electrode was carefully immersed. pH of Kashaya was noted.

3.5.3 Preliminary phytochemical Study⁷⁹: same test was done for plant material analysis and observations were recorded.

3.6 Quantitative phytochemical analysis of kashayas: (Analysis was done at Natural Remedies Bangalore)

3.6.1 Total tannins and phenolic content Tannic acid as reference standard by UV Spectroscopy method⁹³

a. Standard Preparation: Tannic acid (100 mg) dissolved in 50ml of 50%v/v aqueous methanol in sonication, cooled and diluted to 100ml with 50%v/v aqueous methanol. 5ml of this solution was pipetted to a 50ml volumetric flask and volume was made up to 50ml with water.

b. Sample preparation Kashaya: Kashaya liquid (300 mg) was dissolved in 50% v/v aqueous methanol either by sonicating or by heating, cool and make to 100ml with 50% v/v aqueous methanol in volumetric flask. Further diluted 5ml to 50 ml with water.

Colour development: Standard preparation (5 ml) and 5ml of sample were taken in different 100ml volumetric flask. 40ml of water, 5ml of Folin's reagent 10ml saturated solution of NaCO₃ solution were added. Allowed for 30 minutes. Volume was made up, allowed to stand for 20 mins. Read in spectrophotometer at 750nm. Calculated the content using calibration curve or by applying following formula.

Calculation :

Sample(kashsya)

$$\frac{\text{absorbance}}{\text{Standard absorbance}} = \frac{\text{X Standard weight.} \times \text{Sample(Kashay)dilution} \times \text{Purity}}{\text{X Standard dilution} \times \text{Sample(Kashsya) weight}}$$

3.6.2 Estimate the quantity of Total flavonoids content Quarcetin as reference standard by HPLC method a HPLC Analysis for Total Flavonoids⁸³

Chromatographic study conditions:

Mobile phase taken:

- 1) (Solvent A): Anhydrous potassium dihydrogen orthophosphate (KH₂PO₄) (0.136 g) was dissolved in 900 ml of HPLC grade water and orthophosphoric acid (0.5ml) was added . Volume was made up to 1000ml with water, filtered through 0.45 membrane.

(Solvent B) taken Acetonitrile

Time (min)	Buffer Value	Acetonitrile	Value
0.01	A.Conc	B.Conc	10
18.0	A.Conc	B.Conc	15
25.0	A.Conc	B.Conc	25
28.0	A.Conc	B.Conc	45
35.0	A.Conc	B.Conc	85
40.0	A.Conc	B.Conc	35
45.0	A.Conc	B.Conc	10

Column

- i) Col No: Hibar 100-4.6 RP-18e
- ii) Phenomenex- Luna 5: C-18(2) Size: 100x2.50mm.

Detector : Photo diode array detector or UV

Wave length : 370 nm

Flow rate : 0.4 ml/min

Injection volume : 5: 1

Standard preparation:

- Quercetin (10 mg) was dissolved in 40 ml of methanol, sonicated for three minutes, volume was made up to 100ml with methanol.

Sample preparation:

- Kashaya sample (2 gms) was dissolved in 7 ml of the methanol by sonicating and volume was made up to 10 ml by adding methanol then filtered through 0.45 μ membrane filter.

Calculate the Total Flavonoid content by using below formula:

Sum of major peak area of Kashaya	\times	standard Weight (mg)	\times	Sample(Kashaya) dilution (ml)	\times	(%)Purity of standard
Area of the standard		Dilution of Standard (ml)		Kashaya Weight (mg)		

3.7 HPTLC fingerprinting of Kashayas⁹⁴: (Ref. Photo Plate No. 11-13)

Analysis was done at natural remedies Bangalore. The Kashayas were applied band wise using Linomat V applicator (CAMAG, Muttenz, Switzerland) on a commercial 20 cm \times 10 cm pre-coated HPTLC plate Silica gel 60 F254 (Merck). The application conditions were: carrier gas, nitrogen; syringe delivery speed, 10 s/ μ L; application volume, 10 μ L; bandwidth, 8 mm; space between two bands, 20 mm; distance from bottom, 10 mm. 15 ml of mobile phase consisting of with mobile phase Toluene: Ethylacetate::Acetic Acid: (55:45:2). The result was examined under UV 580 nm by using a UV viewer cabinet (CAMAG).

3.8. Experimental studies:

Animal experimental studies were conducted as follows:

3.8.1 Acute anti-inflammatory study of Kashayas done by Carrageenan-induced rat paw edema

3.8.2 Sub-acute anti-inflammatory study of Kashayas done by Foreign body induced granuloma method

3.8.1 Acute anti-inflammatory study⁹⁵⁻⁹⁷:(Photo Plate No. 14 and Annexure No. 10)

(Carrageenan-induced rat paw edema) Wistar rats of weighing between 150-200 gm were procured from the animal house, J. N. Medical College, a KAHER Belagavi, and animal Experimental study carried out at Animal house of Shri. B.M.K. Ayu. college KAHER Belagavi. All animals kept in the colony cages under the temperature $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$ with 45-55% relative humidity with light and dark cycle of 12/12 hr natural. Animals were acclimatized in laboratory the before beginning of the study. Standard pellet diet fed with free access of fresh water *ad libitum*. Hygienic condition maintained by change the floor bed daily. The study protocol approved by Committee of Institutional Animal Ethics (BMK/IAEC/Res-06/2009 Dated: 19/12/2009). Then animals divided into 20 groups and marked

Table no. 10 Animal groups for Carrageenan induced acute anti-inflammatory study

Group Number	Drug	Details of Intervention
Group 01	Control group:	Water with gum acacia
Group 02	Standard group	Ibuprofen
Group 03	Bilwa kashaya	Root Kashaya
Group 04		Leaf Kashaya
Group 05		Stem Bark Kashaya
Group 06	Agnimanth Kashaya	Root Kashaya
Group 07		Leaf Kashaya
Group 08		Stem Bark Kashaya
Group 09	Patala Kashaya	Root Kashaya
Group 10		Leaf Kashaya
Group 11		Stem Bark Kashaya
Group 12	Shyonaka kashaya	Root Kashaya
Group 13		Leaf Kashaya
Group 14		Stem Bark Kashaya
Group 15	Gambhari kashaya	Root Kashaya
Group 16		Leaf Kashaya
Group 17		Stem Bark Kashaya
Group 18	Bhruhatpanch Leaves kashaya	Combination of Leaves
Group 19	Bhruhatpanch stembarks	Combination of stem barks
Group 20	Bhruhatpanch roots Kashaya	Combination of roots

Dose:

- Therapeutic dose of kashaya: 48 ml (1 pala)
- Therapeutic dose of Ibuprofen: 400 mg
- Dose for animal was calculated by using Paget`s and burner`s table

Grouping and Interventions:

- All 20 groups' animals starved overnight given with water previous day of experiment. First group, Control group received water orally, Group 2 received standard drug Ibuprofen; Group 3 to 20 received kashaya of selected plant parts and their combinations.

Study Design:

- A circular marking was done on the paw (at the malleolus) of right leg of all animals to facilitate uniform dipping in mercury of plethysmograph.
- Test drug and Standard drug was administered 60 minutes before induction of inflammation.
- Inflammation induction by injecting 1% carrageenan 0.05 ml in to right paw.
- The paw edema volume 20 groups' animals were measured through plethysmograph by mercury displacement procedure at 0hr- immediately after injecting carrageenan.
- Same procedure repeated at 0.5 hr, 1hr, 2hr, 3hr, 4hr and 5hr. The difference between 0 hour and then subsequent reading of animal paw was taken as the actual edema volume.

All animals were observed for the duration of 5 hrs during acute anti-inflammatory study.

Assessment parameters: Paw volume measurement from 0 to 5hr.

Data analysis:

Statistical analysis was done in Prism Graph Pad version 3.2.1 and results expressed as the mean \pm SEM. Differences among mean of the groups were calculated by one way ANNOVA followed by Tukey`s Multiple compression test. Statistically significance considered as $P < 0.05$.

$$\text{Inhibition Percentage Paw edema}^{64}: \frac{\text{Control group Mean} - \text{Treated group Mean} \times 100}{\text{Control group Mean}}$$

3.8.2 Sub-acute anti-inflammatory study: Foreign body induced granuloma method^{95,98,99} (Photo Plate No. 15-19 & Annexure no. 10)

Wistar rats of weight range of 150-200 gm procured by animal house of Shri. Raghvendra Enterprises Bengaluru, Govt. of India reg #841/b/04/CPCSEA Karnataka and The study was conducted at the Animal house of Shri. B.M.K. Ayu. college KAHER Belagavi. Then all animals kept in the colony cages under the temperature $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$ with 45-55% relative humidity with light and dark cycle of 12/12 hr natural.

Animals were acclimatized in laboratory the before beginning of the study. Standard pellet diet fed with free access of and fresh water *ad libitum*. Hygienic condition maintained by change the floor bed daily. The study protocol approved by the Committee for Institutional Animal Ethics (BMK/IAEC/Res-17/2018-01 Dated: 13/01/2018).

Table No. 11 Experimental Animal Groups for Cotton pellet granuloma sub-acute anti-inflammatory Experimentation

Group Number	Drug	Details of Intervention
Group 01	Control group	With Distilled water and food
Group 02	Standard group	With Ibuprofen
Group 03	Bilwa Kashaya	Root Kashaya
Group 04		Stem bark Kashaya
Group 05	Agnimanth kashaya	Root Kashaya
Group 06		Stem bark Kashaya
Group 07	Patala Kashaya	Root Kashaya
Group 08		Stem bark Kashaya
Group 09	Shyonaka Kashaya	Root Kashaya
Group 10		Stem bark Kashaya
Group 11	Gambhari Kashaya	Root Kashaya
Group 12		Stem bark Kashaya
Group 13	Bhruhatpanch stembarks Kashaya	Combination of stem barks
Group 14	Bhruhatpanch roots Kashaya	Combination of roots

Dose:

- Therapeutic dose of kashaya: 48 ml (1 pala)
- Therapeutic dose of Ibuprofen: 400 mg
- Dose for animal was calculated by using burner's table.

1) Sub-acute Anti-inflammatory study design:

Aseptic precautions and safety were taken throughout the procedure in Sub acute anti-inflammatory study

- All rats were anaesthetized by giving IV injection of Sodium thiopental at dose 0.1 ml/ 200 gm before inducing inflammation.
- Then clipping hairs at axillae and groin, under the anesthetic condition.
- Sterile two cotton pellets of weight 10mg and sterile two grass pith (25mmX2mm) were implanted subcutaneously by making small incision at axillae and groin.

- Wound was sutured.
- Animals were kept in cage after the recovery from an anesthesia individually.
- Test drug (Kashaya) was administered Twice daily from the day of implantation of foreign
- Body to animals of Group 3 to 14 and Standard drug (Ibuprofen) was administered twice daily to animals of group 2. Rats of group 1 were feeded with water & food.
- Treatment was continued daily for ten days.
- 11thday, all rats sacrificed and cotton pellet and grass pith was collected in sterilized container.
- The grass piths preserved in the 10% formalin for Histopathological studies after the processing.
- Processing of cotton pellet and grass pith
- The pellets were freed from extraneous tissue, dried overnight at 60°C to record their dry weight.
- Then Net granuloma formation calculated by subtracting cotton pellets initial weight of (10mg) from the recorded weight.
- Mean dry weight of granuloma treated under Kashaya, Control and standard group calculated, then expressed as mg/100gm of body weight.

Assessment parameters:

- 1) Dry Granuloma weight
- 2) Histopathological observations of granuloma tissue, Stomach and Liver

Data analysis:

Statistical analysis was done in Prism Graph Pad version 3.2.1 and results were expressed as mean \pm SEM. Differences among mean of the groups were calculated by one way ANNOVA test followed by Tukey`s Multiple compression test. Significance considered $P < 0.05$.

Inhibition Percentage:
$$\frac{\text{Control group Mean} - \text{Treated group Mean}}{\text{Control group Mean}} \times 100$$

4. OBSERVATIONS AND RESULTS

Observations & Results of Plant parts

4.1 Quality assessment of **Plant parts**:

4.1.1 Macroscopic observations of collected plant parts:

4.1.2 Microscopic observations of collected plant parts:

4.1.3 Physicochemical Analysis results of Collected plant parts:

4.2 Phytochemical Analysis results of Collected plant parts:

Observations and results of Kashayas

4.3 Quality assessment of together plants parts **Kashaya**:

4.3.1 Organoleptic evaluation observations:

4.3.2 Physicochemical analysis results:

4.4 Phytochemical analysis observations of collected plant parts Kashayas:

4.5 Quantification of Phytochemicals:

4.5.1 Total Tannin & Phenolic content (as Tannic Acid marker by UV Spectroscopy analysis)

4.5.2 Total Flavonoids (as Quercetine by HPLC analysis).

4.6 HPTLC finger printing of Kashayas.

Observations and results of Experimental studies

4.7 In vivo experimental study

4.7.1 Acute anti-inflammatory study of Kashayas (**Carrageenan-induced rat paw edema**)

4.7.2 Sub-acute anti-inflammatory study of Kashayas (**Foreign body induced granuloma**)

4.1 Quality assessment of plant parts:

4.1.1 Macroscopic observations of Leaves, Roots and Stem barks collected plant parts:

Table no.1 Macroscopic observations of “Leaves”(Photo Plate No. 2)

Characters	Bilwa	Agnimanth	Patala	Shyonak	Gambhari
Colour	<i>Pale green</i>	<i>Pale green</i>	<i>Green</i>	<i>Green</i>	<i>Pale green</i>
Odour	<i>Aromatic</i>	<i>Odourless</i>	<i>Odourless</i>	<i>Odourless</i>	<i>Odourless</i>
Taste	<i>Astringent</i>	<i>Bitter</i>	<i>Bitter</i>	<i>Bitter</i>	<i>Bitter</i>
Shape	<i>Ovate</i>	<i>sub orbicular</i>	<i>Elliptic</i>	<i>Triangular ovate</i>	<i>Cordate ovate</i>
Venation	<i>Reticulate</i>	<i>Reticulate</i>	<i>Reticulate</i>	<i>Reticulate</i>	<i>Palmate</i>
Margin	<i>Entire</i>	<i>Dentate</i>	<i>Serrulate</i>	<i>Entire</i>	<i>Entire</i>
Touch	<i>Smooth</i>	<i>Smooth</i>	<i>Glabrous</i>	<i>Smooth</i>	<i>Smooth</i>

Table no.2 Macroscopic observations of “Roots” (Photo Plate No. 3)

Characters	Bilwa	Agnimanth	Patala	Shyonak	Gambhari
Colour	<i>Greenish yellow</i>	<i>Yellowish brown</i>	<i>Brownish</i>	<i>Brownish</i>	<i>Yellowish</i>
Odour	<i>Odourless</i>	<i>Odourless</i>	<i>Odourless</i>	<i>Odourless</i>	<i>Odourless</i>
Taste	<i>Bitter astringent</i>	<i>Bitter astringent</i>	<i>Bitter astringent</i>	<i>Bitter astringent</i>	<i>Bitter astringent</i>
Touch	<i>Rough</i>	<i>Rough</i>	<i>Rough</i>	<i>Rough</i>	<i>Slightly Rough</i>
Fracture	<i>Tough</i>	<i>Tough</i>	<i>Tough</i>	<i>Tough</i>	<i>Tough</i>

Table no. 3 Macroscopic observations of “Stem Barks” (Photo Plate No. 4)

Characters	Bilwa	Agnimanth	Patala	Shyonak	Gambhari
Colour	<i>Ash</i>	<i>Light grey</i>	<i>Dark brown</i>	<i>Greyish brown</i>	<i>Light ash</i>
Odour	<i>Aromatic</i>	<i>Odourless</i>	<i>Odourless</i>	<i>Odourless</i>	<i>Odourless</i>
Taste	<i>Astringent</i>	<i>Bitter</i>	<i>astringent</i>	<i>Bitter</i>	<i>Bitter</i>
Touch	<i>Rough</i>	<i>Rough</i>	<i>Rough</i>	<i>Smooth</i>	<i>Smooth</i>
Fracture	<i>Plain</i>	<i>Fibrous</i>	<i>Spiny</i>	<i>Plain</i>	<i>Plain</i>

4.1.2 Microscopic studies observations of collected plant parts: (Photo Plate No.5)

1) Bilwa:

Leaf: Transverse section of Bilwa Leaf showed:

Epidermis (Outer and inner epidermis) with round to oval cells through striated cuticle. Calcium oxalate crystals clusters observed in groups of fibres. Multilayered collenchyma observed above lower also below the upper epidermis.

Xylem phloem observed in Midrib. Paracytic stomata and covering trichome observed in epidermis. Lignified pitted xylem were observed.

The spongy parenchyma present and palisade cells were observed.

Stem bark: Transverse section of Bilwa stem bark showed

Presence of lignified cork stratified, loosely lengthened cell, Cortex containing of parenchyma, with dense walled lignified stone cells groups.

Fibres, sieve elements, crystal were present in phloem.

Roots: Transverse section Bilwa root showed

Golden yellow contents in slighter few layers of larger cells. Cortex observed parenchymatous cells in polyhedral shape thick walled lignified stone cells.

Phloem observed the fibres, parenchyma, fibres crystals; phloem fibres, fibres with presence of prismatic crystal of ca-oxalate; cambium in rows; secondary xylem fibres, vessels, tracheid's & xy-parenchyma.

Bordered pitted Vessels; fibres taking rectangular xylem parenchyma; medullary rays taking prismatic ca-oxalate presence; starch grains simple.

2) *Agnimanth* :(Photo Plate no.6)

Leaf: Transverse section *Agnimanth* leaf showed

Both epidermis showed hairs multicellular uniseriate. Upper palisade contains Mesophyll and parenchyma in lower.

Collenchyma cells were present below the parenchyma tissue. Vascular bundles Covers were present.

The vascular bundle was present in upper epidermal layer.

Stem bark: Transverse section *Agnimanth* stem bark showed

The Epidermis with thick cuticle with single. Cortex had four to five layered comprises polygonal cells in varying in size. Uneven shape size phloem patches were seen. Vascular bundles were seen in stellar region.

The endodermis defines the cortex of stellar zone by a circular line of cambium layer.

Roots: Transverse section of *Agnimanth* root showed

Exfoliating cork, showing loosely extended, thick-walled cells. Cortex composed with round-oval cells of parenchymatous with calcium oxalate crystal. Endodermis with non-lignified, thick-walled rounded parenchymatous cells.

Phloem showed presence of parenchymatous cells with some of containing calcium oxalate crystal. Xylem was lignified pitted vessels.

3) *Patala*: (Photo Plate No. 7)

Leaf: Transverse section *patala* leaf showed

Thick Epidermis. At certain places, the epidermis was folded inward starting shallow pits. Within the pits there were seen bell shaped glandular trichomes.

Some of the sub epidermal cells are dilated forming circular space in which there were occurrence of large club shaped crystalline body. The midrib was shield shaped and vascular system had bowl-shaped.

Phloem packed around xylem which was further surrounded by thick walled lignified fibres.

Stem bark: Transverse Section patala stem bark showed

Cork after the cortical cells cambium at phloem. Patches of fiber were seen distributed throughout the cortex. Cork having lignified cells with the thick wall.

Cells shape was squarish. Cortex region was containing thin wall parenchymatous having intercellular spaces. Outer cortex was containing collenchymatous pericyclic fibre patches. Phloem cells were efficiently arranged. Phloem fibres were seen arranged in loop form.

Cambium was present. Xylem elements were lignified. Uni or biseriate medullary rays were with starch grains. Vessels were seen in with round in shape.

Roots: Transverse section patala root showed

Thick periderm which consists of cork, phellogen and phelloderm. The vascular cylinder in central position and composed of the outer thick cylinder of the secondary phloem & centrally compacted secondary xylem.

Secondary phloem contains sieve elements & parenchyma cells whereas secondary xylem consuming compacted cluster of fibres and vessels. The vessels are circular & elliptical in shape.

Vessels with thick lignified walls. Xylem fibres present in ground parenchymatous cells of xylem cylinder.

4) Shyonak (Photo Plate No.8)

Leaf: The transverse section of leaf showed

Dorsi ventral nature. Uniseriate, multicellular trichomes were observed on both surfaces. Irregular shaped epidermal cells were present at outermost layer.

In midrib region, epidermal cells were followed by collenchyma cells, ground tissue and vascular bundle. The zone of parenchyma cells was wider below the bundle. Prisms of calcium oxalate crystals were observed in ground tissue portion.

In lamina portion, the upper epidermis was followed by columnar and cylindrical palisade layers. It was continued with loose spongy parenchyma cells. The mesophyll was traversed with separated strands of small vascular bundles.

Stem bark: Transverse section Shyonak stem bark showed

Outer most cork cells. Cork cells were arranged radial rows, suberized, few cells get lignified and seen like stone cells.

Cork followed cork cambium were present. Phelloderm region vary narrow and were thick with stone cells and fibres in this region. Stone cells were smaller in size as compared to phloem region.

The phloem was divided into outer and inner region. In outer phloem of stone cells were present in large groups and fibres in small groups. While in inner phloem fibres were present in large groups and stones cells in small groups. Scleremchyma was observed in inner phloem region.

Medullary rays were multiseriate with a circular crystals Starch grains, were present in the secondary phloem region.

Roots: The transverse section shyonak Root showed

Cork cells containing reddish-brown material; the secondary cortex with oval shaped parenchyma cells; lignified stone cells, with different shapes & sizes, phloem

with sieve tubes, parenchyma, fibres and groups of stone cells; xylem consists of xylem vessels which are differing in sizes, present either single or in group; rays of xylem were wide; wide lumen of the fibres and pointed shape tips, and tracheids present.

5) Gambhari:(Photo Plate No.9)

Leaf: Transverse section of leaf showed

Rectangular shaped upper epidermal cells. Simple covering and glandular trichomes seen. Multicellular, uniseriate covering trichomes with blunt apex were seen.

Spongy parenchyma and palisade differentiate the mesophyll compact single layered Palisade cells were seen. Spongy parenchyma with many layered, loosely arranged with intercellular spaces, without the presence of cluster crystals.

Lower epidermis and upper epidermis were identical. Collenchyma were seen below upper and above lower epidermis.

Central region of cortical parenchyma was a collateral bundle. Patch of Pericyclic fibres covered the phloem.

Roots: Transverse section of root showed

Rectangular and lignified cork cells. Cork was seen after phellogen. Secondary cortex with thin wall parenchymatous cells, starch grains & oil globules.

Calcium oxalate crystal was seen in cortical parenchyma. Phloem made up of phloem parenchyma along with dispersed sieve tubes. Wood consisted of simple pitted wood parenchyma, xylem vessels and fibres, tracheids and medullary rays.

Wood fibres were with simple pits. Medullary with abundant starch grains and occasionally found pitted.

Stem bark: Transverse section of stem bark showed

Discontinuous periderm, intact epidermis. The cortex contains sclerenchyma elements. Cells had lignified walls and reduced lumen.

Secondary phloem with of narrow, thin walled cells. Phloem rays were less prominent and secondary xylem were thick cylinder, contains wide, circular, thin walled, lignified fibres and xylem rays.

Vessels were broad. Pith with compact parenchyma cells.

4.1.3 Physicochemical Analysis results of Collected plant parts: (Annexure 2)

1) Bilwa:

Table no. 4 showing physicochemical analysis of Bilwa plant parts

Plant parts	Bilwa root		Bilwa stem bark		Bilwa leaf
	Root Result	Root API Standard	Stem bark Result	Stem bark API Standard	
Foreign matter	Nil	NMT 1%	Nil	NMT 1%	Nil
Ash value %	3.04	NMT 6%	6.669	NMT 10 %	7.823
Acid insoluble ash %	0.648	NMT 1%	0.597	NMT 1%	3.227
Water soluble extractive %	10.421	NLT 7%	12.678	NLT 9%	11.451
Alcohol soluble extractive %	9.432	NLT 7%	9.376	NLT 4%	4.544

2) Agnimanth:

Table No.5 Showing physicochemical analysis of Agnimanth plant parts

Plant parts	Agnimanth root		Agnimanth stem bark	Agnimanth leaf
	Root	Root API Standard	Stem bark Result	Leaf Result
Foreign matter	Nil	NMT 2%	Nil	Nil
Ash value %	3.364	NMT 6%	6.485	2.366
Acid insoluble ash %	0.94	NMT 1%	2.227	1.379
Water soluble extractive %	6.947	NLT 5%	7.431	14.843
Alcohol soluble extractive %	5.792	NLT 2%	3.453	12.308

3) Patala:

Table no.6. Showing physicochemical analysis of Patala plant parts

Plants parts	Patala Root		Patala Stem bark		Patala leaf
	Root Result	Root API Std	Stem bark Result	Stem Bark API	Leaf Results
Foreign matter	Nil	NMT 2%	Nil	NMT 2%	Nil
Ash value %	5.035	NMT 8%	2.888	NMT 8%	2.366
Acid insoluble ash %	1.726	NMT 6%	0.149	NMT 1%	1.379
Water soluble extractive %	26.841	NLT 20%	29.136	NLT 25%	14.843
Alcohol soluble extractive %	15.705	NLT 15%	18.862	NLT 12.5%	12.308

4) Shyonak:

Table no. 7. Showing physicochemical analysis of Shyonak plant parts

Plant parts	Shyonak Root		Shyonak stem bark	Shyonak leaf
	Root Result	Root API Standard	Stem bark Result	Leaf Result
Foreign matter	Nil	NMT 1%	Nil	Nil
Ash value %	1.633	NMT 5%	7.462	8.473
Acid insoluble ash %	0.384	NMT 1%	0.696	1.932
Water soluble extractive %	46.172	NLT 42%	10.635	16.456
Alcohol soluble extractive %	29.085	NLT 20%	4.283	5.671

5) Gambhari:

Table no. 8 showing physicochemical analysis of Gambhari plant parts

Plant parts	Gambhari Root		Gambhari Stem bark		Gambhari leaf
	Root Result	Root API Std	Stem bark Result	Stem Bark API Standard	Leaf Results
Foreign matter %	Nil	NMT 2%	Nil	NMT 1%	Nil
Ash value %	3.77	NMT 5%	6.673	NMT 11%	9.653
Acid insoluble ash %	0.244	NMT 0.3%	0.197	NMT 0.3%	1.732
Water soluble extractive %	22.208	NLT 20%	26.129	NLT 23%	8.77
Alcohol soluble extractive %	12.572	NLT 7%	13.274	NLT 8%	6.995

4.2 Phytochemical Analysis results of Collected plant parts: (Refer Annexure 3)

1) Bilwa:

Table no. 9 showing phytochemical analysis of Bilwa plant materials.

Test	Water Extract			Alcoholic Extract		
	Root	Stem bark	Leaf	Root	Stem bark	Leaf
Carbohydrate	+ve			+ve		
Reducing Sugar	+ve			+ve		
Monosaccharaides	+ve			+ve		
Pentose sugar	-ve			-ve		+ve
Hexose Sugar	-ve			-ve		
Protein	+ve		-ve	+ve		
Amino acid	+ve		-ve	+ve		
Steroids	-ve			+ve		
Cardiac Glycosides	-ve			+ve		
Anthraquinone Glycosides	-ve			+ve		-ve
Flavonoids	+ve			+ve		
Alkaloids	-ve			+ve		-ve
Tannins	+ve			+ve		-ve

2) Agnimanth:

Table no. 10 showing phytochemical analysis of Agnimanth plant materials

Test	Water Extract			Alcoholic Extract		
	Root	Stem bark	Leaf	Root	Stem bark	Leaf
Carbohydrate	+ve			+ve		
Reducing Sugar	+ve			+ve		
Monosaccharaides	+ve			+ve		
Pentose sugar	-ve			-ve		+ve
Hexose Sugar	-ve			-ve		
Protein	+ve		-ve	+ve		
Amino acid	+ve		-ve	+ve		
Steroids	-ve			+ve		
Cardiac Glycosides	-ve			-ve		
Anthraquinone Glycosides	-ve			+ve	-ve	+ve
Flavonoids	+ve			+ve		
Alkaloids	-ve			+ve		
Tannins	+ve			+ve		

3) Patala:

Table no. 11 Showing phytochemical analysis of Patala plant materials

Test	Water Extract			Alcoholic Extract		
	Root	Stem bark	Leaf	Root	Stem bark	Leaf
Carbohydrate	+ve			+ve		
Reducing Sugar	+ve	-ve	+ve	+ve		
Monosaccharaides	-ve	+ve		-ve	+ve	-ve
Pentose sugar	-ve			+ve	-ve	+ve
Hexose Sugar	-ve			-ve		
Protein	+ve	-ve	+ve	+ve		
Amino acid	+ve	-ve	+ve	+ve		-ve
Steroids	-ve t			+ve		-ve
Cardiac Glycosides	-ve			-ve		
Anthraquinone Glycosides	-ve			+ve	-ve	+ve
Flavonoids	+ve			+ve		
Alkaloids	-ve			+ve		
Tannins	+ve			+ve		

4) Shyonak:

Table no.12 Showing phytochemical analysis of Shyonak plant materials

Test	Water Extract			Alcoholic Extract		
	Root	Stem bark	Leaf	Root	Stem bark	Leaf
Carbohydrate	+ve			+ve		
Reducing Sugar	+ve		-ve			
Monosaccharaides	-ve	+ve		-ve		
Pentose sugar	-ve					
Hexose Sugar						
Protein	+ve		-ve	+ve		
Amino acid						
Steroids	-ve			+ve		-ve
Cardiac Glycosides	-ve			-ve		
Anthraquinone Glycosides				-ve		+ve
Flavonoids	+ve			+ve		
Alkaloids	-ve			+ve		-ve
Tannins	+ve			+ve		

5) Gambhari:

Table no. 13 Showing phytochemical analysis of Gambhari plant materials

Test	Water Extract			Alcoholic Extract		
	Root	Stem bark	Leaf	Root	Stem bark	Leaf
Carbohydrate	+ve			+ve		
Reducing Sugar	-ve	+ve				
Monosaccharaides	+ve		-ve	+ve		-ve
Pentose sugar	+ve	-ve		-ve		+ve
Hexose Sugar	-ve			-ve		
Protein	+ve			+ve		
Amino acid						
Steroids	-ve			+ve		-ve
Cardiac Glycosides				-ve	+ve	-ve
Anthraquinone Glycosides				-ve	+ve	
Flavonoids	+ve			+ve		
Alkaloids	-ve			-ve	+ve	-ve
Tannins	+ve			+ve		

4.3 Quality assessment of collected plants parts Kashaya

4.3.1 Organoleptic evaluation observations: (Annexure –4)

Table No.14 Showing Organoleptic evaluation observation of Kashayas

Plant		Bilwa	Agnimanth	Patala	Shyonak	Gambhari	Combinations
Root Kashaya	Colour	Brown					
	Odour	Odourless					
	Taste	Astringent			Bitter		
Stem Bark Kashaya	Colour	Brown					
		Odourless					
	Taste	Astringent	Astringent	Bitter	Astringent	Astringent	Astringent
Leaf Kashaya	Colour	Dark Brown	Brown	Light Brown	Brown	Brown	Dark Brown
	Odour	Astringent	Odourless				Charactstic
	Taste	Characteristic	Bitter	Astringent	Bitter	Bitter	Astringent

4.3.2 Physicochemical analysis results (Annexure –4)

Table No.15 Showing Physicochemical analysis of kashayas

Plants Parts	Total Solids	pH	Specific Gravity	Total Solids	pH	Specific Gravity	Total Solids	pH	Specific Gravity
	Root Kashaya			Stem Bark kashaya			Leaf kashaya		
Bilwa	9.632 %	6.07	1.038	9.029%	6.05	1.041	10.231%	5.71	1.043
Agnimanth	5.982%	6.05	1.033	6.076%	6.01	1.042	13.94%	5.81	1.047
Patala	15.231%	5.89	1.048	19.310%	6.01	1.064	17.06%	5.58	1.053
Shyonak	18.172%	5.75	1.042	9.127%	6.03	1.039	13.606%	5.41	1.045
Gambhari	18.409%	5.80	1.061	18.623%	6.05	1.061	8.135%	5.53	1.035
Combinations	18.370%	5.82	1.040	11.120%	5.72	1.037	15.076%	6.03	1.049

4.4 Phytochemical analysis observations of collected plant parts kashayas

(Annexure –5)

Table no. 16 Showing Preliminary Phytochemical Analysis of Kashayas

Parts	CH	RS	MONO	PS	HS	PR	AA	ST	CG	AG	FL	AL	TP
Root													
Bilwa	+ ve			+ve	-ve	+ve		-ve	-ve	+ve	+ ve	-ve	+ve
Agnimanth				-ve									
Patala				+ve									
Shyonak				-ve									
Gambhari									-ve				
BPR				+ve									
Stem Bark													
Bilwa	+ ve			+ve	-ve	+ve		-ve	+ve		+ ve	-ve	+ve
Agnimanth													
Patala													
Shyonak				-ve									
Gambhari									+ve				
BPS				+ve						-ve			
Leaf													
Bilwa	+ ve				-ve	+ve		-ve	+ve		+ ve	-ve	+ve
Agnimanth													
Patala				-ve									
Shyonak													
Gambhari									+ve				
BPL				+ve									

Abbreviations: CH- Carbohydrate, RS: Reducing sugars, MONO: Monosacchrides, PS: Pentose sugars, HS: Hexose sugars, PR: Proteins, AA: Amino Acids, ST: Steroids, GL: Cardiac Glycoside, AG: Anthraquinon Glycosides, FL: Flavonoids, AL: Alkaloids, TP: Tannin & Phenolic Compound

4.5 Quantification of Phytochemicals

4.5.1 Total Tannin and phenolic content (as Tannic Acid marker by UV Spectroscopy analysis)(Annexure –6)

4.5.2 Total Flavonoids (as Quercetine by HPLC analysis)(Annexure –7)

Table no. 17 Showing Total Flavonoids & Tannin Percentage in plants parts kashyas individual and combinations

Drug	Plant Part	Total Tannins Percentage	Total Flavonoids Percentage
Bilwa	Root	0.003	0.19
	Leaf	0.024	0.87
	Stem Bark	0.0005	0.08
Agnimanth	Root	0.001	0.14
	Leaf	0.002	0.26
	Stem Bark	0.001	0.14
Patala	Root	0.001	0.16
	Leaf	0.008	0.77
	Stem Bark	0.002	0.15
Shyonak	Root	0.005	0.30
	Leaf	0.027	0.58
	Stem Bark	0.002	0.21
Gambhari	Root	0.002	0.29
	Leaf	0.02	0.54
	Stem Bark	0.0001	0.16
BPR	Combination of plants Roots	0.004	0.21
BPS	Combination of plants Stem barks	0.001	0.14
BPL	Combination of plants Leaves	0.012	0.71

4.6 HPTLC finger printing of Kashayas(Annexure –8)

Table no. 18 HPTLC fingerprinting- plants parts kashyas individual & Combinations

Plants	Leaf Kashaya		Root Kashaya		Stem bark Kashaya	
	Rf Value	% Area	Rf Value	% Area	Rf Value	% Area
Bilwa	0.01	76.66	0.01	17.16	0.01	33.09
	0.92	11.73	0.50	56.13	0.87	100
	--	--	0.80	26.71	--	--
Agnimanth	0.01	39.94	0.01	7.67	0.03	9.72
	0.15	22.15	0.07	4.85	0.14	11.95
	0.86	37.91	0.8	49.92	0.56	35.57
	--	--	--	--	0.88	42.77
Patala	0.01	82.62	0.01	14.58	0.03	47.88
	--	--	0.06	10.83	0.87	52.12
	--	--	0.28	14.53	--	--
	--	--	0.81	33.71	--	--
Shyonak	0.01	40.61	0.01	48.82	0.02	25.82
	0.1	8.10	0.37	4.78	0.16	9.40
	0.32	25.28	0.82	29.37	0.88	44.62
	0.86	26.01	0.01	21.98	--	--
Gambhari	0.03	60.27	--	--	0.02	55.06
	0.88	39.73	--	--	0.9	44.94
Combination Of respective parts	0.01	89	0.26	3.32	0.04	17.51
	--	--	0.49	22.20	0.14	15.35
	--	--	0.78	22.98	0.87	44.05

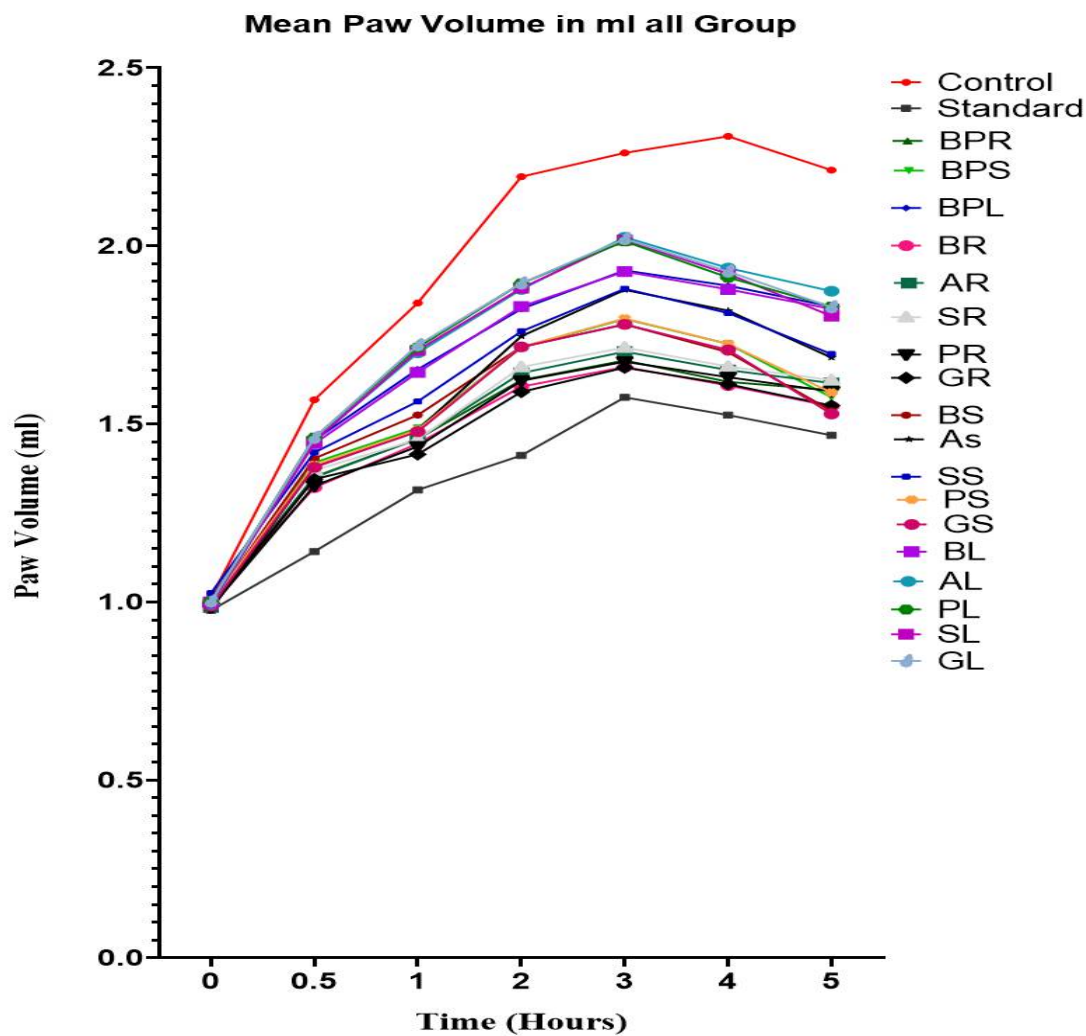
4.7 Animal Experimental study

4.7.1 Acute anti-inflammatory study of Kashayas (Carrageenan-induced rat paw edema)

Table no.19 Showing mean paw volume \pm SEM recorded in carrageenan induced acute inflammatory experimental groups

Group	0 (hr)	0.5 (hr)	1 st (hr)	2 nd (hr)	3 rd (hr)	4 th (hr)	5 th (hr)
Control	1.011 (\pm 0.362)	1.568 (\pm 0.522)	1.84 (0.3705)	2.19 (\pm 0.36856)	2.26 (\pm 0.3534)	2.30 (\pm 0.3270)	2.21 (\pm 0.2076)
Standard	0.9766 (\pm 0.276)	1.141 (\pm 0.019)	1.315 (\pm 0.1945)	1.4116 (\pm 0.0208)	1.575 (\pm 0.1945)	1.525 (\pm 0.2045)	1.46 (\pm 0.0132)
BPR	0.998 (\pm 0.027)	1.35 (\pm 0.023)	1.45 (\pm 0.023)	1.62 (\pm 0.0236)	1.683 (\pm 0.0301)	1.61 (\pm 0.0354)	1.59 (\pm 0.024)
BPS	0.997 (\pm 0.030)	1.39 (\pm 0.1782)	1.491 (\pm 0.153)	1.716 (\pm 0.152)	1.795 (\pm 0.1727)	1.725 (\pm 0.1454)	1.57 (\pm 0.2140)
BPL	1.003 (\pm 0.023)	1.45 (\pm 0.160)	1.65 (\pm 0.0162)	1.82 (\pm 0.1542)	1.931 (\pm 0.0157)	1.888 (\pm 0.1713)	1.83 (\pm 0.1843)
BR	1.033 (\pm 0.025)	1.32 (\pm 0.026)	1.44 (\pm 0.027)	1.60 (\pm 0.0234)	1.66 (\pm 0.024)	1.60 (\pm 0.0230)	1.51 (\pm 0.025)
BS	0.993 (\pm 0.028)	1.40 (\pm 0.027)	1.525 (\pm 0.026)	1.71 (\pm 0.0278)	1.78 (\pm 0.0257)	1.70 (\pm 0.031)	1.50 (\pm 0.029)
BL	1.008 (\pm 0.019)	1.448 (\pm 0.03`)	1.645 (\pm 0.022)	1.83 (\pm 0.0228)	1.92 (\pm 0.0224)	1.93 (\pm 0.022)	1.82 (\pm 0.051)
AR	0.985 (\pm 0.021)	1.35 (\pm 0.021)	1.458 (\pm 0.016)	1.648 (\pm 0.022)	1.70 (\pm 0.0346)	1.65 (\pm 0.029)	1.61 (\pm 0.0288)
AS	0.978 (\pm 0.019)	1.38 (\pm 0.025)	1.48 (\pm 0.027)	1.74 (\pm 0.0204)	1.87 (\pm 0.028)	1.816 (\pm 0.0262)	1.68 (\pm 0.0341)
AL	1.015 (\pm 0.017)	1.45 (\pm 0.028)	1.711 (\pm 0.033)	1.891 (\pm 0.023)	2.056 (\pm 0.032)	1.93 (\pm 0.0245)	1.87 (\pm 0.0254)
PR	0.985 (\pm 0.028)	1.32 (\pm 0.015)	1.4366 (\pm 0.015)	1.62 (\pm 0.0137)	1.67 (\pm 0.0145)	1.63 (\pm 0.0217)	1.59 (\pm 0.0157)
PS	0.996 (\pm 0.012)	1.38 (\pm 0.021)	1.48 (\pm 0.0213)	1.71 (\pm 0.0185)	1.81 (\pm 0.0334)	1.72 (\pm 0.0170)	1.58 (\pm 0.022)
PL	1.006 (\pm 0.025)	1.46 (\pm 0.027)	1.71 (\pm 0.023)	1.89 (\pm 0.0207)	2.013 (\pm 0.0172)	1.915 (\pm 0.0260)	1.83 (\pm 0.0211)
SR	1.006 (\pm 0.011)	1.37 (\pm 0.032)	1.45 (\pm 0.0240)	1.66 (\pm 0.025)	1.715 (\pm 0.016)	1.66 (\pm 0.0174)	1.62 (\pm 0.204)
SS	1.025 (\pm 0.029)	1.42 (\pm 0.024)	1.56 (\pm 0.0174)	1.75 (\pm 0.0213)	1.88 (\pm 0.0178)	1.795 (\pm 0.0131)	1.698 (\pm 0.185)
SL	0.99 (\pm 0.0271)	1.45 \pm (0.026)	1.70 (\pm 0.0238)	1.88 (\pm 0.0162)	2.016 (\pm 0.0158)	1.92 (\pm 0.0177)	1.803 (\pm 0.152)
GR	0.98 (\pm 0.024)	1.34 (\pm 0.019)	1.44 (\pm 0.0149)	1.59 (\pm 0.0205)	1.66 (\pm 0.0185)	1.61 (\pm 0.0147)	1.55 (\pm 0.0256)
GS	0.98 (\pm 0.028)	1.38 (\pm 0.021)	1.47 (\pm 0.0206)	1.71 (\pm 0.0183)	1.78 (\pm 0.0167)	1.71 (\pm 0.0224)	1.51 (\pm 0.0162)
GL	1.00 (\pm 0.030)	1.46 (\pm 0.021)	1.72 (\pm 0.0208)	1.89 (\pm 0.023)	2.02 (\pm 0.0259)	1.928 (\pm 0.023)	1.82 (\pm 0.0196)

Graph no.1 Showing Mean paw volume recorded in carrageenan induced acute anti-inflammatory study in all experimental groups



a) Statistical analysis of paw volume of Control, Standard, BPR, BPS & BPL

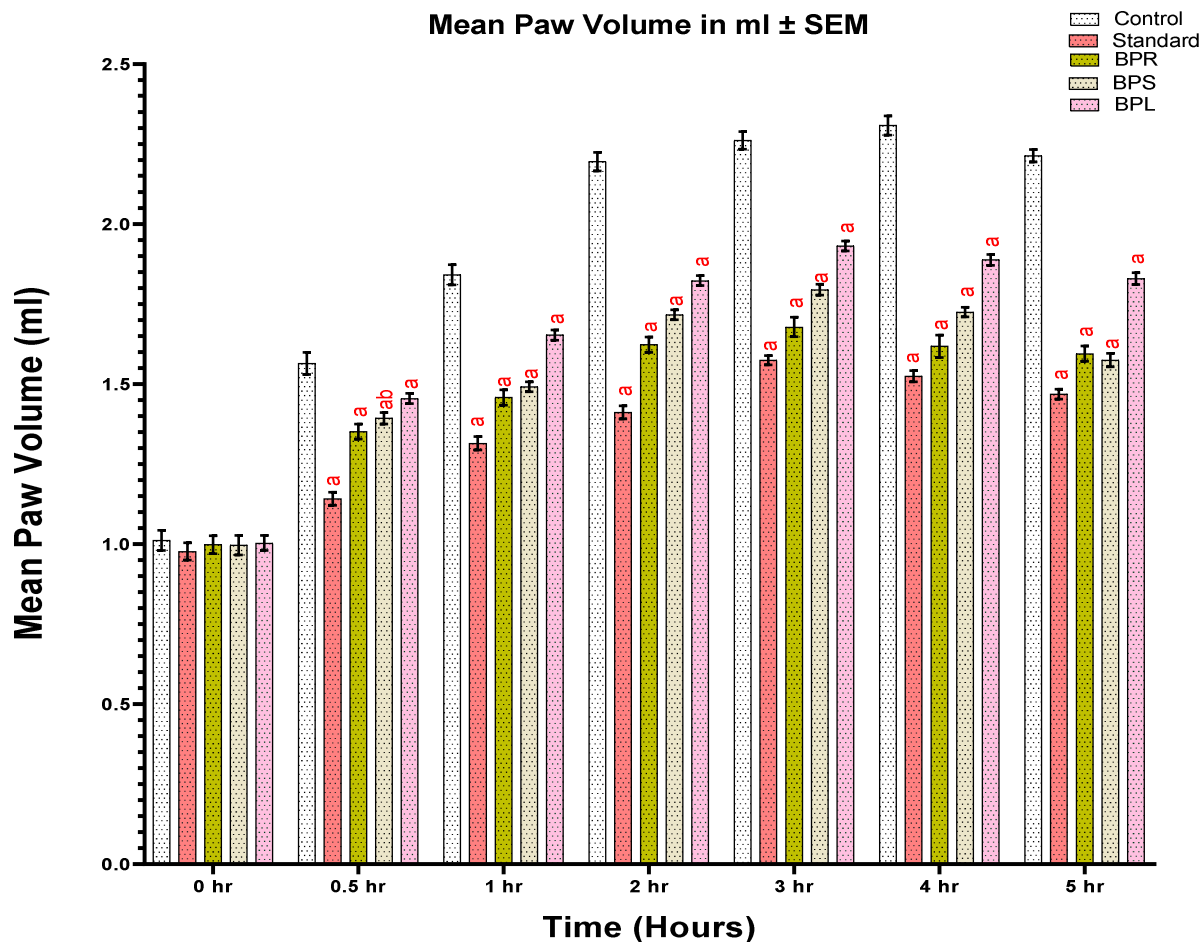
Group:

Table no.20 Showing Comparison of Mean paw volume (\pm SEM) & Percentage of Inhibition of the Control, standard, BPR, BPS and BPL group (0 to 5th hr) in acute inflammatory study

Group		0 (hr)	0.5 (hr)	1 st (hr)	2 nd (hr)	3 rd (hr)	4 th (hr)	5 th (hr)
Control	Mean Paw volume	1.011 (\pm 0.36)	1.568 (\pm 0.52)	1.84 (0.3705)	2.19 (\pm 0.368)	2.26 (\pm 0.353)	2.30 (\pm 0.3270)	2.21 (\pm 0.207)
	% of Inhibition	0	0	0	0	0	0	0
Standard	Mean Paw volume	0.9766 (\pm 0.27)	1.141 ^a (\pm 0.011)	1.315 ^a (\pm 0.194)	1.4116 ^a (\pm 0.020)	1.575 ^a (\pm 0.194)	1.525 ^a (\pm 0.2045)	1.46 ^a (\pm 0.013)
	% of Inhibition	0	27.01	28.72	35.54	32.30	33.79	33.41
BPR	Mean Paw volume	0.998 (\pm 0.027)	1.35 ^a (\pm 0.023)	1.45 ^a (\pm 0.023)	1.62 ^a (\pm 0.023)	1.683 ^a (\pm 0.030)	1.61 ^a (\pm 0.0353)	1.59 ^a (\pm 0.024)
	% of Inhibition	0	13.81	20.95	25.87	25.73	29.74	27.66
BPS	Mean Paw volume	0.997 (\pm 0.030)	1.39 ^{ab} (\pm 0.172)	1.491 ^a (\pm 0.153)	1.716 ^a (\pm 0.152)	1.795 ^a (\pm 0.172)	1.725 ^a (\pm 0.1454)	1.57 ^a (\pm 0.214)
	% of Inhibition	0	11.26	19.62	21.91	20.97	25.09	28.57
BPL	Mean Paw volume	1.003 (\pm 0.023)	1.45 ^a (\pm 0.160)	1.65 ^a (\pm 0.016)	1.82 ^a (\pm 0.154)	1.931 ^a (\pm 0.015)	1.888 ^a (\pm 0.1713)	1.83 ^a (\pm 0.184)
	% of Inhibition	0	7.02	10.39	16.74	14.25	18.25	17.01

a ($P < 0.001$), b ($P < 0.01$), c $P < (0.05)$ ^a $P < 0.001$ Standard compared with, BPR, BPS control and BPL at 0.5 to 5thhr^a $P < 0.001$ BPR compared with, BPL control at 0.5 to 5thhr and BPS at 2nd to 4thhr^a $P < 0.001$ BPS compared with control, at 0.5 to 5thhr and BPL at 1sthr to 5th^b $P < 0.05$ BPS compared with BPL at 0.5 hr^a $P < 0.001$ BPL compared with Control at 0.5 to 5thhr

Graph no. 2 Showing Comparison of Mean paw volume (\pm SEM) of Control, standard, BPR, BPS and BPL group in acute inflammatory study



a ($P < 0.001$), b ($P < 0.01$), c ($P < 0.05$)

^a $P < 0.001$ Standard compared with, BPR, BPS control and BPL at 0.5 to 5thhr

^a $P < 0.001$ BPR compared with, BPL control at 0.5 to 5thhr and BPS at 2nd to 4thhr

^a $P < 0.001$ BPS compared with control, at 0.5 to 5thhr and BPL at 1st to 5th

^b $P < 0.05$ BPS compared with BPL at 0.5 hr

^a $P < 0.001$ BPL compared with Control at 0.5 to 5thhr

b) Statistical analysis of paw volume of Control, BPR, BR, BS & BL:

Table no. 21 Showing Comparison of Mean paw volume and % of Inhibition of Control, BPR, BR, BS and BL group (0hr to 5th hr) in acute inflammatory study and significance

Group		0 (hr)	0.5 (hr)	1 st (hr)	2 nd (hr)	3 rd (hr)	4 th (hr)	5 th (hr)
Control	Mean Paw volume	1.011 (±0.362)	1.568 (±0.522)	1.84 (0.370)	2.19 (±0.3685)	2.26 (±0.353)	2.30 (±0.327)	2.21 (±0.207)
	% of Inhibition	0						
BPR	Mean Paw volume	0.998 (±0.027)	1.35 ^{ab} (±0.023)	1.45 ^a (±0.023)	1.62 ^a (±0.023)	1.683 ^a (±0.030)	1.61 ^a (±0.035)	1.59 ^a (±0.024)
	% of Inhibition	0	13.81	20.95	25.87	25.73	29.74	27.66
BR	Mean Paw volume	1.033 ^a (±0.025)	1.32 ^a (±0.026)	1.44 ^a (±0.027)	1.60 ^a (±0.0234)	1.66 ^a (±0.024)	1.60 ^a (±0.0230)	1.51 ^a (±0.025)
	% of Inhibition	0	15.73	21.68	26.71	26.54	30.18	29.75
BS	Mean Paw volume	0.993 ^a (±0.028)	1.40 ^a (±0.027)	1.525 ^a (±0.026)	1.71 ^a (±0.0278)	1.78 ^a (±0.0257)	1.70 ^a (±0.031)	1.50 ^a (±0.029)
	% of Inhibition	0	10.52	17.34	21.64	21.23	26.13	30.12
BL	Mean Paw volume	1.008 ^a (±0.019)	1.448 ^a (±0.03)	1.645 ^a (±0.022)	1.83 ^a (±0.0228)	1.92 ^a (±0.0224)	1.93 ^a (±0.022)	1.82 ^a (±0.051)
	% of Inhibition	0	7.83	10.84	16.43	14.67	15.85	17.31

a ($P < 0.001$), b ($P < 0.01$), c $P < (0.05)$

^a $P < 0.001$ BPR compared with control, BL at 0.5 to 5thhr,

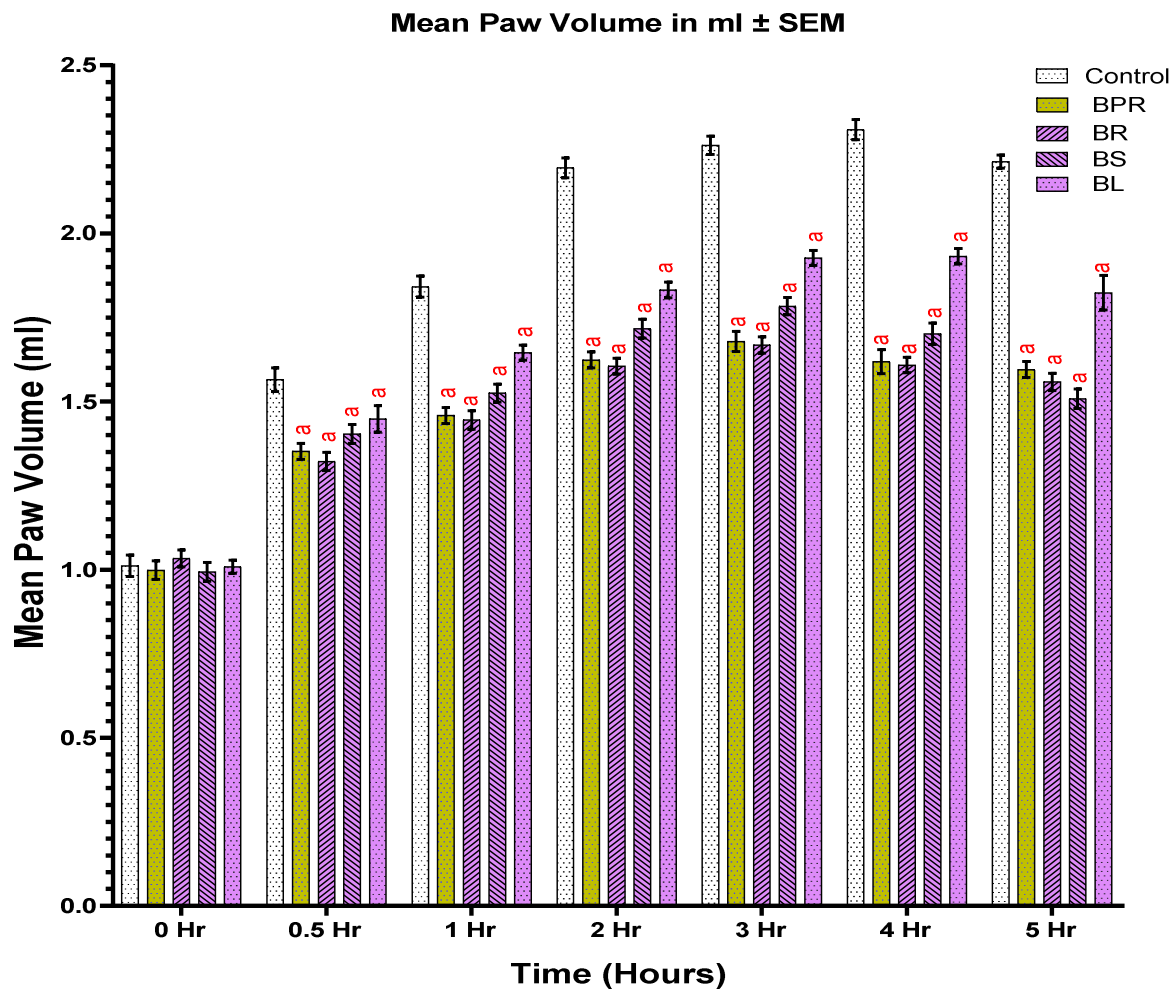
^a $P < 0.001$ BR compared with control and BL at 0.5 to 5thhr

^a $P < 0.001$ BS compared with control at 0.5 to 5thhr,

^a $P < 0.001$ BS compared with BL at 1st to 5thhr

^a $P < 0.001$ BL compared with Control at 0.5 to 5thhr

Graph no. 3 Showing Comparison of Mean paw volume of Control, BPR, BR, BS and BL group in acute inflammatory study



^a ($P < 0.001$), ^b ($P < 0.01$), ^c ($P < 0.05$)

^a $P < 0.001$ BPR compared with control and BL at 0.5 to 5thhr,

^a $P < 0.001$ BR compared with control and BL at 0.5 to 5thhr

^a $P < 0.001$ BS compared with control at 0.5 to 5thhr,

^a $P < 0.001$ BS compared with BL at 1st to 5thhr

^a $P < 0.001$ BL compared with Control at 0.5 to 5thhr

c) Statistical analysis of paw volume of Control, BPR, AR, AS & AL:

Table no. 22 Showing Comparison of Mean paw volume (\pm SEM) and % of Inhibition of the Control, BPR, AR, AS and AL group (0 to 5th hr) in acute inflammatory study and significance

Group		0 (hr)	0.5 (hr)	1 st (hr)	2 nd (hr)	3 rd (hr)	4 th (hr)	5 th (hr)
Control	Mean Paw volume	1.011 (\pm 0.362)	1.568 (\pm 0.522)	1.84 (0.370)	2.19 (\pm 0.3685)	2.26 (\pm 0.353)	2.30 (\pm 0.327)	2.21 (\pm 0.207)
	% of Inhibition	0						
BPR	Mean Paw volume	0.998 (\pm 0.027)	1.35 ^{ab} (\pm 0.023)	1.45 ^a (\pm 0.023)	1.62 ^a (\pm 0.023)	1.683 ^a (\pm 0.030)	1.61 ^a (\pm 0.035)	1.59 ^a (\pm 0.024)
	% of Inhibition	0	13.81	20.95	25.87	25.73	29.74	27.66
AR	Mean Paw volume	0.985 (\pm 0.021)	1.35 (\pm 0.021)	1.458 (\pm 0.016)	1.648 ^a (\pm 0.022)	1.70 ^a (\pm 0.0346)	1.65 ^a (\pm 0.029)	1.61 ^{ac} (\pm 0.028)
	% of Inhibition	0	13.91	20.95	24.97	25.24	28.32	26.67
AS	Mean Paw volume	0.978 ^a (\pm 0.019)	1.38 ^{ac} (\pm 0.025)	1.48 ^a (\pm 0.027)	1.74 ^a (\pm 0.020)	1.87 ^a (\pm 0.028)	1.816 ^a (\pm 0.0262)	1.68 ^a (\pm 0.034)
	% of Inhibition	0	12.01	19.60	20.24	16.96	21.06	23.50
AL	Mean Paw volume	1.015 ^a (\pm 0.017)	1.45 ^a (\pm 0.028)	1.711 ^a (\pm 0.033)	1.891 ^a (\pm 0.023)	2.056 ^a (\pm 0.032)	1.93 ^a (\pm 0.0245)	1.87 ^a (\pm 0.025)
	% of Inhibition	0	9.76	7.85	14.23	10.39	15.85	15.04

a ($P < 0.001$), b ($P < 0.01$), c ($P < 0.05$)

^a $P < 0.001$ BPR compared with control, AS and AL at 0.5 to 5thhr

^a $P < 0.001$ AR compared with control and AL at 0.5 to 5thhr,

^c $P < 0.05$ AR compared with AS at 5thhr,

^a $P < 0.001$ AR compared with AS at 2nd to 4thhr

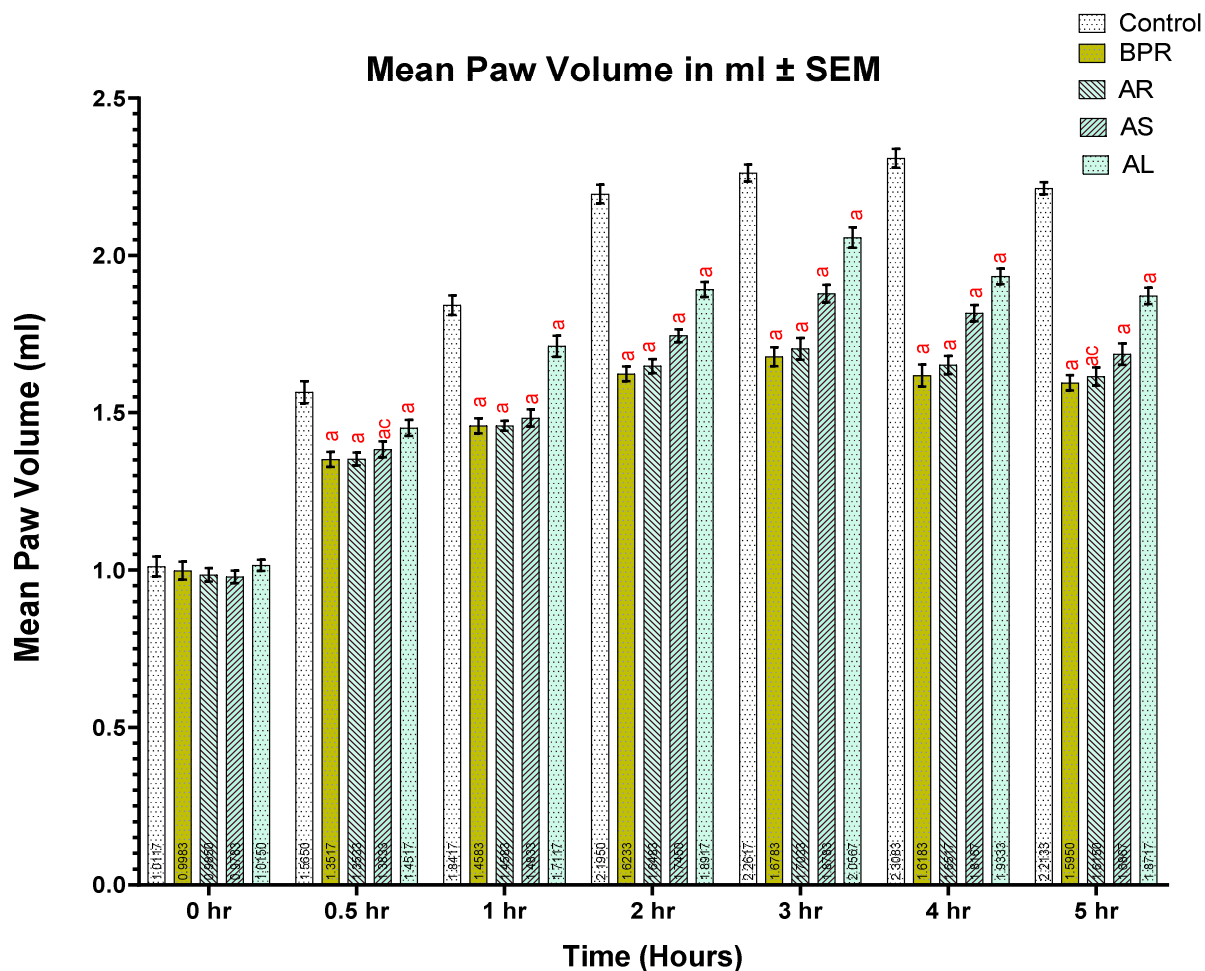
^a $P < 0.001$ AS compared with control 0.5 to 5th hr

^c $P < 0.05$ AS compared with AL at 5th hr

^a $P < 0.001$ AS compared with AL at 2nd to 5thhr

^a $P < 0.001$ AL compared with Control at 0.5 to 5thhr

Graph no. 4 Showing Comparison of Mean paw volume of Control, BPR, AR, AS and AL group in acute inflammatory study



^a ($P < 0.001$), ^b ($P < 0.01$), ^c ($P < 0.05$)

^a $P < 0.001$ BPR compared with control, AS and AL at 0.5 to 5thhr

^a $P < 0.001$ AR compared with control and AL at 0.5 to 5thhr,

^c $P < 0.05$ AR compared with AS at 5thhr,

^a $P < 0.001$ AR compared with AS at 2nd to 4thhr

^a $P < 0.001$ AS compared with control 0.5 to 5th hr

^c $P < 0.05$ AS compared with AL at 5th hr

^a $P < 0.001$ AS compared with AL at 2nd to 5thhr^a

$P < 0.001$ AL compared with Control at 0.5 to 5thhr

d) Statistical analysis of paw volume of Control, BPR, SR, SS & SL:

Table no. 23 Showing Comparison of Mean paw volume (\pm SEM) and % of Inhibition of Control, BPR, SR, SS and SL group (0 to 5th hr) in acute inflammatory study and significance

Group		0 (hr)	0.5 (hr)	1 st (hr)	2 nd (hr)	3 rd (hr)	4 th (hr)	5 th (hr)
Control	Mean Paw volume	1.011 (\pm 0.36)	1.568 (\pm 0.52)	1.84 (\pm 0.3705)	2.19 (\pm 0.368)	2.26 (\pm 0.353)	2.30 (\pm 0.327)	2.21 (\pm 0.207)
	% of Inhibition	0	0	0	0	0	0	0
BPR	Mean Paw volume	0.998 (\pm 0.027)	1.35 ^a (\pm 0.023)	1.45 ^a (\pm 0.023)	1.62 ^a (\pm 0.0236)	1.683 ^a (\pm 0.030)	1.61 ^a (\pm 0.035)	1.59 ^a (\pm 0.024)
	% of Inhibition	0	13.81	20.95	25.87	25.73	29.74	27.66
SR	Mean Paw volume	1.006 (\pm 0.011)	1.37 ^a (\pm 0.03)	1.45 ^a (\pm 0.240)	1.66 ^a (\pm 0.025)	1.715 ^a (\pm 0.016)	1.66 ^a (\pm 0.017)	1.62 ^a (\pm 0.204)
	% of Inhibition	0	12.64	21.05	24.20	24.11	27.86	26.83
SS	Mean Paw volume	1.025 (\pm 0.029)	1.42 ^a (\pm 0.024)	1.56 ^a (\pm 0.017)	1.75 ^a (\pm 0.021)	1.88 ^a (\pm 0.0178)	1.795 ^a (\pm 0.013)	1.698 ^a (\pm 0.185)
	% of Inhibition	0	9.45	15.26	19.63	20.35	21.35	23.05
SL	Mean Paw volume	0.99 (\pm 0.027)	1.45 ^a (\pm 0.026)	1.70 ^a (\pm 0.023)	1.88 ^a (\pm 0.016)	2.016 ^a (\pm 0.0158)	1.92 ^a (\pm 0.017)	1.803 ^a (\pm 0.152)
	% of Inhibition	0	7.44	7.53	14.08	10.76	16.58	18.21

a ($P < 0.001$), b ($P < 0.01$), c $P < (0.05)$

^a $P < 0.001$ BPR compared with control, and SL at 0.5 to 5thhr

^a $P < 0.001$ BPR compared with SS 1st to 5th hr

^c $P < 0.05$ BPR Compared with SS at 0.5hr

^a $P < 0.001$ SR compared with control and SL at 0.5 to 5thhr

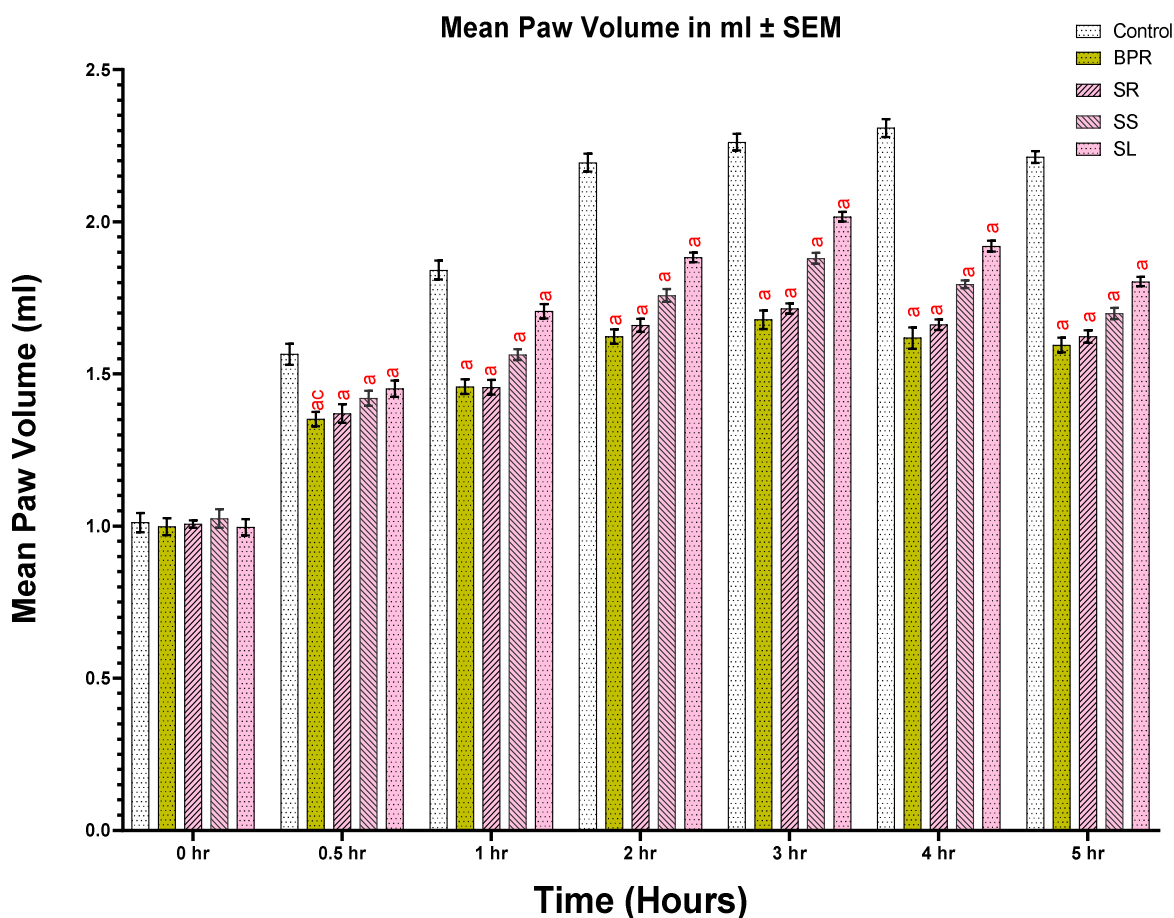
^a $P < 0.001$ SR compared with SS at 1st to 5th hr

^a $P < 0.001$ SS compared with Control at 0.5 to 5thhr

^a $P < 0.001$ SS compared with SL at 1st to 5thhr

^a $P < 0.001$ SL compared with Control at 0.5 to 5th hr

Graph no. 5 Showing Comparison of Mean paw volume of Control, BPR, SR, SS and SL group in acute inflammatory study



a ($P < 0.001$), b ($P < 0.01$), c ($P < 0.05$)

^a $P < 0.001$ BPR compared with control, and SL at 0.5 to 5th hr

^a $P < 0.001$ BPR compared with SS 1st to 5th hr

^c $P < 0.05$ BPR Compared with SS at 0.5 hr

^a $P < 0.001$ SR compared with control and SL at 0.5 to 5th hr

^a $P < 0.001$ SR compared with SS at 1st to 5th hr

^a $P < 0.001$ SS compared with Control at 0.5 to 5th hr

^a $P < 0.001$ SS compared with SL at 1st to 5th hr

^a $P < 0.001$ SL compared with Control at 0.5 to 5th hr

e) Comparison of Control, BPR, PR, PS & PL:

Table no. 24 Showing Comparison of Mean paw volume (\pm SEM) and % of Inhibition of Control, BPR, PR, PS and PL group (0 to 5th hr) in acute inflammatory study and significance

Group		0 (hr)	0.5 (hr)	1 st (hr)	2 nd (hr)	3 rd (hr)	4 th (hr)	5 th (hr)
Control	Mean Paw volume	1.011 (\pm 0.362)	1.568 (\pm 0.522)	1.84 (0.370)	2.19 (\pm 0.36856)	2.26 (\pm 0.353)	2.30 (\pm 0.327)	2.21 (\pm 0.207)
	% of Inhibition	0						
BPR	Mean Paw volume	0.998 (\pm 0.027)	1.35 ^{ab} (\pm 0.023)	1.45 ^a (\pm 0.023)	1.62 ^a (\pm 0.0236)	1.683 ^a (\pm 0.030)	1.61 ^a (\pm 0.035)	1.59 ^a (\pm 0.024)
	% of Inhibition	0	13.81	20.95	25.87	25.73	29.74	27.66
PR	Mean Paw volume	0.985 ^a (\pm 0.0281)	1.32 ^a (\pm 0.015)	1.4366 ^a (\pm 0.015)	1.62 ^a (\pm 0.0137)	1.67 ^a (\pm 0.0145)	1.63 ^a (\pm 0.021)	1.59 ^a (\pm 0.0157)
	% of Inhibition	0	15.41	22.13	25.95	26.51	29.71	27.81
PS	Mean Paw volume	0.996 (\pm 0.0128)	1.38 (\pm 0.021)	1.48 (\pm 0.0215)	1.71 (\pm 0.0185)	1.81 (\pm 0.0334)	1.72 (\pm 0.017)	1.58 (\pm 0.022)
	% of Inhibition	0	8.49	15.53	21.61	18.73	21.57	27.96
PL	Mean Paw volume	0.99 (\pm 0.027)	1.45 ^a \pm (0.026)	1.70 ^a (\pm 0.023)	1.88 ^a (\pm 0.0162)	2.016 ^a (\pm 0.015)	1.92 ^a (\pm 0.017)	1.803 ^a (\pm 0.152)
	% of Inhibition	0	6.80	7.04	13.47	10.91	17.01	17.05

a ($P < 0.001$), b ($P < 0.01$), c $P < (0.05)$

^a $P < 0.001$ BPR compared with control, and PL at 0.5 to 5thhr and

^a $P < 0.001$ BPR compared to PS at 1st to 5thhr

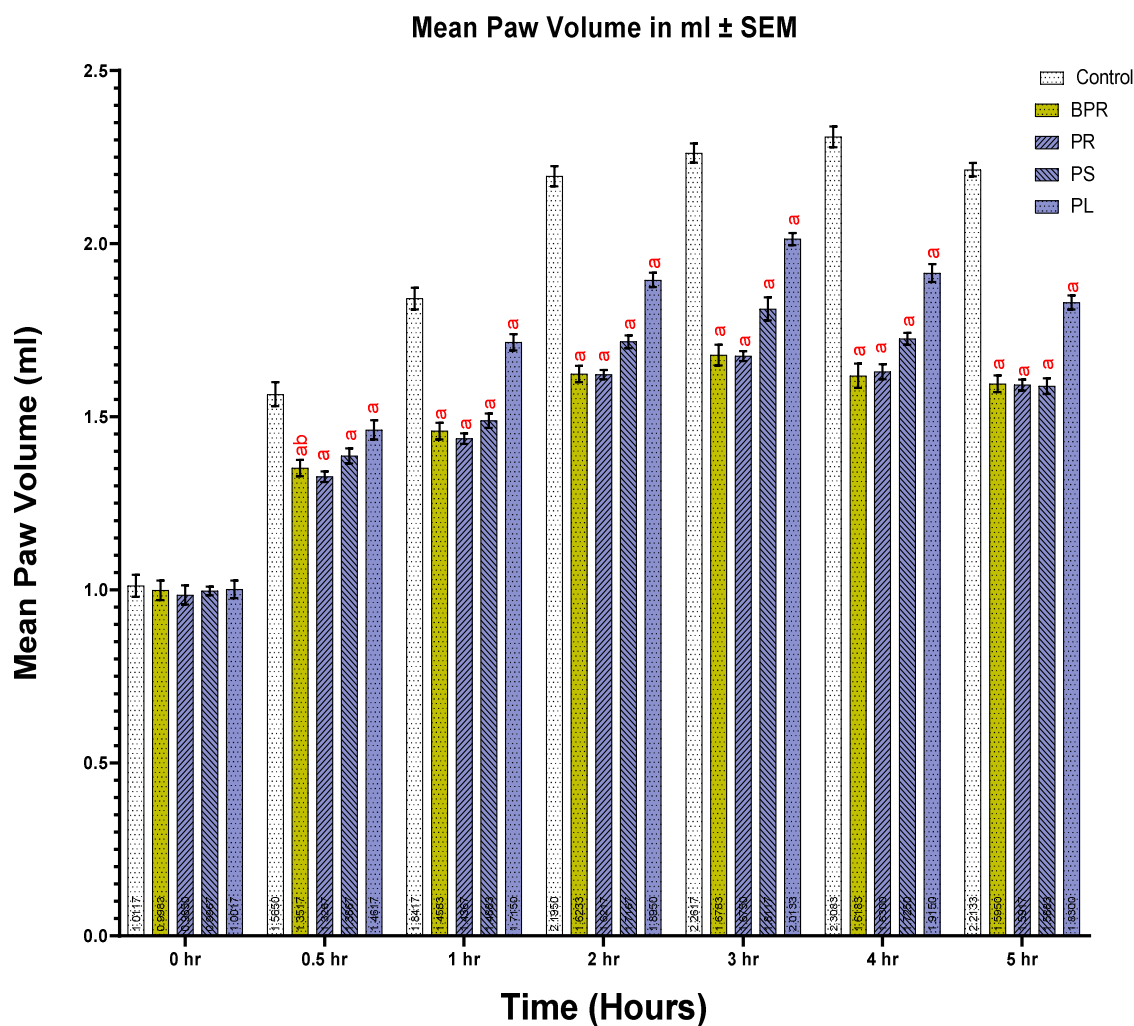
^b $P < 0.01$ BPR compared with PS at 0.5hr

^a $P < 0.001$ PR compared with PL and control at 0.5 to 5thhr

^a $P < 0.001$ PS compared with PL and Control at 0.5 to 5thhr

^a $P < 0.001$ PL compared with Control at 0.5 to 5th hr.

Graph no. 6 showing Comparison of Mean paw volume of Control, BPR, PR, PS and PL group in acute inflammatory study



a ($P < 0.001$), b ($P < 0.01$), c ($P < 0.05$)

^a $P < 0.001$ BPR compared with control, and PL at 0.5 to 5th hr and

^a $P < 0.001$ BPR compared to PS at 1st to 5th hr

^b $P < 0.01$ BPR compared with PS at 0.5 hr

^a $P < 0.001$ PR compared with PL and control at 0.5 to 5th hr

^a $P < 0.001$ PS compared with PL and Control at 0.5 to 5th hr

^a $P < 0.001$ PL compared with Control at 0.5 to 5th hr.

f) Statistical analysis of paw volume of Control, BPR, GR, GS & GL:

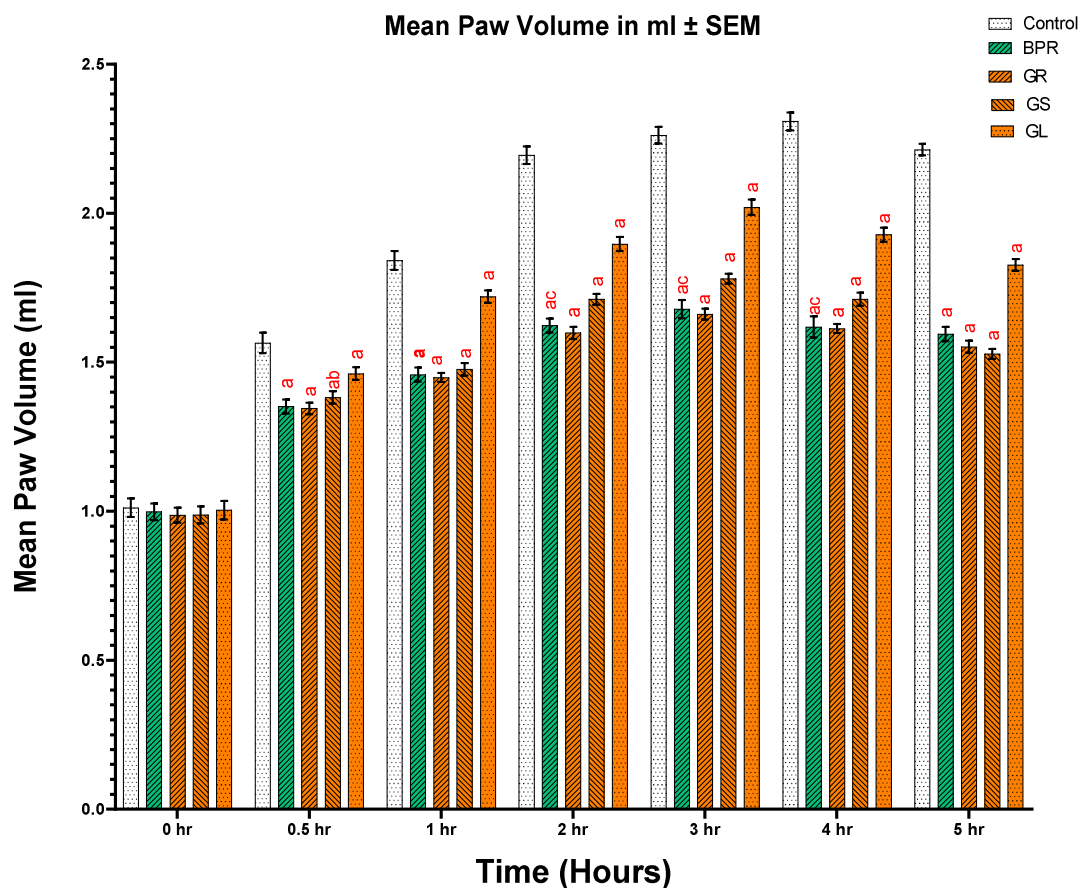
Table no. 25 showing Comparison of Mean paw volume (\pm SEM) and % ofInhibition of Control, BPR, GR, GS and GL group (0 to 5th hr) in acute

inflammatory study and significance

Group		0 (hr)	0.5 (hr)	1 st (hr)	2 nd (hr)	3 rd (hr)	4 th (hr)	5 th (hr)
Control	Mean Paw volume	1.011 (\pm 0.362)	1.568 (\pm 0.522)	1.84 (\pm 0.370)	2.19 (\pm 0.368)	2.26 (\pm 0.353)	2.30 (\pm 0.327)	2.21 (\pm 0.207)
	% of Inhibition	0						
BPR	Mean Paw volume	0.998 (\pm 0.027)	1.35 ^{ab} (\pm 0.023)	1.45 ^a (\pm 0.023)	1.62 ^a (\pm 0.023)	1.683 ^a (\pm 0.030)	1.61 ^a (\pm 0.035)	1.59 ^a (\pm 0.024)
	% of Inhibition	0	13.81	20.95	25.87	25.73	29.74	27.66
GR	Mean Paw volume	0.98 (\pm 0.248)	1.34 ^a (\pm 0.019)	1.44 ^a (\pm 0.014)	1.59 ^a (\pm 0.020)	1.66 ^a (\pm 0.018)	1.6 ^a (\pm 0.014)	1.55 ^a (\pm 0.025)
	% of Inhibition	0	14.23	23.30	27.39	26.62	30.06	29.62
GS	Mean Paw volume	0.98 (\pm 0.028)	1.38 ^{ab} (\pm 0.021)	1.47 ^a (\pm 0.020)	1.71 ^a (\pm 0.018)	1.78 ^a (\pm 0.016)	1.71 ^a (\pm 0.0224)	1.51 ^a (\pm 0.016)
	% of Inhibition	0	12.11	19.87	21.61	21.23	25.40	30.68
GL	Mean Paw volume	1.00 (\pm 0.030)	1.46 ^a (\pm 0.021)	1.72 ^a (\pm 0.028)	1.89 ^a (\pm 0.023)	2.02 ^a (\pm 0.0259)	1.928 ^a (\pm 0.023)	1.82 ^a (\pm 0.019)
	% of Inhibition	0	6.80	6.68	13.47	10.61	13.68	17.08

a ($P < 0.001$), b ($P < 0.01$), c $P < (0.05)$ ^a $P < 0.001$ BPR compared with control, and GL at 0.5 to 5thhr^c $P < 0.05$ BPR compared with GS at 2nd to 4th hr^a $P < 0.001$ GR compared with control and GL at 0.5 to 5thhr^a $P < 0.001$ GR compared with GS at 2nd to 4th hr,^a $P < 0.001$ GS & GL compared with Control at 0.5 to 5thhr^a $P < 0.001$ GS compared with GL at 1st to 5thhr ,^b $P < 0.01$ GS compared with GL at 0.5 hr,

Graph no. 7 Showing Comparison of Mean paw volume of Control, BPR, GR, GS and GL group in acute inflammatory study



a ($P < 0.001$), b ($P < 0.01$), c $P < (0.05)$

^a $P < 0.001$ BPR compared with control, and GL at 0.5 to 5thhr

^c $P < 0.05$ BPR compared with GS at 2nd to 4th hr

^a $P < 0.001$ GR compared with control and GL at 0.5 to 5thhr

^a $P < 0.001$ GR compared with GS at 2nd to 4th hr

^a $P < 0.001$ GS compared with Control at 0.5 to 5thhr

^a $P < 0.001$ GS compared with GL at 1st to 5thhr

^b $P < 0.01$ GS compared with GL at 0.5 hr

^a $P < 0.001$ GL compared with Control at 0.5 to 5th hr

4.7.2 Sub-acute anti-inflammatory study of Kashayas (Foreign body induced granuloma)

Table no. 26 Showing dry mean granuloma weight and percentage of inhibition in Cotton pellet granuloma method sub-acute anti-inflammatory study

Groups	Dry Mean Granuloma Weight \pm SEM	Percentage of Inhibition
Control	56.06 (± 0.938)	0 %
Standard	11.75 ^a (± 0.4305)	79.04 %
BPR	24.14 ^a (± 0.726)	56.23%
BPS	31.3 ^a (± 1.031)	44.13%
BR	30.48 ^a (± 0.737)	45.62%
BS	42.2 ^a (± 1.331)	24.72%
AR	30.5 ^a (± 1.137)	45.84%
AS	40.7 ^a (± 1.645)	27.31%
PR	29.0 ^a (± 1.118)	48.21%
PS	35.84 ^a (± 0.893)	36.03%
SR	30.11 ^a (± 0.785)	46.28%
SS	40.21 ^a (± 0.962)	28.27%
GR	30.45 ^a (± 0.955)	45.70%
GS	39.92 ^a (± 1.345)	28.27%

a ($P < 0.001$), b ($P < 0.01$), c ($P < (0.05)$)

^a $P < 0.001$ Standard compared with, PR, BPS, BR, BS, AR, AS, PR, PS, SR, SS,

GR, GS control

^a $P < 0.001$ BPR compared with BPS, BR, BS, AR, AS, PR, PS, SR, SS, GR, GS, control

^a $P < 0.001$ BPS compared with, BR, control compared with control and BS.

^a $P < 0.001$ AR compared with AS and control, PR compared with control and PS

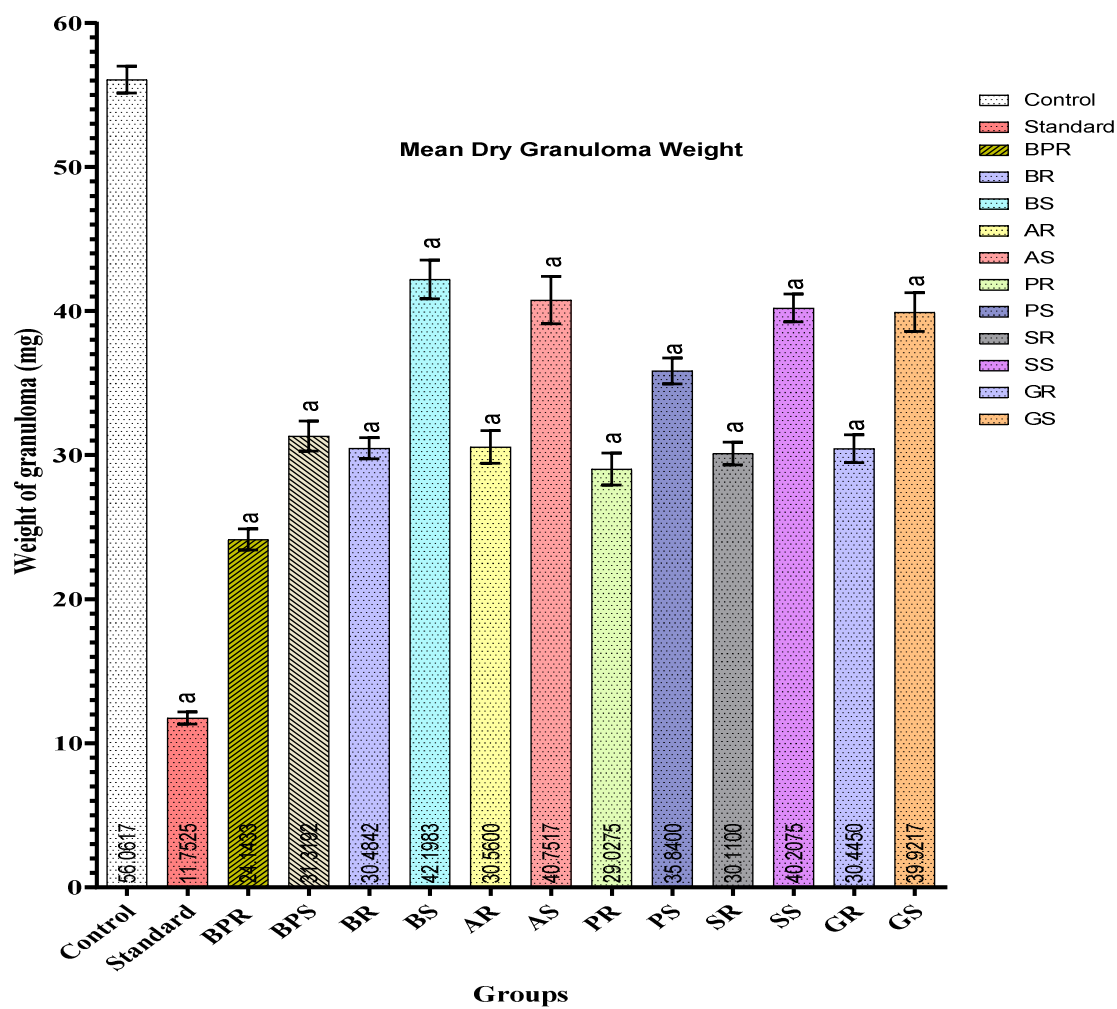
^a $P < 0.001$ SR compared with SS and control, GR compared with control and GS

Observations:

1. Gross behavior of the animals: No changes found in Fur, Eyes, Skin, Sleeping, Respiration throughout the study.
2. Animals were feared during the study after inducing edema
3. Animals were licking their inflamed paw.
4. Animals were getting irritated during dosing
5. Food and water – all animals had taken food and water normally
6. No evident toxic signs were observed in the study.
7. No mortality was found among any of the animals throughout the study.

Note: In acute anti-inflammatory study leaves of individual and combination of plants showed less effectiveness compared to roots & stem barks therefore leaf groups were not considered in the sub-acute anti-inflammatory study (as per objective). Hence following groups were selected for the sub-acute anti-inflammatory study.

Graph no.8 Showing dry mean granuloma weight (\pm SEM) in Sub-acute anti-inflammatory study in all groups



a ($P < 0.001$), b ($P < 0.01$), c ($P < 0.05$)

Table no.27 Showing Histopathological observations of Grass piths

(Annexure 11 & photo plate no.20-22)

Test Drug	Edema	Inflammatory infiltration	Macrophages	Granulation tissue	Fibroblast	Collagen formation			
BR	Mild	Moderate			Mild	Moderate			
BS	NIL	Mild							
AR	Mild	Moderate			Moderate	Moderate			
AS		Mild						Moderate	Mild
PR		Moderate							
PS		Mild							
SR		Mild							
SS		Moderate							
GR		Mild							
GS									
BPR		.Nil							Moderate
BPS		Mild							
Std		Nil	Nil						
Cont	Moderate					Mild			

Table no. 28- Liver Histopathology Observation in all groups (Annexure 12 & Photo plate 23-25)

Drug	Central vein cong	Sinusoidal congestion	Focal hemorrhage	Inflammation	Fatty change	Ballooning hepatocytes	Apoptosis	Degeneration	Spotty Necrosis	Centri lobular necrosis	Piecemeal necrosis	Confluent necrosis	Portal triditis	Bile duct proliferation	Cholestasis	Ground glass change	Kupffer cell hyperplasia	Fibrosis	Regenerative nodules	Hepatocellular dysplasia	Cirrhosis
BS	Marked	Mild	Mild	Mild	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
AS	Mild	Mild	Nil	Mild	Nil	Mild	Nil	Nil	Mild	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
PS	Mild	Moderate	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
SS	Mild	Mild	Nil	Mild	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
GS	Mild	Moderate	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
BR	Mild	Mild	Nil	Mild	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
AR	Mild	Moderate	Nil	Mild	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
PR	Mild	Mild	Nil	Mild	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
SR	Moderate	Mild	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
GR	Mild	Moderate	Nil	Mild	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
BPR	Mild	Moderate	Nil	Mild	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
BPS	Mild	Mild	Nil	Mild	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
C	Mild	Moderate	Nil	Mild	Nil	Mild	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil
S	Moderate	Mild	Nil	Mild	Nil	Mild	Nil	Nil	Mild	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Mild	Nil	Nil	Nil	Nil

**Table no. 29 Stomach Histopathological Observations in all groups (Annexure 13
photo plate 26-28)**

Drug	Mucosal congestion	Mucosal edema	Mucosal Hemorrhage	Desquamation	Neutrophilic infiltration	Lymphocytic infiltration	Mucosal ulceration	Granulation tissue	Cellular degeneration
BS	Mild	NIL							
AS	Mild								
PS	Mild								
SS	Mild								
GS	Moderate								
BR	Mild								
AR	Mild								
PR	Mild								
SR	Mild								
GR	Mild								
BPR	Mild								
BPS	Mild								
CS	Mild								
SS	Mild								

Observations:

(All experimental animals were observed for 10 days)

- Gross behavior: No changes found in Eyes, Skin, Sleeping, Respiration throughout the study.
- No evident toxic signs were observed in the study.
- Food and water intake: all animals had taken food and water normally.
- No mortality was found among any of the animals during the study.

DISCUSSION

Deciduous tree like Bilwa (*Aegle marmelos* (L.) Corr.), Agnimanth (*Clerodendron phlomidis* L.f.), Gambhari (*Gmelina arborea* Linn.), Patala (*Stereospermum suaveolens*(Rox.) DC.) , Shyonak (*Oroxylum indicum* (L.) Vent.) are perennial trees combinedly popularly known as Bhruhtpanchmoola in Ayurved were selected for the study. Roots is foremost part of these plants are recommended either single or in combination for shothaghna property in Ayurvedic literature. This is correlated with anti-inflammatory action²⁸. Generally administered in the form of kashayas (Aqueous extract).

Approximately 700 yogas mentioned in text *Bharat Bhaishajya Ratnakar* using either single or whole plants of Bhruhatpanchmoola. Bhruhatpanch root and individual plants of Bhruhatpanch root has been indicated in Shotha (inflammation) of various ailments²⁷. Current clinical utility of Bhruhatpancha root is very vast, but the source of availability is endangered. This is due to exploitation of roots, improper harvesting of roots destroys the plant, the expected root development required longer time due to Perennial habit, Patala (*Stereospermum suaveolens*(Rox.) DC.) Shyonak (*Oroxylum indicum* (L.) Vent.) are listed under endangered, Other three plants also facing the same situation, still among endangered plants roots are exploited and plants become extinct. Hence it is need of hour to search alternative to roots, especially Patala and Shyonak which are categorized under endangered species²⁸. If plants alternate parts possess the same therapeutic efficacy then roots can be retained and manufacturing crisis with Bhruhatpanch root can be addressed efficiently. **Hence, the study was conducted to find efficacy of individual root, stem barks, leaves of**

Bhruhatpancha root and their combinations against Bhruhatpancha root through anti-inflammatory experimental models.

Inflammation is a crucial biological process for maintaining the body's homeostasis. It is indispensable for successfully fighting pathogens and for the repair of damaged tissue. However, inflammatory processes are also involved in the onset and maintenance of many severe disorders, such as rheumatoid arthritis, asthma, chronic inflammatory bowel diseases, type 2 diabetes, neurodegenerative diseases, and cancer etc. Currently available repertoire of approved anti-inflammatory agents consists of nonsteroidal anti-inflammatory drugs, glucocorticoids, immunosuppressant drugs, and biologicals. Despite of this arsenal, therapies are often not enough and patients' health is also affected by side effects. Ayurved fulfils such demand and plants are best source of broad-spectrum remedies in human history.

Acute Anti-inflammatory study:

Efficacy of Bhruhatpanch Stembark and Bhruhatpanch Leaves in comparison to Bhruhatpanch root (Table no. 19)

Bhruhatpanch root which is the combination of roots, Bhruhatpanch Stembark; the combination of stem bark and Bhruhatpanch leaves; the combination of leaves and Ibuprofen; the standard drug was used in this study to evaluate the anti-inflammatory activity. Animals treated with Ibuprofen have shown statistically significant difference ($P < 0.001$) in reducing inflammation in terms of paw volume as compared to control, Bhruhatpanch root, Bhruhatpanch stembark and Bhruhatpanch leaves treated animals at 0.5hr to 5th hr. Bhruhatpanch root group of the animals have shown statistically significant difference ($P < 0.001$) in reducing mean paw volume when compared to Bhruhatpanch leaves from 0.5hr to 5th hr.

The mean paw volume of the animals treated with Bhruhatpanch root and Bhruhatpanch stembark group have shown comparable reduction in paw volume between 0.5 to 5th hr. This explains that both the Kashayas groups are effective in reducing inflammation. The mean paw volume of Bhruhatpanch root and Bhruhatpanch stembark is 1.59 ml and 1.57 ml. The percentage of inhibition Bhruhatpanch root & Bhruhatpanch stembark 27.59% and 28.51% at 5th hr. As inhibition activity is comparable in both the Kashayas and therefore Bhruhatpanch stembark kashaya may be used in the place of Bhruhatpanch root but not Bhruhatpanch leaves.

Vyas *et al.* (2011) studied the comparative anti-inflammatory activity of Brihatpanchamoola Kwatha prepared by using by root bark and stem bark of Bhrihatpanchamoola. Brihatpanchamoola Kwatha prepared from bark (SK) samples was found significant compared to Brihatpanchamoola Kwatha prepared by root (RK) which suppressed the carrageenan induced paw oedema (14.34%) in compared to control group, while Brihatpanchamoola Kwatha prepared by stem bark (SK) produced a significant ($P < 0.05$) suppression in oedema formation (20.56%) comparison to control group. **The study also concluded that stem bark can be used in non-availability of root samples⁶⁹.**

Efficacy of Bilwa Root ,Bilwa Sstem bark and Bilwa Leaves in comparison to Bhruhatpanch root (Table no. 20)

Bhruhatpanch root (Combination of root) group had shown statistically significant difference in reducing mean paw volume ($P < 0.001$) when compared to Bilwa Leaves from 0.5hr to 5th hr. The mean paw volume of Bilwa root, Bilwa Stembark and Bhruhatpanch root group had shown no significant difference at 0.5hr

to 5thhr means BR and BS showing comparable efficacy as Bhruhatpanch root. The mean paw volume 1.59ml and percentage of inhibition 27.59% at 5thhr of Bhruhatpanch root treated group was compared with paw volume 1.51 ml and inhibition 29.75% of BR treated group and mean paw volume 1.50ml and inhibition 30.12% in Bilwa stembark treated group. **These finding were comparable, hence Bhruhatpanch root may be replaced with Bilwa root and Bilwa stembark but not with Bilwa leaf.**

Bilwa root treated group of animals shown statistically significant difference ($P < 0.001$) in mean paw volume when compared to Bilwa leaf from 0.5 to 5th hr. The mean paw volume of Bilwa root and Bilwa stembark treated group shown no significant difference at 0.5 to 5thhr, which explains the Bilwa root and Bilwa stembark were equally effective on inflammation. The mean paw volume was 1.50 ml and 30.12% of inhibition at 5th hr of Bilwa stembark treatment, which is comparable with mean paw volume of 1.51 ml and 29.75% of inhibition after BR treated group. Hence it can be concluded that **Bilwa root may be replaced by Bilwa stembark but not Bilwa leaf.**

Bhattacharya et al (2016) reported the preliminary phytochemical studies on ethanolic extract of the *Aegle marmelos* (L.) Corr. Leaves and, detected Alkaloids, Saponin, flavonoids, steroids and tannin, The extract was known to have significant effect as an anti-inflammatory activity. The ethanolic extract observed an anti-inflammatory and anti-diarrheal in dose dependent manner when compared control and standard (diclofenac sodium) (10mg/kg, p.o). Study benefit of *Aegle marmelos* (L.) Corr. in treating inflammatory pain.³⁸

Efficacy of Agnimanth root, Agnimanth stembark and Agnimanth leaves in comparison to Bhruhatpanch Root (Table no. 21)

Bhruhatpanch oot (Combination of root) group had shown statistically significant difference ($P < 0.001$) in reducing mean paw volume when compared to Aganimanth stembark and Agnaimnth leaves from 0.5 to 5thhr. The mean paw volume of Agnimanth root and Bhruhatpanch root treated groups of animals had shown no significant difference at 0.5 to 5thhr, which means Agnimanth root having comparable efficacy in reducing inflammation as Bhruhatpanch root. The mean paw volume (1.61ml) and percentage of inhibition (26.67%) at 5thhr of Agnimanth root treated group were also compared to Bhruhatpanch root treated group with paw volume (1.59ml) and inhibition of (27.59%). There was no statistically significant difference between two groups. **Thus, the combined root extract Bhruhatpanch root may be replaced with the treatment of Agnimanth root but not with Agnimanth Stembark and Agnimanth Leaf.**

Agnimanth root extract treated group shown statistically significant difference in reducing mean paw volume of the animals ($P < 0.001$) as compared to Agnimanth stembark and Agnimanth leaf from 0.5hr to 5thhr. The mean paw volume and percentage of inhibition compared at 5thhr, which were 1.68ml and 23.50% for Agnimanth stembark, and 1.87ml and 15.04% for Agnimanth leaf respectively. **This results conclude that Agnimanth root may not be replaced by Agnimanth stembark or Agnimanth leaf.**

Vijayamirtharaj et al (2011) reported that a chloroform extract of *Clerodendrum phlomidis* L.f. aerial parts showed significant anti-inflammatory effect in animal study. Anti-inflammatory dose results were comparable with standard drug (phenylbutazone). Chloroform extract of *C. phlomidis* L.f. was treated to Paw edema,

C. phlomidis L.f. The dose 400, 200 mg/kg showed good reduction in paw edema by inhibition 26.80% and 34.02 % respectively, after 4 hr.⁴⁴

Efficacy of Shyonak root, Shyonak stem bark and Shyonak leaf in comparison to Bhruhatpanch Ro (Table no. 22)

Bhruhatpanch root (Combination root) group had shown statistically significant difference in mean paw volume ($P < 0.001$) when compared to Shyonak stem bark and Shyonak leaf from 0.5 to 5thhr. The mean paw volume of Shyonak root and Bhruhatpanch root group shown no significant difference at 0.5 to 5thhr means Shyonak root having similar efficacy as Bhruhatpanch root. The mean paw volume 1.62ml and percentage of inhibition 26.83% of Shyonak root treated group at 5thhr were compared with Bhruhatpanch root treated animals with mean paw volume 1.59ml and inhibition of 27.59%. **These results conclude that Bhruhatpanch root may be replaced by Shyonak root but not by Shyonak stem bark or Shyonak leaf.**

Shyonak root treated group of animals showed statistically significant difference ($P < 0.001$) in mean paw volume as compared to Shyonak stem bark and Shyonak leaf treated group from 0.5 to 5thhr. The mean paw volume and percentage of inhibition compared at 5thhr, which were 1.69ml and 23.05% for Shyonak stem bark treated group, and 1.80 ml and 18.21% for Shyonak leaf treated group respectively. **These findings concluded that Shyonak root may not be replaced by Shyonak stem bark and Shyonak leaf**

Krunaldoshi et al (2012) studied root bark and stem bark kashaya exhibit statistically significant decreased paw edema compared to the control. Percentage suppression of edema in group stem bark was (26.30%) and (22.70%) in roots. So, stem bark **decoction of shyonaka can be used as anti-inflammatory drug**⁵⁷.

Efficacy of Patala root, Patala stembark and Patala leaf in comparison to Bhruhatpanch root (Table no. 23)

Bhruhatpanch root (Combination root) group had shown statistically significant difference in reducing mean paw volume ($P < 0.001$) when compared to Patala leaf from 0.5 to 5thhr. The mean paw volume of Patala root, Patala stembark and Bhruhatpanch root group showed no significant difference at 0.5 to 5thhr means Patala root and Patala stembark having similar efficacy as Bhruhatpanch root. The mean paw volume and percentage of inhibition of Patala root treated group 1.62ml; 27.81% and Patala stembark treated group 1.58ml; 27.96% and Bhruhatpanch root 1.59ml; 27.59% are comparable findings. **The data showed that Bhruhatpanch root can be replaced by Patala root or Patala stembark but not Patala leaf.**

Patala root treated animals have shown statistically significant difference in reducing mean paw volume ($P < 0.001$) when compared to Patala leaf from 0.5 to 5th hr. The mean paw volume of Patala root and Patala stembark group shown no significant difference at 0.5hr to 5thhr means both are equally effective to treat inflammation. The mean paw volume (1.59ml) and percentage of inhibition (27.81%) of PR treated group found comparable compared at 5thhr to Patala stembak treated group with paw volume (1.58ml) and (27.96%) inhibition. **It concluded that Patala root may be replaced with Patala stembark but not Patala leaf.**

Balasubramanian et al.(2010) Studied and reported anti-inflammatory activity of *Stereospermum suavegens* (Roxb.DC) (Bignoniaceae) ethanol extract of bark (400 mg/kg body weight) and observed that the edema induced by carrageenan, dextran, and histamine group can be reduced accordingly, bark extract (400 mg/kg)

showed considerable reduction (34.77%) in sub-acute animal model. Study reveals that action was dose dependent⁵¹.

Efficacy of Gambhari root, Gambhari stembark and Gambhari leaf in comparison to Bhruhatpanch root (Table no. 24)

Bhruhatpanch root (Combination root) group had shown statistically significant difference in reducing mean paw volume ($P < 0.001$) when compared to Gambhari leaf from 0.5 to 5thhr. The mean paw volume of Gambhari root, Gambhari stembark and Bhruhatpanch root group shown no significant difference at 0.5 to 5thhr means GR and GS having similar efficacy as Bhruhatpanch root. The mean paw volume 1.55ml with percentage of inhibition 29.62% of GR treated group at 5th hr. and GS treated group 1.51ml; 30.68% compared with Bhruhatpanch root 1.59ml; 27.59% are the comparable findings. **These finding concludes that Bhruhatpanch root may be replaced with the Gambhari root and Gambhari stembark but not with Gambhari Leaf.**

Gambhari root Kashaya treated group of animals have shown statistically significant difference ($P < 0.001$) in the mean paw volume as compared to Gambhari leaf treated animals from 0.5hr to 5thhr. The mean paw volume of Gambhari root and Gambhari stembark treated groups has shown no significant difference at 0.5hr to 5thhr means both are having similar effect. The mean paw volume 1.55ml and percentage of inhibition 29.62% of Gambhari root treated animals at 5thhr were compared to mean paw volume of 1.51ml and inhibition 30.68% by Gambhari stembark treatment. **The obtained data concluded that Gambhari root may be replaced by Gambhari stembark but not Gambhari Leaf.**

Kaur et al. (2017) reported methanol extract of *Gmelina arborea* Linn. at the dose of 500 mg/kg and its ethyl acetate fraction at 50 mg/kg showed significant reduction in paw edema in comparison with standard drug. Ethyl acetate fraction was subjected to column chromatography which resulted in isolation of a new flavonoid (GM-01). Anti-inflammatory effect of methanol extract and its fractions can attribute to the presence of the flavonoid GM-01.⁶⁶

Discussion on inflammatory inhibitory activity in acute inflammatory condition:

Khatib et al. (2010) and *Benni et al.* (2011) reported that, acute inflammation is driven by biphasic mode, which is initiated by release of either histamine or serotonin, followed by inhibition of protease, lysozymes and prostaglandins¹⁰⁰⁻¹⁰¹. In acute inflammation study, rats of all groups showed significant reduction in inflammation and showed inhibitory activity at dose of 0.86 ml/kg body weight .from 0.5hr to 3rdhr followed up to 5thhr compared to control group (table 20-24, Graph 2-6). This reduction in edema and inhibitory activity of test groups may be due to inhibition of release of histamine, catalysed by serotonin (1-2 hrs) and later over-riden (>3 hrs) by prostaglandin.

Bhruhatpanch root (Combination of Roots), Bhruhatpanch stem bark (Combination of stem bark), Bilwa Root and Bilwa Stem bark, Gambhari root and Gambhari stem bark, Patala root and Patala stem bark were able to reduce the edema at post 3 hrs indicating its role potentially on prostaglandins.

Tannins and flavonoids are reported to have their effect on cyclooxygenase (COX). Flavonoids are a group of polyphenols with the ability to inhibit the biosynthesis of prostaglandins. There are two commonly known isomeric forms of COX (COX-1 and COX-2). Many of herbal extracts have

shown to inhibit COX-1 and COX-2 which are major molecular target of several anti-inflammatory action (14). Preliminary phytochemical screening of all kashayas showed, presence of Tannins, and Phenolic compounds and Flavonoid (Table no. 15), which are mainly responsible for anti-inflammatory action. *Kashayas may act in the same pathway and showing the inflammatory inhibitory action.*⁷⁵⁻⁸⁴

Discussion on Sub-Acute Anti-inflammatory study:

In acute anti-inflammatory study, the inflammation inhibitory activity in the test groups of **Bhruhatpanch leaf and other individual leaf groups** showed significant reduction compared to Bhruhatpanch root. Though Bhruhatpanch leaf and other leaf groups showed presence of Tannins and Flavonoids and showed significant anti-inflammatory activity compared to control group but insignificant when compared to Bhruhatpanch root group. Hence leaves of individual plants and Bhruhatpanch leaf groups are withdrawn for sub-acute anti-inflammatory study. On the basis findings of acute inflammatory study Bhruhatpanch root, Bhruhatpanch stembark, individual plants stem bark and roots were continued for further studies i.e. sub-acute anti-inflammatory study.

In sub-acute anti-inflammatory experiment, mean granuloma formation showed significant difference between Bhruhatpanch root (24.14 ± 0.72 mg), standard (11.75 ± 0.43 mg) and control (56.06 ± 0.938 mg). Individual roots and stem barks of BPR and BPS respectively showed minimal efficacy in modulating sub-acute inflammation as indicated by mean granuloma weight and histopathology images (Table 25-27)

Histopathological observations of all groups indicated that the kashayas moderately supporting in granuloma formation as noted by moderate collagen formation in the granulation tissue around grass pith with sustainable inhibition in acute inflammation. Sub-acute inflammation is characterized by cascade of events starting from infiltration of mononuclear cells followed by fibroblast proliferation leading to collagen and granuloma formation. The dry granuloma weight having correlation with total granulomatous tissues formed over grass pith in test groups and has comparative results were comparable to standard drug²⁴.

During the experiments involving anti-inflammatory activities murine models have demonstrated that naive CD4+ helper T cells (T_H) can be developed into at least four types of committed helper T cells, namely T helper 1 (Th1), Th2, Th17 and regulatory T cells (Tregs). In humans, there is evidence for the existence of all but discrete Th17 cells, helper T cells secreting interleukin (IL)-17 have clearly been described (*Fossiez 1996*). IL-17 has a proinflammatory role and has been implicated by the body in many inflammatory conditions in both humans and mice, while Tregs have an anti-inflammatory role. Interferon (IFN)- γ being the signature cytokine plays a major role in the immune response during inflammation¹⁰².

Sub-acute inflammation is characterised by cascade of events starting from infiltration of mononuclear cells followed by fibroblast proliferation to collagen and granuloma formation. In the present study the dry weight of the cotton pellet was correlated with the amount of granulomatous tissue formed. Histopathology results in present study showed that, test group was comparable standard drug. But in mean granuloma weight has significant difference in test drugs compared to standard drug ibuprofen. Kashaya treated groups managed to hasten the process of repair and not allowing the inflammation to be sustained.

Macro and Microscopic observation gives the pharmacognostics markers for identification of parts of selected plants. Presence of preliminary phytochemical was comparable with their respective plant parts either single or in combination in kashaya (Table 1-18).

There were variation in physicochemical results, HPTLC results and concentration of phytochemicals among different parts of plants. *Haring et al (2007)* and *Detlaff et al(2018)* stated that the tannins found in leaf differ from root and stem, even seasonal variations were noticed with highest concentration in roots during summer. This corroborates the classical instruction of collection of drugs and their parts in specific season¹⁰³⁻¹⁰⁴.

Total Tannin and Flavonoid content found higher in leaf than root and stembark but unable to reduce inflammation. Roots and stembark showed efficacy in acute and sub-acute inflammation inhibition activity in experimental rats. Different forms of tannins and flavonoids present in leaf, roots, and stembark and their active metabolic effect may be responsible for inflammation inhibitory activity in experimental rats. *Wei et al 2010*, found that tannins in stem and root have different polymer chains responsible for anti-oxidant activity which was not available in leaves as per (MALDI-ToF MS analysis)¹⁰⁵.

In the present study it observed that the findings of roots Bhruhatpanch root, Bilwa root, Agnimanth root, Patala root, Shyonak root, Gambhari root groups and Bhruhatpanch stembark, Bilwa stembark, Gambhari stembark, Patala stembark groups were comparable in reducing inflammation. Hence Bhruhatpanch stembark, Bilwa stembark, Patala stembark, Gambhari stembark, Bilwa root, Agnimanth root, Patala root, Shyonak root, Gambhari root may be used in the place of Bhruhatpanch root.

Among individual plants roots Bilwa, Patala and Gambhari can be replaced with respective plant stembark as similar findings were seen in the study.

Present study justifies that stem bark also has considerable acute anti-inflammatory activity [shothagna property] on comparison with roots of brhat panch moola plants. However, the leaf of brhat panchmoola have shown some extent of anti-inflammatory activity which is not significant in comparison to stem bark and roots of brahtpanchmoola. Individual plants root, stembark of Bilwa, Patala, Gambhari and combination of stembarks can be the alternatives for combination roots. In individual plants Bilwa, Patala and Gambhari may be replaced by their respective stem barks. This also reveals that by using the suggested alternative parts efficacy of selected plants will be maintained. With the sustainable use of alternative parts i.e. we can conserve the selected plants in natural habitat. This study supports proposed hypothesis.

SUMMARY

Bilwa, Agnimanth, Patala, Shyonak and Gambhari are five perennial plants described in Ayurveda classics for the treatment of Shotha i.e. inflammatory conditions. Root kashsya i.e. aqueous extract of these plants generally prescribed or utilized in Kashaya form, either in single or combined. As they have shothahar property these plants are placed in Charakdashamani in Shothahargana i.e. plants having action in shotha. Shothargana together also called as Dashmoola. Dashmoola having two major component Bhurutpanchmoola (five perennial plants) and Laghupanchmoola (five Herb plants).

The present study focused on Bhruhatpanchmoola group i.e on five perennial trees, namely Bilwa (*Aegle marmelos* (L.) Corr.) belonging to Rutaceae Gambhari (*Gmelina arborea* Linn.), Agnimanth (*Clerodendrum phlomoidis* L.f.) Belonging to Verbenaceae family and Shyonaka (*Oroxylum indicum* (L.)Vent.) and Patla (*Stereospermum suaveolens* (Roxb.) DC.) Bignonaceae family.

Out of 9548 formulations 712 formulation these plants are utilized either in single or combination. There is a huge demand for these plants in Ayurveda medicines. Because of involment of roots and perennial in habit, cultivation and harvesting is a long process. Among these plants Shyonaka (*Oroxylum indicum* (L.)Vent.) and Patla (*Stereospermum suaveolens* (Roxb.) DC.) listed under endangered species and also other plants facing the same situations. To meet present need and future requirement alternative to roots is essential. If it is prove that other parts of these plants such as stem barks or leaves possess similar activity then we can use them as an alternatives for roots without compromising quality of products. With this background acute and sub-acute anti-inflammatory study was planned

representative of shothghna property. Our literature survey did not provide such comparative scientific data for these plants.

Study was executed with collection of plants parts i.e. roots, leaves and stem barks from natural habitat. As per season of collection and instructions from national medicinal plants board for collection of roots were collected in grishmarutu, leaves varsharutu and stem bark sharadrutu. Bilwa, Agnimanth and Gambhari were collected from the natural habitat of Belagavi Karnataka where as Shyonak and plant were collected from natural habitat of Rahuri Maharashtra. Collected plants parts duly indentified and authenticated by the experts of Central Research Facility AYUSH approved ASU drug testing laboratory of KAHER`s Shri. B. M. K. Ayurved college Belagavi.

Collected samples observed for macro and microscopic examination. Macroscopic characters such as colour, odour, taste, shape texture etc. noted. In microscopic examination the different cells and their contents were observed. Both macro and microscopic observations helped to confirm their identity.

The physicochemical analysis of collected plants parts were done according to Ayurvedic Pharmacopeial methods on parameters employed for raw drugs and compared with quality standards available for plants parts such as roots of all plants, stembark Bilwa, Patala and Gambhari where as Shyonak and Agnimanth stembark as well as leaves of selected plants where quality standards are not available the methods repeated for three times the mean values taken as reference standards.

Phytochemcial analysis were done for all plants with water and alcohol extracts. Carbohydrate, Reducing sugars, Tannins and flavonoids were detected in

water extracts whereas in alcohol extracts steroids alkaloids, monosaccharide were detected.

Kashayas (Aqueous Extract) was prepared as per classical reference of Sharangdhar Madhyam Khanda^{2/1} by mixing one part of coarse powder of drug with sixteen parts water, boiled and reduced to 1/8th portion. Single drug coarse powder of all plant parts was prepared in pulverizer (Clit Mill – 7.5 HP Motor) with mesh size 40-60.

Coarse powder of five roots, five stem barks and five leaves of Bilwa, Agnimatha, Shyonak, Patala and Gambhari was prepared by mixing in equal proportion of individual drugs coarse powders. Quality assessment of prepared kashayas was done as per protocol recommended for ASU Drugs published by Ministry of AYUSH.

Sensory evaluation was done for colour, odour and taste that showed similar observation between the parts for selected plants. According to physicochemical analysis of kashayas only specific gravity and pH of Kashya comparable with in selected plants. Total solid content was differing due to particle sizes, nature of materials and decoction procedure.

Phytochemical analysis of all kashsyas, observed similarity in presence of carbohydrate, Proteins, amino acids, pentose sugars, tannins, Flavonoids in within the selected plants parts kashsyas.

Phytochemicals quantified for Total Tannin and Phenols with tannic acid and Total Flavonoids with Quercetine as reference standards. Results of roots and stem bark were comparable however in leaves it was slightly higher compare to roots and

stem barks. HPTLC fingerprinting analysis showed similarity in separation of phytochemicals in common mobile phase.

Experimental studies Acute & Subacute anti-inflammatory were done in the Animal research laboratory of KAHER`s Shri. B.M.K. Ayurved Mahavidyalaya, Belagavi.

Acute anti-inflammatory study of Kashayas were done by Carrageenan-induced rat paw edema method. The study protocol was accepted by the Committee of Institutional Animal Ethics (BMK/IAEC/Res-06/2009 Dated: 19/12/2009). Then animals divided into 20 groups (Table no 10)

Combination of Roots, Combination of stem bark, Bilwa Root and Stem bark, Gambhari root and stem bark, Patala root and stem bark was able to reduce the edema at post 3 hours indicating its role potentially on prostaglandins results were supported by by finding of with Benni J et al 2011 on bilwa extract, and other studies done on these individual test drugs have shown cyclooxygenase inhibition activity.

In Acute Anti-inflammatory study it was observed that the findings of roots Bhruhtpanch root, Bilwa root, Agnimanth root, Patala root, Shyonak root, Gambhari root groups and Bhruhatpanch stem bark, Bilwa stembark, Gambhari stembark, Patala Stembark groups were comparable in reducing inflammation. Hence Bhruhatpanch stem bark, Bilwa stembark, Gambhari stembark, Patala Stembark, Bhruhtpanch root, Bilwa root, Agnimanth root, Patala root, Shyonak root, Gambhari root can be used in the place of Bhuhatpanch root. Among individual plants roots Bilwa, Patala and Gambhari can be replaced with respective plant stembark as similar findings were seen in the study.

In acute anti-inflammatory leaves of individual and combination of plants showed less effective compared to roots and stem barks therefore leaf groups were dropped sub-acute anti-inflammatory study as per objective.

Sub-acute anti-inflammatory study of Kashayas were done by Foreign body induced granuloma method. The study protocol was approved by the Committee for Institutional Animal Ethics (BMK/IAEC/Res-17/2018-01 Dated: 13/01/2018). Then animals divided into 14 groups (Table no 11)

Sub-Acute inflammation is characterised by cascade of events starting from infiltration of mononuclear cells followed by fibroblast proliferation to collagen and granuloma formation. Here in study the dry weight of the cotton pellet correlates well with the amount of granulomatous tissue formed. Histopathology results in present study showed that, test group has comparative results against standard drug. But in mean granuloma weight it is observed significant difference in test drugs compared to standard drug ibuprofen. Kashaya treated groups managed to hasten the process of repair and not allowing the inflammation to be sustained.

In Sub-acute inflammatory condition combination of roots or stem bark of BPR not shown statistical antagonizing effect indicating its lesser role in anchoring sub-acute inflammatory process

This study justifies that selected other parts i.e. stembark & leaves are having of respective plants are having shothaghghna property i.e. anti-inflammatory activity only at acute inflammation. Individual plants root, stembark of Bilwa, Patala, Gambhari and combination of stembarks may be the alternatives for combination roots.

In individual plants Bilwa, Patala & Gambhari may be replaced by their respective stem barks. This also reveals that by using the suggested alternative parts efficacy of selected plants will be maintained either single or in combination. With the sustainable use of alternative part i.e. stembark in place of combination or single we can conserve and preserved the selected plants of Bhruhatpanchmoola in natural habitat. This study supports hypothesis of the study.

CONCLUSION

- Each kashaya of Bilwa, Agnimanth, Patala, Shyonak or Gambhari roots showed same degree of inhibition in acute inflammatory condition in rats when compared to kashsya of Bhruhatpanch roots.
- Kashaya of stem barks of Bilwa, Patala and Gambhari have shown comparable in acute anti-inflammatory condition when compared to kashsya of Bhruhatpanch roots.
- Kashsya of Bhruhatpanch Stem barks (BPS) showed similar effect in acute anti-inflammatory condition when compared to kashsya of Bhruhatpanch roots.
- Acute anti-inflammatory action of Bhruhatpanch roots kashsya is comparable with kashaya of individual roots of Bilwa, Agnimanth, Patala, Shyonak or Gmabhari or Stem barks of Bilwa, Patala and Gambhari or Kashsya of Bhruhatpanch Stem barks.
- This may help to choose alternative parts in the place of Bhruhatpanch root and also help in conservation of Bhruhatpanchmoola plants by exploitation
- Whilst, In Sub-acute inflammatory condition combination of roots or stem bark of BPR not shown statistical antagonizing effect indicating its lesser role in anchoring sub-acute inflammatory process.

SCOPE FOR FURTHER STUDY

Potent results showed plant parts can be taken up for clinical efficacy for shothaghna property i.e. anti-inflammatory activity

Isolation and characterization of the active component of potent plant part kashayas.

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ANNEXURES


Photo plate-1

Collection of Plant materials of selected plants

Plant Name	Roots	Leaves	Stem Barks
Bilwa			
Agnimath			
Patala			
Shyonak			
Gambhari			

ANNEXURES-1


Authetication Certificates of Plant parts collected




KLEU's Shri BMK Ayurveda Mahavidyalaya, Belagavi, 590003
 Central Research Facility
DRUG AUTHENTICATION REPORT

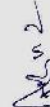
Submitted By: Mr. Ajit Lingayat
 Submitted Date: 30/12/16
 Date of Issue: 5/1/17

SL NO	Sample Name	Scientific Name	Family	Part submitted	CRF Code	Authenticated as			Remarks	
						Ayurvedic Name	Scientific Name	Family		Part Authenticated
1.	Bilwa	<i>Aegle marmelos</i> L.	Rutaceae	Stem Bark	CRF/Auth/16/ 260	Bilwa	<i>Aegle marmelos</i> L.	Rutaceae	Stem Bark	
2.	Agrimathi	<i>Clerodendron philloides</i> L. f.	Verbenaceae	Stem Bark	CRF/Auth/16/ 261	Agrimathi	<i>Clerodendron philloides</i> L. f.	Verbenaceae	Stem Bark	
3.	Patala	<i>Stereospermum suaveolens</i> DC	Bignoniaceae	Stem Bark	CRF/Auth/16/ 262	Patala	<i>Stereospermum suaveolens</i> DC	Bignoniaceae	Stem Bark	
4.	Shyonak	<i>Oroxylum indicum</i> (Linn)	Bignoniaceae	Stem Bark	CRF/Auth/16/ 263	Shyonak	<i>Oroxylum indicum</i> (Linn)	Bignoniaceae	Stem Bark	
5.	Gambhoori	<i>Gmelina arborea</i> Roxb	Verbenaceae	Stem Bark	CRF/Auth/16/ 264	Gambhoori	<i>Gmelina arborea</i> Roxb	Verbenaceae	Stem Bark	

Signature: 
 Authentication Expert Name: Dr. Adresh Holleyache
 Date: 5/1/17



 CRF
 SHAHAPUR,
 BELAGAVI

Signature of Coordinator
 ASU Drug Testing Laboratory




KLEU's Shri BMK Ayurveda Mahavidyalaya, Belagavi. 590003
Central Research Facility
DRUG AUTHENTICATION REPORT



Submitted By: Mr. Ajit Lingayat
 Submitted Date : 30/12/16

Date of Issue: 5/1/17

SL NO	Sample Name	Scientific Name	Family	Part submitted	CRF Code	Ayurvedic Name	Authenticated as			Remarks
							Scientific Name	Family	Part Authenticated	
1.	Bilwa	<i>Aegle marmelos</i> L.	Rutaceae	Root	CRF/Auth/16/ 265	Bilwa	<i>Aegle marmelos</i> L.	Rutaceae	Root	
2.	Agnimath	<i>Clerodendrum phlomisoides</i> L. f.	Verbenaceae	Root	CRF/Auth/16/ 266	Agnimath	<i>Clerodendrum phlomisoides</i> L. f.	Verbenaceae	Root	
3.	Patala	<i>Stereospermum sacroboles</i> DC	Bignoniaceae	Root	CRF/Auth/16/ 267	Patala	<i>Stereospermum sacroboles</i> DC	Bignoniaceae	Root	
4.	Slyonak	<i>Oroxylum indicum</i> (Linn)	Bignoniaceae	Root	CRF/Auth/16/ 268	Slyonak	<i>Oroxylum indicum</i> (Linn)	Bignoniaceae	Root	
5.	Gambhari	<i>Gmelina arborea</i> Roxb	Verbenaceae	Root	CRF/Auth/16/ 269	Gambhari	<i>Gmelina arborea</i> Roxb	Verbenaceae	Root	

Signature:

Authentication Expert Name: Dr. Advesh Holeyachre

Date: 5/1/17



Signature of Coordinator
 ASU Drug Testing Laboratory



KLEU's Shri BMK Ayurveda Mahavidyalaya, Belagavi, 590003
Central Research Facility
DRUG AUTHENTICATION REPORT



Submitted By: Mr. Ajit Lingayat
Submitted Date : 30/12/16

Date of Issue: 5/1/17

SL NO	Sample Name	Scientific Name	Family	Part submitted	CRF Code	Authenticated as			Remarks	
						Ayurvedic Name	Scientific Name	Family		Part Authenticated
1.	Bilwa	<i>Aegle marmelos</i> L.	Rutaceae	Leaves	CRF/Auth/16/ 270	Bilwa	<i>Aegle marmelos</i> L.	Rutaceae	Leaves	
2.	Agnimath	<i>Cherodendron phlomidis</i> L. f.	Verbenaceae	Leaves	CRF/Auth/16/ 271	Agnimath	<i>Cherodendron phlomidis</i> L. f.	Verberaceae	Leaves	
3.	Patala	<i>Stereospermum sauvagesii</i> DC	Bignoniaceae	Leaves	CRF/Auth/16/ 272	Patala	<i>Stereospermum sauvagesii</i> DC	Bignoniaceae	Leaves	
4.	Shyonak	<i>Oroxylum indicum</i> (Linn)	Bignoniaceae	Leaves	CRF/Auth/16/ 273	Shyonak	<i>Oroxylum indicum</i> (Linn)	Bignoniaceae	Leaves	
5.	Gambhari	<i>Gmelina arborea</i> Roxb	Verbanaceae	Leaves	CRF/Auth/16/ 274	Gambhari	<i>Gmelina arborea</i> Roxb	Verbenaceae	Leaves	



Signature:

Authentication Expert Name: Dr. Advesh Holyache

Date: 5/1/17

Signature of Coordinator
ASU Drug Testing Laboratory

Photo plate- 2

Macroscopic studies of Leaf plant materials



Bilwa



Agnimatha



Shyona



Gambhari



Patala

Photo plate- 3

Macroscopic studies of Root plant material



Bilwa



Agnimatha



Shyonak



Gambhari



Patala

Photo plate- 4

Macroscopic Studies of Stem Barks



Bilwa



Agnimatha



Shyonak



Gambhari



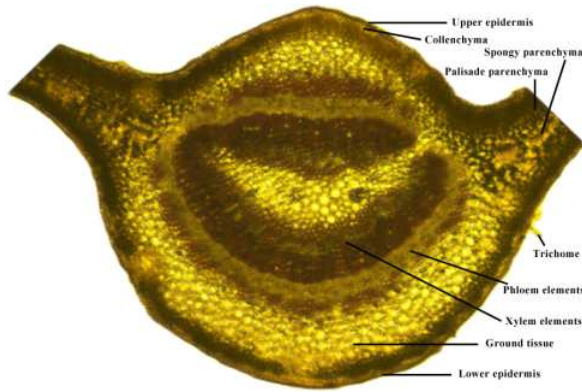
Patala

Photo plate- 5

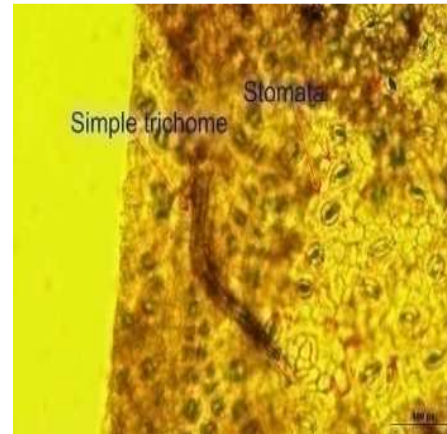
MICROSCOPY OF BILWA PLANT MATERIALS

Leaf

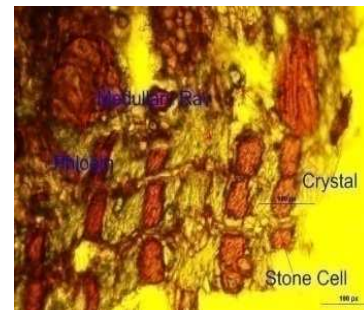
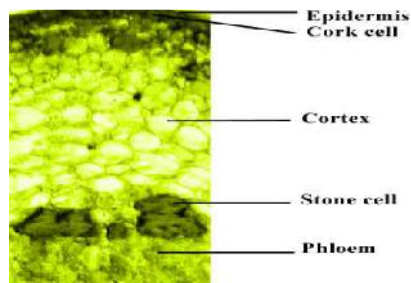
Leaf TS



Leaf Surface Preparation



T.S of stem Bark



T.S. Root

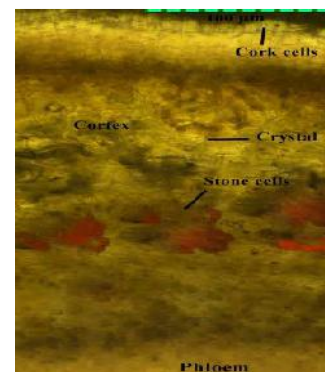
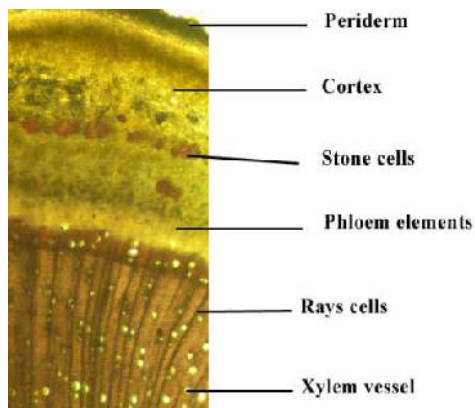
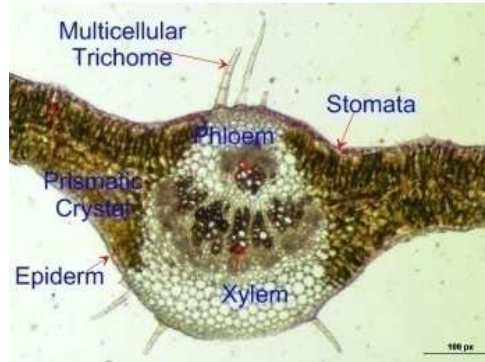


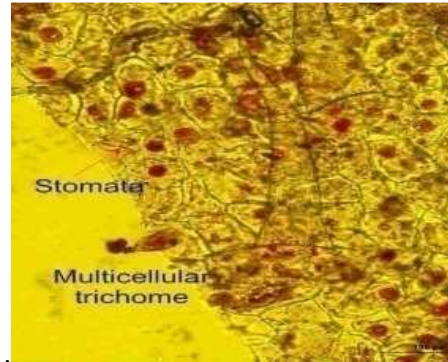
Photo plate- 6

MICROSCOPY OF AGNIMATH PLANT MATERIAL

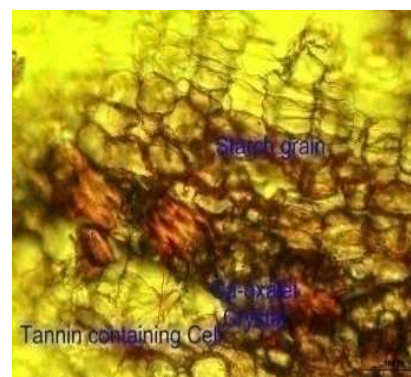
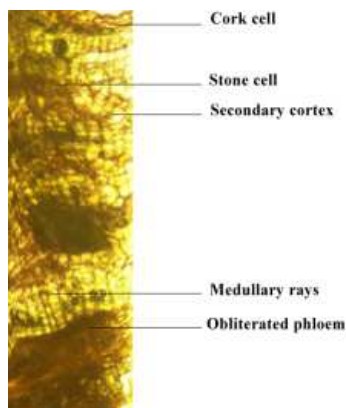
Leaf TS



Leaf Surface Preparation



T.S of stem Bark



T.S. Root

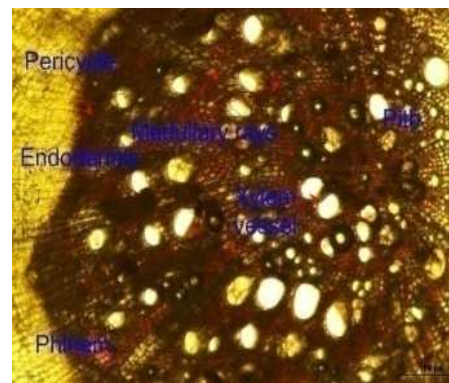
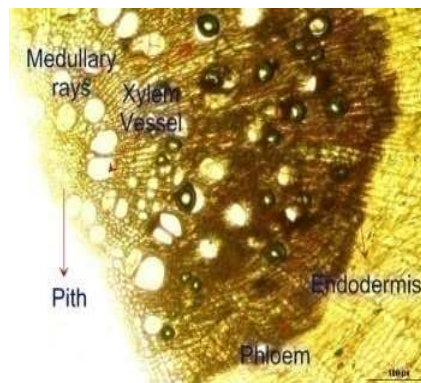
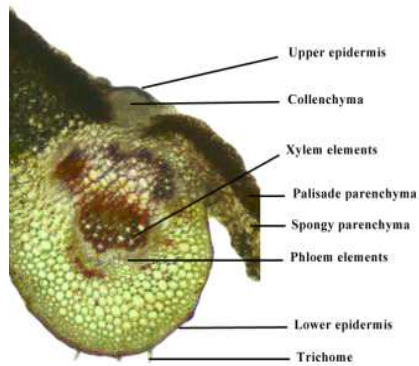


Photo plate- 7

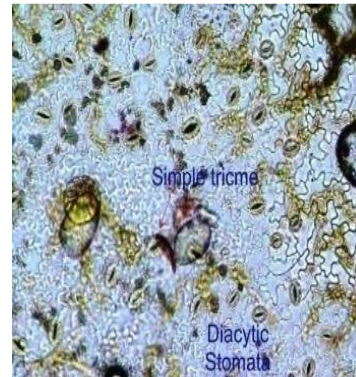
MICROSCOPY OF SHYONAK PLANT MATERIAL

Leaf

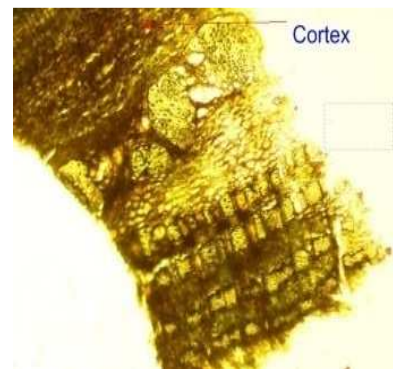
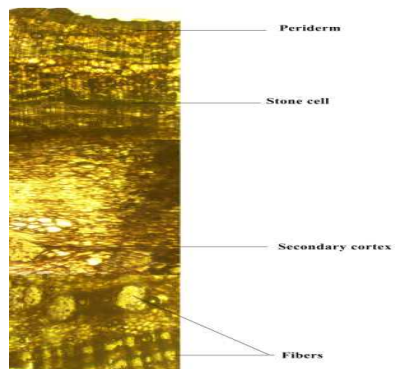
Leaf TS



Leaf Surface Preparation



T.S of stem Bark



T.S. Root

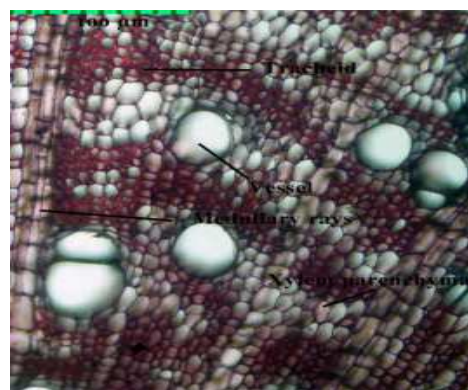
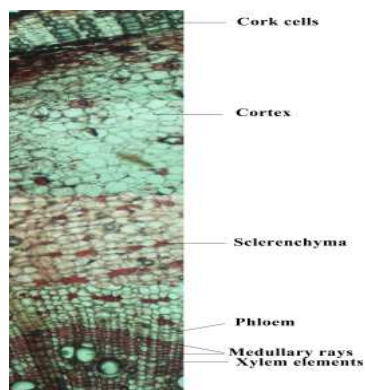
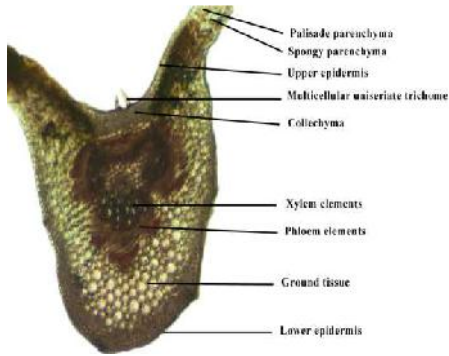


Photo plate- 8

MICROSCOPY OF PATALA PLANT MATERIALS

Leaf

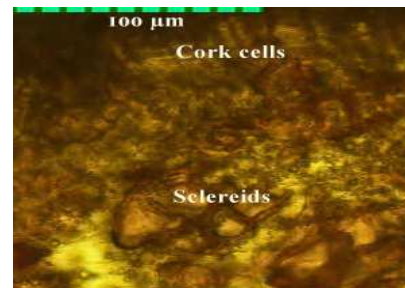
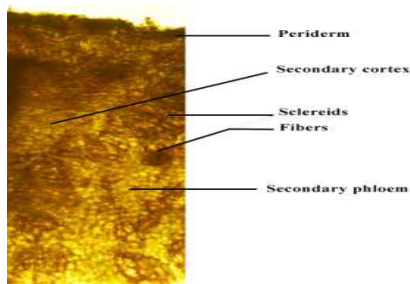
Leaf TS



Leaf Surface Preparation



T.S of stem Bark



T.S. Root

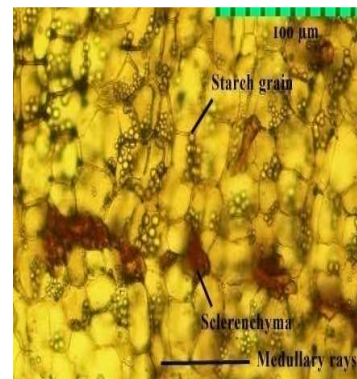
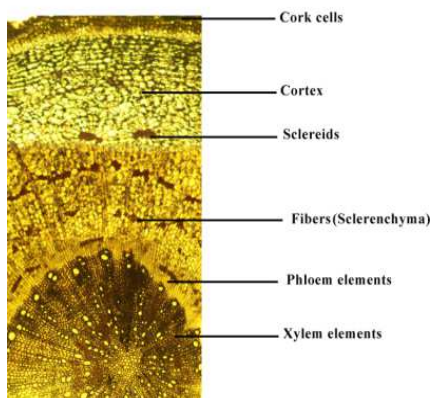
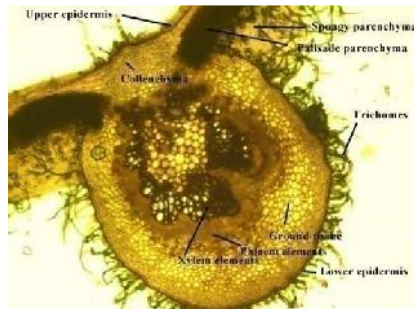


Photo plate- 9

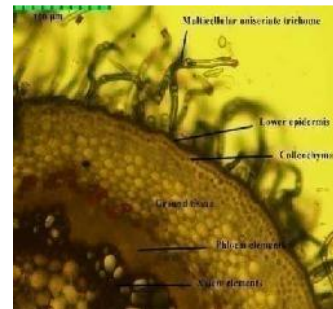
MICROSCOPY OF GAMBHARI PLANT MATERIALS

Leaf

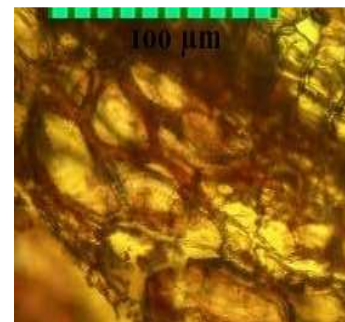
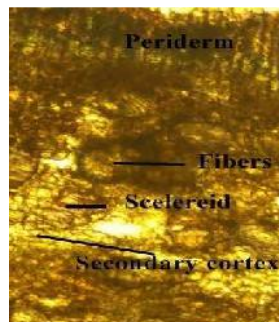
Leaf TS



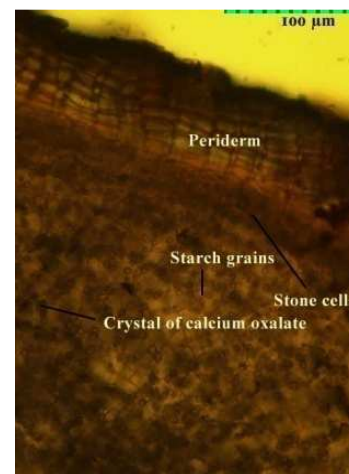
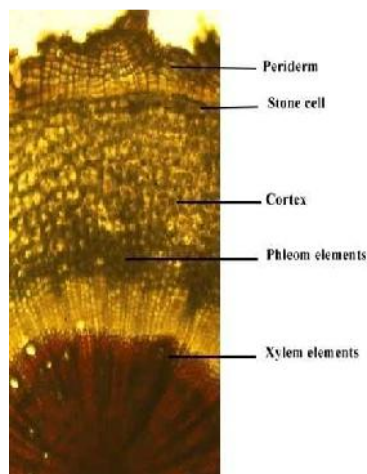
Leaf Surface Preparation



T.S of stem Bark



T.S. Root



ANNEXURES-2

Physicochemical Analysis results of Collected plant parts

K.L.E University's
(Accredited 'A' Grade BY NAAC (2nd Cycle) & Placed in Category 'A' by MHRD, Govt)
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Shahapur, Belgaum-590003 Karnataka-India

Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No:CRF/220/17-18

Date of Receipt:24/11/2017

Mfgd/Researcher: Mr.Ajit Lingayat

Report Date:07/12/2017

Sample : Bilwa

Batch No. : NA

Part/Form : Root

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/220/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :-**

TESTS	LIMITS (As per API)	RESULTS
PART	Root	: Root
COLOUR	Pale Yellowish	: Pale Yellowish
TASTE	Sweet	: Sweet
ODOUR	Odourless	: Odourless

Physico Chemical Standards :-

TESTS	LIMITS (As per API)	RESULTS
Foreign Matter	Not More Than 1%	Nil
Ash Value	Not More than 6 %	3.040 %
Acid insoluble Ash	Not more than 1 %	0.648 %
Water soluble extractive	Not Less than 7 %	10.421 %
Alcohol soluble extractive	Not Less than 7 %	9.432 %

(Standards referred above are as per API)

* In my opinion, the Sample is standard quality


ANALYST


AUTHORISED SIGNATORY

K.L.E University's
(Accredited 'A' Grade BY NAAC (2nd Cycle) & Placed in Category 'A' by MHRD, Govt.)
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Shahapur, Belgaum-590003 Karnataka-India

Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No: CRF/228/17-18

Date of Receipt: 24/11/2017

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 07/12/2017

Sample : Agnimanth

Batch No. : NA

Part/Form : Root

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/228/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :-**


TESTS	LIMITS (As per API)	RESULTS
PART	Root	: Root
COLOUR	Yellowish Brown	: Yellowish brown
TASTE	Slightly Astringent	: Slightly Astringent
ODOUR	Characteristic	: Characteristic

Physico Chemical Standards :-

TESTS	LIMITS (As per API)	RESULTS
Foreign Matter	Not More Than 2%	Nil %
Ash Value	Not More than 6%	3.364 %
Acid insoluble Ash	Not more than 1%	0.940 %
Water soluble extractive	Not Less than 5%	6.947 %
Alcohol soluble extractive	Not Less than 2%	5.792 %

(Standards referred above are as per API)

* In my opinion the Sample is standard quality


ANALYST


AUTHORISED SIGNATORY

K.L.E University's
(Accredited 'A' Grade BY NAAC (2nd Cycle) & Placed in Category 'A' by MHRD, Govt.)
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Shahapur, Belgaum-590003 Karnataka-India

Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. TL-8/2011)

Reference No: CRF/224/17-18

Date of Receipt: 24/11/2017

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 07/12/2017

Sample : Patala

Batch No. : NA

Part/Form : Root

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/224/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic:-**

TESTS	LIMITS	RESULTS
PART	Root	: Root
COLOUR	Brownish Cream	: Brownish Cream
TASTE	Bitter	: Bitter
ODOUR	Not Distinct	: Not Distinct

Physico Chemical Standards:-

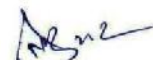
TESTS	LIMITS	RESULTS
Foreign Matter	Not More Than 2 %	: Nil
Ash Value	Not More Than 8 %	: 5.035 %
Acid insoluble Ash	Not More Than 6 %	: 1.726 %
Water soluble extractive	Not Less Than 20%	: 26.841 %
Alcohol soluble extractive	Not Less Than 10 %	: 15.705 %

(Standards referred above are as per API)

* In my opinion the Sample is standard quality



ANALYST

AUTHORISED SIGNATORY

K.L.E University's
(Accredited 'A' Grade BY NAAC (2nd Cycle) & Placed in Category 'A' by MHRD, GoI)
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Shahapur, Belgaum-590003 Karnataka-India

Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. TL-8/2011)

Reference No: CRF/222/17-18

Date of Receipt: 24/11/2017

Mfgd/Researcher : Mr. Ajit Lingayat

Report Date: 07/12/2017

Sample : Shyonak

Batch No. : NA

Part/Form : Root

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/222/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :-**

TESTS	Limits	RESULTS
PART	Root	: Root
COLOUR	Greyish brown to light	: Greyish brown to light Brown
TASTE	Slightly sweet	: Slightly sweet
ODOUR	Characteristic	: Characteristic

Physico Chemical Standards :-

TESTS	Limits	RESULTS
Foreign Matter	Not More Than 1%	: Nil
Ash Value	Not More Than 5%	: 1.633 %
Acid insoluble Ash	Not More Than 1%	: 0.384 %
Water soluble extractive	Not less Than 42%	: 46.172 %
Alcohol soluble extractive	Not More Than 20%	: 29.085 %

(Standards referred above are as per **API**)

* In my opinion the Sample is standard quality


ANALYST


AUTHORISED SIGNATORY

K.L.E University's
(Accredited 'A' Grade BY NAAC (2nd Cycle) & Placed In Category 'A' by MHRD, GoI)
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Shahapur, Belgaum-590003 Karnataka-India
Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. TL-8/2011)

Reference No: CRF/227/17-18

Date of Receipt: 24/11/2017

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 07/12/2017

Sample : Gambhari

Batch No. : NA

Part/Form : Stem Bark

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/227/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :-**

TESTS	LIMITS (As per API)	RESULTS
PART	Stem Bark	: Stem Bark
COLOUR	Yellowish brown	: Yellowish brown
TASTE	Non distinct	: Non distinct
ODOUR	Odourless	: Odourless

Physico Chemical Standards :-

TESTS	LIMITS (As per API)	RESULTS
Foreign Matter	Not More Than 1%	: Nil %
Ash Value	Not More than 11 %	: 6.673 %
Acid insoluble Ash	Not more than 0.3%	: 0.197 %
Water soluble extractive	Not Less than 23 %	: 26.129 %
Alcohol soluble extractive	Not Less than 8 %	: 13.724 %

(Standards referred above are as per API)

* In my opinion the Sample is standard quality


ANALYST




AUTHORISED SIGNATORY

K.L.E University's
(Accredited 'A' Grade BY NAAC (2nd Cycle) & Placed in Category 'A' by MHRD, Govt)

Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Shahapur, Belgaum-590003 Karnataka-India

Central Research Facility

Form-50 [See Rule 160-D (F)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No:CRF/226/17-18

Date of Receipt:24/11/2017

Mfgd./Researcher: Mr.Ajit Lingayat

Report Date:07/12/2017

Sample : Gambhari

Batch No. : NA

Part/Form : Root

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/226/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE

(The Drugs & Cosmetic Act 1940 and the rules there under)

Description Macroscopic :-

TESTS	LIMITS (As per API)	RESULTS
PART	Root	: Root
COLOUR	Greyish Brown.	: Greyish Brown.
TASTE	Sweetish With Bitter.	: Sweetish With Bitter
ODOUR	Characteristic.	: Characteristic

Physico Chemical Standards :-

TESTS	LIMITS (As per API)	RESULTS
Foreign Matter	Not More Than 2%	:Nil
Ash Value	Not More than 5%	:3.770 %
Acid insoluble Ash	Not more than 0.3%	:0.244 %
Water soluble extractive	Not Less than 20%	:22.208 %
Alcohol soluble extractive	Not Less than 7%	:12.572 %

(Standards referred above are as per API)

* In my opinion the Sample is standard quality


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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.IL-8/2011)

Reference No: CRF/221/17-18
Mfgd/Researcher : Mr. Ajit LingayatDate of Receipt: 24/11/2017
Report Date: 07/12/2017Sample : Bilwa
Product : PLANT
Date : 24/11/2017
(* N/A - Not Available)Batch No. : NA
Sample Qty : 50 gmPart/Form : Stem bark
Reference No : CRF/221/17-18**ANALYTICAL TEST CERTIFICATE***(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :-**


TESTS	LIMITS (As per API)	RESULTS
PART	Stem Bark	: Stem bark
COLOUR	N/A	: Greyish
TASTE	Not Characteristic	: Not Characteristic
ODOUR	Not Characteristic	: Not Characteristic

Physico Chemical Standards :-

TESTS	LIMITS (As per API)	RESULTS
Foreign Matter	Not More Than 1%	Nil %
Ash Value	Not More than 10 %	6.669 %
Acid insoluble Ash	Not more than 1 %	0.597 %
Water soluble extractive	Not Less than 9 %	12.678 %
Alcohol soluble extractive	Not Less than 4 %	9.376 %

(Standards referred above are as per API)

* In my opinion the Sample is standard quality


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. 71.8/2011)

Reference No: CRF/229/17-18

Date of Receipt: 24/11/2017

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 07/12/2017

Sample : Agnimanth

Batch No. : NA

Part/Form : Stem bark

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/229/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :-****TESTS****RESULTS**

PART

: Stem bark

COLOUR

: Yellowish Brown

TASTE

: Bitter

ODCUR

: Odourless

Physico Chemical Standards :-**TESTS****RESULTS**

Foreign Matter

Nil

Ash Value

6.485 %

Acid insoluble Ash

2.227 %

Water soluble extractive

7.431 %

Alcohol soluble extractive

3.453 %


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TL-8/2011)

Reference No:CRF/225/17-18
Mfgd/**Researcher**: Mr.Ajit LingayatDate of Receipt:24/11/2017
Report Date:07/12/2017Sample : Patala
Product : PLANT
Date : 24/11/2017
(* N/A - Not Available)Batch No. : NA
Sample Qty : 50 gmPart/Form : Stem Bark
Reference No : CRF/225/17-18**ANALYTICAL TEST CERTIFICATE***(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic:-**

TESTS	LIMITS	RESULTS
PART	Stem Bark	: Stem Bark
COLOUR	Dull Brown	: Dull Brown
TASTE	Not Characteristic	: Not Characteristic
ODOUR	Not Characteristic	: Not Characteristic

Physico Chemical Standards:-

TESTS	LIMITS	RESULTS
Foreign Matter	Not More Than 2 %	:Nil
Ash Value	Not More Than 8 %	:2.288 %
Acid insoluble Ash	Not More Than 1 %	:0.149 %
Water soluble extractive	Not less Than 25 %	:29.136 %
Alcohol soluble extractive	Not less Than 12.5 %	:18.862 %

Standards referred above are as per API)

* In my opinion the Sample is standard quality



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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-9/2011)

Reference No:CRF/223/17-18

Date of Receipt:24/11/2017

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:07/12/2017

Sample : Shyonak

Batch No. : NA

Part/Form : Stem bark

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/223/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :-****TESTS****RESULTS**

PART

: Stem bark

COLOUR

: Greyish Brown

TASTE

: Bitter

ODOUR

: Characteristic

Physico Chemical Standards :-

Foreign Matter

:Nil

Ash Value

:7.462 %

Acid insoluble Ash


:0.696 %

Water soluble extractive

:10.635 %

Alcohol soluble extractive

:4.283 %


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. 11-8/2011)

Reference No: CRF/227/17-18

Date of Receipt: 24/11/2017

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 07/12/2017

Sample : Gambhari

Batch No. : NA

Part/Form : Stem Bark

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/227/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE
(The Drugs & Cosmetic Act 1940 and the rules there under)

Description Macroscopic :-

TESTS	LIMITS (As per API)	RESULTS
PART	Stem Bark	: Stem Bark
COLOUR	Yellowish brown	: Yellowish brown
TASTE	Non distinct	: Non distinct
ODOUR	Odourless	: Odourless

Physico Chemical Standards :-

TESTS	LIMITS (As per API)	RESULTS
Foreign Matter	Not More Than 1%	: Nil %
Ash Value	Not More than 11 %	: 6.673 %
Acid insoluble Ash	Not more than 0.3%	: 0.197 %
Water soluble extractive	Not Less than 23 %	: 26.129 %
Alcohol soluble extractive	Not Less than 8 %	: 13.724 %

(Standards referred above are as per API)

* In my opinion the Sample is standard quality


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TL-8/2011)

Reference No:CRF/186/17-18

Date of Receipt:02/11/2017

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:15/11/2017

Sample : Bilwa Leaf

Batch No. : NA

Part/Form : Leaf

Product : PLANT

Sample Qty : 20 gm

Reference No : CRF/186/17-18

Date : 02/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :-**

TESTS	RESULTS
PART	: Leaf
COLOUR	: Pale Green
TASTE	: Astringent
ODOUR	: Aromatic

Physico Chemical Standards :-

TESTS	RESULTS
Foreign Matter	: Nil
Ash Value	: 7.823 %
Acid insoluble Ash	: 3.227 %
Water soluble extractive	: 11.451 %
Alcohol soluble extractive	: 4.544 %


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. TL-8/2011)

Reference No: CRF/185/17-18

Date of Receipt: 02/11/2017

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 15/11/2017

Sample : Agnimanth Leaf

Batch No. : NA

Part/Form : Leaf

Product : PLANT

Sample Qty : 20 gm

Reference No : CRF/185/17-18

Date : 2/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :-**

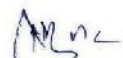
TESTS	RESULTS
PART	: Leaf
COLOUR	: Pale Green
TASTE	: Bitter
ODOUR	: Odourless

Physico Chemical Standards :-

TESTS	RESULTS
Foreign Matter	Nil
Ash Value	2.265 %
Acid insoluble Ash	1.379 %
Water soluble extractive	14.843 %
Alcohol soluble extractive	12.308 %


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TL-8/2011)

Reference No:CRF/183/17-18

Date of Receipt:02/11/2017

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:15/11/2017

Sample : Patala Leaf

Batch No. : NA

Part/Form : Leaf

Product : PLANT

Sample Qty : 20 gm

Reference No : CRF/183/17-18

Date : 02/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic:-**


TESTS	RESULTS
PART	: Leaf
COLOUR	: Greenish
TASTE	: Bitter
ODOUR	: Odourless

Physico Chemical Standards:-

TESTS	RESULTS
Foreign Matter	:Nil
Ash Value	:7.980 %
Acid insoluble Ash	:5.369 %
Water soluble extractive	:18.165 %
Alcohol soluble extractive	:10.882 %


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Form-50 [See Rule 160-D (f)]

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Reference No:CRF/187/17-18

Date of Receipt:02/11/2017

Mfgd/**Researcher**: Mr.Ajit Lingayat

Report Date:15/11/2017

Sample : Shyonak leaf

Batch No. : NA

Part/Form : Leaf

Product : PLANT

Sample Qty : 20 gm

Reference No : CRF/187/17-18

Date : 02/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :-****TESTS****RESULTS**

PART

: Leaf

COLOUR

: Greenish

TASTE

: Bitter

ODOUR

: Odourless

Physico Chemical Standards :-**TESTS****RESULTS**

Foreign Matter

:Nil

Ash Value

:8.473 %

Acid insoluble Ash

:1.932 %

Water soluble extractive

:16.456 %

Alcohol soluble extractive

:5.671 %


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Form-50 [See Rule 160-D (f)]

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Reference No:CRF/184/17-18
Mfgd/**Researcher**: Mr.Ajit Lingayat
Sample : Gambhari Leaf
Product : PLANT
Date : 02/11/2017
(* N/A - Not Available)

Batch No. : NA
Sample Qty : 20 gm

Date of Receipt:02/11/2017
Report Date:15/11/2017
Part/Form : Leaf
Reference No : CRF/184/17-18

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :-**

TESTS	RESULTS
PART	: Leaf
COLOUR	: Pale green
TASTE	: Bitter
ODOUR	: Odourless

Physico Chemical Standards :-

TESTS	RESULTS
Foreign Matter	:Nil
Ash Value	:9.653 %
Acid insoluble Ash	:1.732 %
Water soluble extractive	:8.770 %
Alcohol soluble extractive	:6.995 %


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ANNEXURES-3

Phytochemical Analysis results of Collected plant parts

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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TL-8/2011)

Reference No:CRF/220/17-18

Date of Receipt:24/11/2017

Mfgd/Researcher: Mr.Ajit Lingayat

Report Date:15/12/2017

Sample : Bilwa Root
Product : PLANT
Date : 24/11/2017
[* N/A - Not Available]

Batch No. : NA
Sample Qty : 50 gm

Part/Form : Root
Reference No : CRF/220/17-18

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Positive	Positive
Test for Pentose Sugar	Negative	Negative
Test for Hexose	Negative	Negative
Test for Protiens	Positive	Positive
Test for Amino Acids	Positive	Positive
Test for Steroids	Negative	Positive
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Positive
Test for Tannins	Positive	Positive
Test for Glycosides:		
A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Positive


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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic No.TL-8/2011)

Reference No:CRF/228/17-18

Date of Receipt:24/11/2017

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:15/12/2017

Sample : Agnimanth root

Batch No. : NA

Part/Form : Root

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/228/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Positive	Positive
Test for Pentose Sugar	Negative	Negative
Test for Hexose	Negative	Negative
Test for Protiens	Positive	Positive
Test for Amino Acids	Positive	Positive
Test for Steroids	Negative	Negative
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Positive
Test for Tannins	Positive	Positive

Test for Glycosides:

A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Positive


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-9/2011)

Reference No:CRF/224/17-18

Date of Receipt:24/11/2017

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:15/12/2017

Sample : Patala Root

Batch No. : NA

Part/Form : Root

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/224/17-18

Date : 24/11/2017

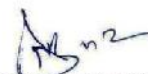
(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Negative	Negative
Test for Pentose Sugar	Negative	Negative
Test for Hexose	Negative	Negative
Test for Protiens	Positive	Positive
Test for Amino Acids	Positive	Positive
Test for Steroids	Negative	Positive
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Positive
Test for Tannins	Positive	Positive
Test for Glycosides:		
A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Positive



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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No:CRF/222/17-18

Date of Receipt:24/11/2017

Mfgd/Researcher: Mr.Ajit Lingayat

Report Date:15/12/2017

Sample : Shyonak Root

Batch No. : NA

Part/Form : Root

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/222/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Negative	Negative
Test for Pentose Sugar	Negative	Negative
Test for Hexose	Negative	Negative
Test for Protiens	Positive	Positive
Test for Amino Acids	Positive	Positive
Test for Steroids	Negative	Positive
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Positive	Positive
Test for Tannins	Positive	Positive
Test for Glycosides:		
A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Negative



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Form-50 [See Rule 160-D (f)]

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Reference No:CRF/226/17-18

Date of Receipt:24/11/2017

Mfgd/**Researcher**: Mr.Ajit Lingayat

Report Date:15/12/2017

Sample : Gambhari Root

Batch No. : NA

Part/Form : Root

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/226/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Negative	Positive
Test for Monosacharides	Positive	Positive
Test for Pentose Sugar	Positive	Negative
Test for Hexose	Negative	Negative
Test for Protiens	Negative	Positive
Test for Amino Acids	Negative	Positive
Test for Steroids	Negative	Positive
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Positive
Test for Tannins	Positive	Positive

Test for Glycosides:

A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Negative


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No:CRF/221/17-18

Date of Receipt:24/11/2017

Mfgd/**Researcher** :Mr.Ajit Lingayat

Report Date:15/12/2017

Sample : Bilwa Stem

Batch No. : NA

Part/Form : Stem

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/221/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Negative	Positive
Test for Pentose Sugar	Negative	Negative
Test for Hexose	Negative	Negative
Test for Protiens	Positive	Positive
Test for Amino Acids	Positive	Positive
Test for Steroids	Negative	Positive
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Positive
Test for Tannins	Positive	Positive
Test for Glycosides:		
A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Positive


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No: CRF/229/17-18
Mfgd/Researcher: Mr. Ajit LingayatDate of Receipt: 24/11/2017
Report Date: 15/12/2017Sample : Agnimanth Stem Bark
Product : PLANT
Date : 24/11/2017
(* N/A - Not Available)Batch No. : NA
Sample Qty : 50 gmPart/Form : Stem bark
Reference No : CRF/229/17-18**ANALYTICAL TEST CERTIFICATE***(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Positive	Positive
Test for Pentose Sugar	Negative	Negative
Test for Hexose	Negative	Negative
Test for Protiens	Positive	Positive
Test for Amino Acids	Positive	Positive
Test for Steroids	Negative	Positive
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Positive
Test for Tannins	Positive	Positive
Test for Glycosides:		
A. Cardiac Glycosides	Negative	Negative
B. Anthraquinone glycosides	Negative	Positive


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No:CRF/225/17-18

Mfgd/**Researcher** :Mr.Ajit Lingayat

Date of Receipt:24/11/2017

Report Date:15/12/2017

Sample : Patala Stem Bark

Batch No. : NA

Part/Form : Stem bark

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/225/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Negative	Positive
Test for Monosacharides	Positive	Positive
Test for Pentose Sugar	Negative	Negative
Test for Hexose	Negative	Negative
Test for Protiens	Negative	Positive
Test for Amino Acids	Negative	Positive
Test for Steroids	Negative	Positive
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Positive
Test for Tannins	Positive	Positive
Test for Glycosides:		
A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Negative


ANALYST




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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TL-8/2011)

Reference No:CRF/223/17-18

Date of Receipt:24/11/2017

Mfgd/**Researcher**: Mr.Ajit Lingayat

Report Date:15/12/2017

Sample : Shyonak Stem

Batch No. : NA

Part/Form : Stem

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/223/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Positive	Negative
Test for Pentose Sugar	Negative	Negative
Test for Hexose	Negative	Negative
Test for Protiens	Positive	Positive
Test for Amino Acids	Positive	Positive
Test for Steroids	Negative	Positive
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Positive
Test for Tannins	Positive	Positive
Test for Glycosides:		
A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Negative


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No:CRF/227/17-18

Date of Receipt:24/11/2017

Mfgd/Researcher: Mr.Ajit Lingayat

Report Date:15/12/2017

Sample : Gambhari Stem bark

Batch No. : NA

Part/Form : Stem bark

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/227/17-18

Date : 24/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Positive	Positive
Test for Pentose Sugar	Negative	Negative
Test for Hexose	Negative	Negative
Test for Protiens	Positive	Positive
Test for Amino Acids	Positive	Positive
Test for Steroids	Negative	Positive
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Positive
Test for Tannins	Positive	Positive
Test for Glycosides:		
A.Cardiac Glycosides	Negative	Positive
B.Anthraquinone glycosides	Negative	Positive


ANALYST




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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TL-8/2011)

Reference No:CRF/186/17-18

Date of Receipt:02/11/2017

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:18/11/2017

Sample : Bilwa leaf

Batch No. : NA

Part/Form : Leaf

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/186/17-18

Date : 02/11/2017

(* N/A - Not Available)

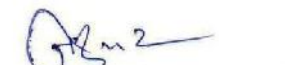
ANALYTICAL TEST CERTIFICATE

(The Drugs & Cosmetic Act 1940 and the rules there under)

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Positive	Negative
Test for Pentose Sugar	Negative	Positive
Test for Hexose	Negative	Negative
Test for Protiens	Negative	Positive
Test for Amino Acids	Negative	Positive
Test for Steroids	Negative	Negative
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Positive
Test for Tannins	Positive	Positive
Test for Glycosides:		
A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Positive


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TL-B/2011)

Reference No:CRF/185/17-18

Date of Receipt:02/11/2017

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:18/11/2017

Sample : Agnimanth leaf

Batch No. : NA

Part/Form : Leaf

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/185/17-18

Date : 02/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE

(The Drugs & Cosmetic Act 1940 and the rules there under)

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Negative	Negative
Test for Pentose Sugar	Negative	Positive
Test for Hexose	Negative	Negative
Test for Protiens	Positive	Positive
Test for Amino Acids	Positive	Positive
Test for Steroids	Negative	Negative
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Negative
Test for Tannins	Negative	Negative
Test for Glycosides:		
A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Negative


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No:CRF/183/17-18

Date of Receipt:02/11/2017

Mfgd/Researcher: Mr.Ajit Lingayat

Report Date:18/11/2017

Sample : Patala Leaf

Batch No. : NA

Part/Form : Leaf

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/183/2017-18

Date : 02/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Positive	Negative
Test for Pentose Sugar	Negative	Positive
Test for Hexose	Negative	Negative
Test for Protiens	Positive	Negative
Test for Amino Acids	Positive	Positive
Test for Steroids	Negative	Negative
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Positive
Test for Tannins	Positive	Positive
Test for Glycosides:		
A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Positive


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No TL-8/2011)

Reference No: CRF/187/17-18

Date of Receipt: 02/11/2017

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 18/11/2017

Sample : Shyonak leaf

Batch No. : NA

Part/Form : Leaf

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/187/17-18

Date : 02/11/2017


(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Negative	Positive
Test for Monosacharides	Positive	Negative
Test for Pentose Sugar	Negative	Positive
Test for Hexose	Negative	Negative
Test for Protiens	Negative	Positive
Test for Amino Acids	Negative	Positive
Test for Steroids	Negative	Negative
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Negative
Test for Tannins	Positive	Positive
Test for Glycosides:		
A. Cardiac Glycosides	Negative	Negative
B. Anthraquinone glycosides	Negative	Positive


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No:CRF/184/17-18

Date of Receipt:02/11/2017

Mfgd/**Researcher**: Mr.Ajit Lingayat

Report Date:18/11/2017

Sample : Gambhari Leaf

Batch No. : NA

Part/Form : Leaf

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/184/17-18

Date : 02/11/2017

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	WATER	ALCOHOL
Test for Carbohydrates	Positive	Positive
Test for Reducing sugar	Positive	Positive
Test for Monosacharides	Negative	Negative
Test for Pentose Sugar	Negative	Positive
Test for Hexose	Negative	Negative
Test for Protiens	Positive	Positive
Test for Amino Acids	Positive	Positive
Test for Steroids	Negative	Negative
Test for Flavonoids	Positive	Positive
Test for Alkaloids	Negative	Negative
Test for Tannins	Positive	Positive
Test for Glycosides:		
A.Cardiac Glycosides	Negative	Negative
B.Anthraquinone glycosides	Negative	Positive


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Photo plate no. 10

Preparation of Kashaya



Weighing of Material



Soaking in Precribed Qnty of water



Boiling on Mild Fire



Filtering of Kashaya



Leaf kashaya (Individual & Combination)



Root Kashaya(Individual & Combination)



Stem Bark Kashaya(Individual & Combination)

ANNEXURES-4

Quality assessment of collected plants parts Kashaya

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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.IL-8/2011)

Reference No:CRF/81/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher**:Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Bilwa root Kashaya

Part/Form : Kashaya(Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/81/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :****TESTS****RESULTS**

PART

: Kashaya(Aqueous extract)

COLOUR

: Brownish

TASTE

: Astringent

ODOUR

: Odourless

Physico Chemical Standards :**TESTS****RESULTS**

Total solids

:9.632%

pH

:6.07

Specific gravity

:1.038


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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No: CRF/82/18-19

Date of Receipt: 20/03/2018

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 02/04/2018

Sample : Agnimanth root Kashaya

Part/Form : Kashaya (Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/82/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (Aqueous extract)
COLOUR	: Brown
TASTE	: Astringent
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	: 5.982%
pH	: 6.05
Specific gravity	: 1.033


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Shahapur, Belgaum-590003 Karnataka-India

Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-9/2011)

Reference No:CRF/80/18-19

Date of Receipt:20/03/2018

Mfgd/Researcher:Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Patala root Kashaya

Part/Form : Kashaya (Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/80/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (Aqueous extract)
COLOUR	: Brown
TASTE	: Astringent
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	:15.321%
pH	:5.89
Specific gravity	:1.048


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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No:CRF/78/18-19

Date of Receipt:20/03/2018

Mfgd/Researcher :Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Shyonak root Kashaya

Part/Form : Kashaya (Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/78/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :****TESTS****RESULTS**

PART

: Kashaya (Aqueous extract)

COLOUR

: Brown

TASTE

: Bitter

ODOUR

: Odourless

Physico Chemical Standards :**TESTS****RESULTS**

Total solids

:18.172%

pH

:5.75

Specific gravity

:1.042


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. TL-8/2011)

Reference No: CRF/79/18-19

Date of Receipt: 20/03/2018

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 02/04/2018

Sample : Gambhari root Kashaya

Part/Form : Kashaya (Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/79/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (Aqueous extract)
COLOUR	: Brown
TASTE	: Bitter
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	: 18.409%
pH	: 5.80
Specific gravity	: 1.061


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Central Research Facility

Form-50 [See Rule 180-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TL-8/2011)

Reference No:CRF/86/18-19

Date of Receipt:20/03/2018

Mfgd/Researcher :Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Bilwa Stem Kashaya

Part/Form : Kashaya (Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/86/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (Aqueous extract)
COLOUR	: Brown
TASTE	: Astringent
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	: 9.029%
pH	: 6.05
Specific gravity	: 1.049


ANALYST




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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No:CRF/87/18-19

Date of Receipt:20/03/2018

Mfgd/Researcher:Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Agnimanth Stem Kashaya

Part/Form: Kashaya (Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/87/18-19

Date : 20/03/018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (Aqueous extract)
COLOUR	: Brown
TASTE	: Astringent
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	:6.076%
pH	:6.01
Specific gravity	:1.042


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TI-8/2011)

Reference No:CRF/85/18-19

Date of Receipt:20/03/2018

Mfgd/Researcher:Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Patala stem Kashaya

Part/Form : Kashaya (Aqueous Extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/85/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :****TESTS****RESULTS**

PART

: Kashaya (Aqueous Extract)

COLOUR

: Light brown

TASTE

: Bitter

ODOUR

: Odourless

Physico Chemical Standards :**TESTS****RESULTS**

Total solids

:19.310%

pH

:6.01

Specific gravity

:1.064


 ANALYST


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No:CRF/83/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher**:Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Shyonak stem Kashaya

Part/Form : Kashaya (Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/83/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (Aqueous extract)
COLOUR	: Brownish
TASTE	: Astringent
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	:9.127%
pH	:6.03
Specific gravity	:1.039


ANALYST




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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No:CRF/84/18-19

Mfgd/Researcher:Mr.Ajit Lingayat

Date of Receipt:20/03/2018

Report Date:02/04/2018

Sample : Gambhari Stem Kashaya

Part/Form : Kashaya (Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/84/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (Aqueous extract)
COLOUR	: Brown
TASTE	: Astringent
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	:18.623%
pH	:6.05
Specific gravity	:1.061


ANALYST




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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. TL-8/2011)

Reference No: CRF/76/18-19

Date of Receipt: 20/03/2018

Mfgd./Researcher: Mr. Ajit Lingayat

Report Date: 02/04/2018

Sample : Bilwa leaf Kashaya

Part/Form : Kashaya (Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/76/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (Aqueous extract)
COLOUR	: Dark Brown
TASTE	: Astringent
ODOUR	: Characteristic

Physico Chemical Standards :

TESTS	RESULTS
Total solids	: 10.231%
pH	: 5.71
Specific gravity	: 1.043


ANALYST




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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. TL-8/2011)

Reference No: CRF/77/18-19

Date of Receipt: 20/03/2018

Mfgd/Researcher : Mr. Ajit Lingayat

Report Date: 02/04/2018

Sample : Agnimath Leaf Kashaya

Part/Form : Kashaya (Aqueous Extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/77/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (Aqueous Extract)
COLOUR	: Brown
TASTE	: Bitter
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	: 13.94%
pH	: 5.81
Specific gravity	: 1.047


ANALYST




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K.L.E University's
(Accredited 'A' Grade BY NAAC (2nd Cycle) & Placed in Category 'A' by MHRD, Govt.)
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Shahapur, Belgaum-590003 Karnataka-India

Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TI-8/2011)

Reference No:CRF/75/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher** :Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Patala Leaf Kashaya

Part/Form : Kashaya (Aqueous Extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/75/18-19

Date : 20/03/18

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**


TESTS	RESULTS
PART	: Kashaya (Aqueous Extract)
COLOUR	: Brown
TASTE	: Bitter
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	:17.06%
pH	:5.58
Specific gravity	:1.053


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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL.8/2011)

Reference No:CRF/73/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher** :Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Shyonak leaf Kashaya

Part/Form : Kashaya (aqueous extract)

Product : Plant

Sample Qty : 50 ml

Reference No : CRF/73/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (aqueous extract)
COLOUR	: Brown
TASTE	: Bitter
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	:13.606%
pH	:5.41
Specific gravity	:1.045


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No:CRF/74/18-19

Date of Receipt:20/03/2018

Mfgd/Researcher:Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Gambhari Leaf Kashaya

Part/Form : Kashaya (Aqueous Extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/74/18-19

Date : 20/03/18

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (Aqueous Extract)
COLOUR	: Dark Brown
TASTE	: Bitter
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	:8.135%
pH	:5.53
Specific gravity	:1.035


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No:CRF/89/18-19

Date of Receipt:20/03/2018

Mfgd/Researcher :Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Bruhat Panchmool root Kashaya Part/Form : Kashaya (Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/89/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)***Description Macroscopic :**

TESTS	RESULTS
PART	: Kashaya (Aqueous extract)
COLOUR	: Brown
TASTE	: Bitter
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	:18.370%
pH	:5.82
Specific gravity	:1.040


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No:CRF/90/18-19

Date of Receipt:20/03/2018

Mfgd/Researcher:Mr.Ajit Lingayat

Report Date:02/04/2018

Sample : Bruhat Panchmoola stem Kashaya

Part/Form: Kashaya (Aqueous extract)

Product : Plant

Sample Qty : 50 ml

Reference No : CRF/90/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE

(The Drugs & Cosmetic Act 1940 and the rules there under)

Description Macroscopic :

TESTS	RESULTS
PART	: Kashaya (Aqueous extract)
COLOUR	: Light brown
TASTE	: Astringent
ODOUR	: Odourless

Physico Chemical Standards :

TESTS	RESULTS
Total solids	:11.120%
pH	:5.72
Specific gravity	:1.037


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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. TI-8/2011)

Reference No: CRF/88/18-19

Date of Receipt: 20/03/2018

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 02/04/2018

Sample : Bruhat panchmool leaf Kashaya Part/Form : Kashaya (Aqueous extract)

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/88/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE

(The Drugs & Cosmetic Act 1940 and the rules there under)

Description Macroscopic :

TESTS	RESULTS
PART	: Kashaya (Aqueous extract)
COLOUR	: Dark brown
TASTE	: Astringent
ODOUR	: Characteristic

Physico Chemical Standards :

TESTS	RESULTS
Total solids	: 15.076%
pH	: 6.03
Specific gravity	: 1.049


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ANNEXURES-5

Phytochemical analysis observations of collected plant parts kashayas

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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic No.TL-8/2011)

Reference No:CRF/81/18-19

Date of Receipt:20/03/2018

Mfgd/Researcher: Mr.Ajit Lingayat

Report Date:23/03/2018

Sample : Bilwa root Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50ml

Reference No : CRF/81/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Positive
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive

Test for Glycosides:

A.Cardiac Glycosides	Positive
B.Anthraquinone glycosides	Negative


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory LC No.TL-8/2011)

Reference No:CRF/82/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:24/03/2018

Sample : Agnimanth root Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50ml

Reference No : CRF/82/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Negative
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive
Test for Glycosides:	
A.Cardiac Glycosides	Negative
B.Anthraquinone glycosides	Negative


ANALYST




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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. TI-8/2011)

Reference No: CRF/80/18-19

Date of Receipt: 20/03/2018

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 23/03/2018

Sample : Patala root Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50ml

Reference No : CRF/80/18-19

Date : 20/03/2018


(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Positive
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive

Test for Glycosides:

A. Cardiac Glycosides	Positive
B. Anthraquinone glycosides	Negative


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No:CRF/78/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:23/03/2018

Sample : Shyonak root Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/78/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Negative
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive
Test for Glycosides:	
A.Cardiac Glycosides	Negative
B.Anthraquinone glycosides	Positive


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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No:CRF/79/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:23/03/2018

Sample : Gambhari root Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 gm

Reference No : CRF/79/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*


TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Positive
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive

Test for Glycosides:

A.Cardiac Glycosides	Negative
B.Anthraquinone glycosides	Negative


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Shahapur,Belgaum-590003 Karnataka-India

Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TI-8/2011)

Reference No:CRF/86/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:26/03/2018

Sample : Bilwa Stem Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/86/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Positive
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive
Test for Glycosides:	
A.Cardiac Glycosides	Positive
B.Anthraquinone glycosides	Negative


ANALYST




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 Shahapur, Belgaum-590003 Karnataka-India
Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No:CRF/87/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:26/03/2018

Sample : Agnimanth Stem Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/87/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Positive
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive
Test for Glycosides:	
A.Cardiac Glycosides	Negative
B.Anthraquinone glycosides	Negative


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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No. TL-8/2011)

Reference No: CRF/85/18-19

Date of Receipt: 20/03/2018

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 24/03/2018

Sample : Patala Srem Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50ml

Reference No : CRF/85/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Positive
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive
Test for Glycosides:	
A. Cardiac Glycosides	Negative
B. Anthraquinone glycosides	Negative


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic No.TL-8/2011)

Reference No:CRF/83/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:24/03/2018

Sample : Shyonak Stem Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/83/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Negative
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive

Test for Glycosides:

A.Cardiac Glycosides	Negative
B.Anthraquinone glycosides	Negative


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No:CRF/84/18-19
Mfgd/**Researcher:** Mr.Ajit LingayatDate of Receipt:20/03/2018
Report Date:24/03/2018Sample : Gambhari Stem Kashaya
Product : PLANT
Date : 20/03/2018
(* N/A - Not Available)Batch No. : NA
Sample Qty : 50mlPart/Form : Kashaya
Reference No : CRF/84/18-19**ANALYTICAL TEST CERTIFICATE***(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Positive
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive
Test for Glycosides:	
A.Cardiac Glycosides	Positive
B.Anthraquinone glycosides	Negative


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No:CRF/76/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:22/03/2018

Sample : Bilwa leaf Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/76/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Negative
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive

Test for Glycosides:

A.Cardiac Glycosides	Positive
B.Anthraquinone glycosides	Negative


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Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic No.TI-8/2011)

Reference No:CRF/77/18-19

Date of Receipt:20/03/2018

Mfgd/**Researcher:** Mr.Ajit Lingayat

Report Date:22/03/2018

Sample : Agnimanth leaf Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/77/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Negative
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive

Test for Glycosides:

A.Cardiac Glycosides	Negative
B.Anthraquinone glycosides	Negative


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Form-50 [See Rule 160-0 (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TL-8/2011)

Reference No: CRF/75/18-19

Date of Receipt: 20/03/2018

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 22/03/2018

Sample : Patala leaf Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/75/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosaccharides	Positive
Test for Pentose Sugar	Negative
Test for Hexose	Negative
Test for Proteins	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive

Test for Glycosides:

A. Cardiac Glycosides	Positive
B. Anthraquinone glycosides	Negative


ANALYST


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Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TL-8/2011)

Reference No:CRF/73/18-18

Date of Receipt:20/03/2018

Mfgd/Researcher: Mr.Ajit Lingayat

Report Date:22/03/2018

Sample : Shyonak leaf kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/73/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Negative
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive

Test for Glycosides:

A.Cardiac Glycosides	Negative
B.Anthraquinone glycosides	Negative


ANALYST




AUTHORISED SIGNATOR

K.L.E University's
(Accredited 'A' Grade BY NAAC (2nd Cycle) & Placed in Category 'A' by MHRD, Govt)

Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Shahapur, Belgaum-590003 Karnataka-India

Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TL-8/2011)

Reference No:CRF/74/18-19

Date of Receipt:20/03/2018

Mfgd/Researcher: Mr.Ajit Lingayat

Report Date:22/03/2018

Sample : Gambhari leaf kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/74/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE

(The Drugs & Cosmetic Act 1940 and the rules there under)

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Negative
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive

Test for Glycosides:

A.Cardiac Glycosides	Positive
B.Anthraquinone glycosides	Negative


ANALYST




AUTHORISED SIGNATORY

K.L.E University's
(Accredited 'A' Grade BY NAAC (2nd Cycle) & Placed in Category 'A' by MHRD, GoI)
Shri B.M.Kankanwadi Ayurveda Mahavidyalaya
Shahapur, Belgaum-590003 Karnataka-India

Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic.No.TL.8/2011)

Reference No: CRF/90/18-19

Date of Receipt: 20/03/2018

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 26/03/2018

Sample : Bruhat panchmoola stem Kashaya

Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 ml


Reference No : CRF/90/18-19

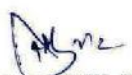
Date : 20/03/2018

[* N/A - Not Available]

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Positive
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive
Test for Glycosides:	
A. Cardiac Glycosides	Positive
B. Anthraquinone glycosides	Negative


ANALYST


AUTHORISED SIGNATORY

K.L.E University's
(Accredited 'A' Grade BY NAAC (2nd Cycle) & Placed in Category 'A' by MHRD, GoI)
Shri B.M.Kankanawadi Ayurveda Mahavidyalaya
Shahapur, Belgaum-590003 Karnataka-India

Central Research Facility

Form-50 [See Rule 160-D (f)]

(AYUSH Approved ASU Drug Testing Laboratory Lic. No.TI-8/2011)

Reference No: CRF/88/18-19

Date of Receipt: 20/03/2018

Mfgd/Researcher: Mr. Ajit Lingayat

Report Date: 26/03/2018

Sample : Bruhat panchmool leaf kashaya Batch No. : NA

Part/Form : Kashaya

Product : PLANT

Sample Qty : 50 ml

Reference No : CRF/88/18-19

Date : 20/03/2018

(* N/A - Not Available)

ANALYTICAL TEST CERTIFICATE*(The Drugs & Cosmetic Act 1940 and the rules there under)*

TESTS	RESULT
Test for Carbohydrates	Positive
Test for Reducing sugar	Positive
Test for Monosacharides	Positive
Test for Pentose Sugar	Positive
Test for Hexose	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Negative
Test for Flavonoids	Positive
Test for Alkaloids	Negative
Test for Tannins	Positive

Test for Glycosides:

A. Cardiac Glycosides	Positive
B. Anthraquinone glycosides	Negative


ANALYST




AUTHORISED SIGNATORY

ANNEXURES-6

Total Tannin and phenolic content (as Tannic Acid marker by UV Spectroscopy analysis)



TEST REPORT

Report No: NRPL/QCO/03/089


Issued to:
Mr. Ajit Chandrashekar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com


Lab Reference No. : 1803089E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Leaf - BL Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Dark brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.87	By UV Spectrophotometry

Note: The results are reported on "As is" basis


ANALYST


AUTHORISED SIGNATORY

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
2) The client asked for above tests only.
3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
4) Total liability of our laboratory is limited to the invoice amount.
5) This report should not be reproduced, used as evidence in the court of law or it should not be used in any kind of advertising /media without our prior written consent.
6) The client asked for above tests only.
7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/091

Issued to:
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 Assistant Professor
 B. M.K. Ayurved College,
 Shahapur, Belagavi - 590003
 Karnataka
 Mob: 9620165655
 E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803091E
 Your Test Requisition No. : Letter
 Date : 21.03.2018
 Date of Receipt : 22.03.2018
 Date of Report : 14.04.2018
 Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Leaf - AL Kashaya** bearing Batch No.: **Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.26	By UV Spectrophotometry
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

- Note:**
- 1) The results listed above pertain only to the tested samples and applicable parameters.
 - 2) The client asked for above tests only.
 - 3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
 - 4) Total liability of our laboratory is limited to the invoice amount.
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 - 6) The client asked for above tests only.
 - 7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/093

Issued to:
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Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803093E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as Leaf - PL Kashaya bearing Batch No.: Not specified was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.77	By UV Spectrophotometry
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
2) The client asked for above tests only.
3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
4) Total liability of our laboratory is limited to the invoice amount.
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6) The client asked for above tests only.
7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/092



Issued to:
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 Shahapur, Belagavi - 590003
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 Mob: 9620165655
 E-mail: ajittingayat26@gmail.com

Lab Reference No. : 1803092E
 Your Test Requisition No. : Letter
 Date : 21.03.2018
 Date of Receipt : 22.03.2018
 Date of Report : 14.04.2018
 Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Leaf - SL Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.58	By UV Spectrophotometry

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
 2) The client asked for above tests only.
 3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
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 6) The client asked for above tests only.
 7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/090

Issued to:



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Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803090E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Leaf - GL Kashaya** bearing Batch No.: **Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Dark brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.54	By UV Spectrophotometry

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

- Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
2) The client asked for above tests only.
3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
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6) The client asked for above tests only.
7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/094

Issued to:
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Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803094E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Leaf - BPL Kashaya** bearing Batch No.: **Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Dark brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.71	By UV Spectrophotometry
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

- Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
2) The client asked for above tests only.
3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
4) Total liability of our laboratory is limited to the invoice amount.
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6) The client asked for above tests only.
7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/101

Issued to:
Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803101E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Stem - BS Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.08	By UV Spectrophotometry
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
2) The client asked for above tests only.
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6) The client asked for above tests only.
7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/103

Issued to:
 Mr. Ajit Chandrashekhar Lingayat
 Assistant Professor
 B. M.K. Ayurved College,
 Shahapur, Belagavi - 590003
 Karnataka
 Mob: 9620165655
 E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803103E
 Your Test Requisition No. : Letter
 Date : 21.03.2018
 Date of Receipt : 22.03.2018
 Date of Report : 14.04.2018
 Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Stem - AS Kashaya** bearing Batch No.: **Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Light brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.14	By UV Spectrophotometry
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
 2) The client asked for above tests only.
 3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
 4) Total liability of our laboratory is limited to the invoice amount.
 5) This report should not be reproduced, used as evidence in the court of law or it should not be used in any kind of advertising /media without our prior written content.
 6) The client asked for above tests only.
 7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/105

Issued to:
Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803105E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Stem - PS Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Light brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.15	By UV Spectrophotometry
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

- Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
2) The client asked for above tests only.
3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
4) Total liability of our laboratory is limited to the invoice amount.
5) This report should not be reproduced, used as evidence in the court of law or it should not be used in any kind of advertising /media without our prior written consent.
6) The client asked for above tests only.
7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/104

Issued to:
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 Assistant Professor
 B. M.K. Ayurved College,
 Shahapur, Belagavi - 590003
 Karnataka
 Mob: 9620165655
 E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803104E
 Your Test Requisition No. : Letter
 Date : 21.03.2018
 Date of Receipt : 22.03.2018
 Date of Report : 14.04.2018
 Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Stem - SS Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Light brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.21	By UV Spectrophotometry
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
 2) The client asked for above tests only.
 3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
 4) Total liability of our laboratory is limited to the invoice amount.
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 6) The client asked for above tests only.
 7) Sample not drawn by us.

Natural Remedies Private Limited

Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

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TEST REPORT

Report No: NRPL/QCO/03/102

Issued to:
Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803102E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Stem - GS Kashaya** bearing Batch No.: **Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Light brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.16	By UV Spectrophotometry
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

- Note:**
- 1) The results listed above pertain only to the tested samples and applicable parameters.
 - 2) The client asked for above tests only.
 - 3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
 - 4) Total liability of our laboratory is limited to the invoice amount.
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 - 6) The client asked for above tests only.
 - 7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/106



Issued to:
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Assistant Professor
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Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803106E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Stem - BPS Kashaya** bearing Batch No.: **Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Light brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.14	By UV Spectrophotometry

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
2) The client asked for above tests only.
3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
4) Total liability of our laboratory is limited to the invoice amount.
5) This report should not to be reproduced, used as evidence in the court of law or it should not be used in any kind of advertising /media without our prior written content.
6) The client asked for above tests only.
7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/095

Issued to:



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Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803095E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Root - BR Kashaya** bearing Batch No.: **Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.19	By UV Spectrophotometry

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

- Note:
- 1) The results listed above pertain only to the tested samples and applicable parameters.
 - 2) The client asked for above tests only.
 - 3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
 - 4) Total liability of our laboratory is limited to the invoice amount.
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 - 6) The client asked for above tests only.
 - 7) Sample not drawn by us.

Natural Remedies Private Limited

Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

5 B, Veerasandra Industrial Area, Hosur Road, Electronic City Post, Bangalore 560 100. INDIA

Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com



TEST REPORT

Report No: NRPL/QCO/03/097

Issued to:



Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803097E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Root - AR Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.14	By UV Spectrophotometry

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

- Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
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4) Total liability of our laboratory is limited to the invoice amount.
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6) The client asked for above tests only.
7) Sample not drawn by us.

Natural Remedies Private Limited

Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

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TEST REPORT

Report No: NRPL/QCO/03/099

Issued to:



Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803099E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Root - PR Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.16	By UV Spectrophotometry

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

- Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
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7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/098



Issued to:
Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803098E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Root - SR Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.30	By UV Spectrophotometry

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

- Note:
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 - 7) Sample not drawn by us.

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TEST REPORT

Report No: NRPL/QCO/03/096



Issued to:
Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1803096E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Root - GR Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.29	By UV Spectrophotometry

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

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Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com



TEST REPORT

Report No: NRPL/QCO/03/100


Issued to:
Mr. Ajit Chandrashekar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com


Lab Reference No. : 1803100E
Your Test Requisition No. : Letter
Date : 21.03.2018
Date of Receipt : 22.03.2018
Date of Report : 14.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Root - BPR Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown liquid	By Visual
2)	Total Polyphenols as Tannic acid (%w/w)	0.21	By UV Spectrophotometry

Note: The results are reported on "As is" basis


ANALYST


AUTHORISED SIGNATORY

- Note:
- 1) The results listed above pertain only to the tested samples and applicable parameters.
 - 2) The client asked for above tests only.
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ANNEXURES-7

Total Flavonoids (as Quercetine by HPLC analysis)



TEST REPORT

Report No: NRPL/QCO/04/048



Issued to:
Mr. Ajit Chandrashekar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804048E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Leaf - BL Kashaya** bearing Batch No.: **Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Dark Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.024	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

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7) Sample not drawn by us.

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Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

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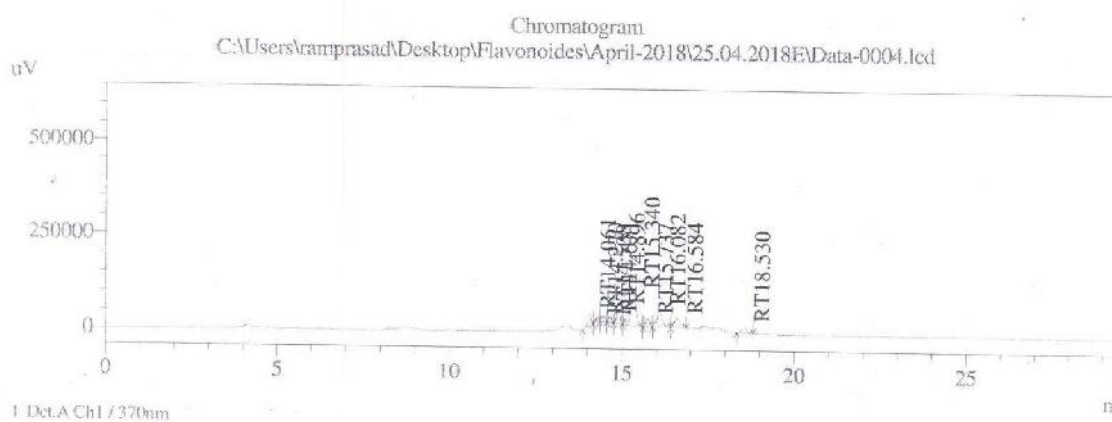
Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====**Natural Remedies Pvt Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018\ENData-0004.lcd

Sample Name : Leaf - BL Kashaya
 Sample ID : 1804048E
 Tray# : 1
 Vial# : 2
 Injection Volume : 5 uL
 Data Filename : Data-0004.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 25-04-2018 21:10:34
 Data Processed : 26-04-2018 15:00:56



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018\ENData-0004.lcd

Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	14.061	RT14.061	221779	9.171
2	14.270	RT14.270	54654	2.260
3	14.508	RT14.508	12329	0.510
4	14.671	RT14.671	81561	3.373
5	14.896	RT14.896	256640	10.612
6	15.340	RT15.340	833813	34.479
7	15.737	RT15.737	154603	6.393
8	16.082	RT16.082	437977	18.111
9	16.584	RT16.584	235471	9.737
10	18.530	RT18.530	129507	5.355
Total			2418334	100.000



TEST REPORT

Report No: NRPL/QCO/04/050



Issued to:
Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804050E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Leaf - AL Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.002	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

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7) Sample not drawn by us.

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Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

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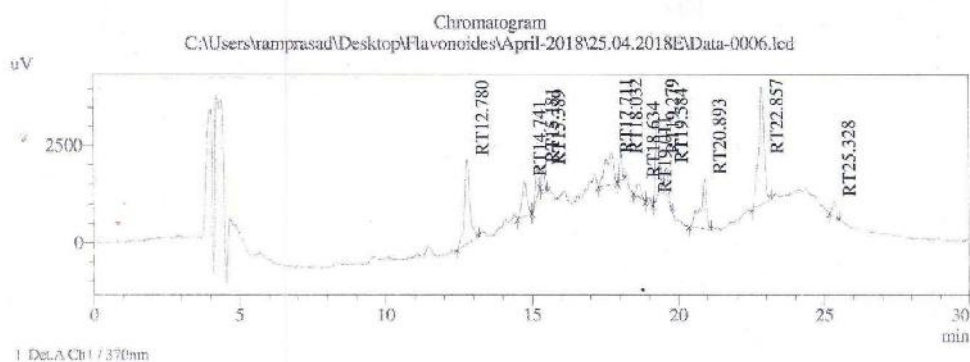
Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====**Natural Remedies Pvt Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0006.lcd

Sample Name : Leaf - AL Kashaya
 Sample ID : 1804050E
 Tray# : 1
 Vial# : 4
 Injection Volume : 5 uL
 Data Filename : Data-0006.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 25-04-2018 22:11:54
 Data Processed : 26-04-2018 15:07:38



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0006.lcd

Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	12.780	RT12.780	28170	17.509
2	14.741	RT14.741	10637	6.612
3	15.181	RT15.181	5319	3.306
4	15.389	RT15.389	3547	2.205
5	17.711	RT17.711	16011	9.952
6	18.032	RT18.032	5447	3.386
7	18.634	RT18.634	3540	2.201
8	19.011	RT19.011	1147	0.713
9	19.279	RT19.279	17570	10.921
10	19.584	RT19.584	5400	3.357
11	20.893	RT20.893	19474	12.104
12	22.857	RT22.857	40894	25.418
13	25.328	RT25.328	3731	2.319
Total			160889	100.000



TEST REPORT

Report No: NRPL/QCO/04/052



Issued to:
 Mr. Ajit Chandrashekar Lingayat
 Assistant Professor
 B. M.K. Ayurved College,
 Shahapur, Belagavi - 590003
 Karnataka
 Mob: 9620165655
 E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804052E
 Your Test Requisition No. : E-mail
 Date : 16.04.2018
 Date of Receipt : 16.04.2018
 Date of Report : 27.04.2018
 Sample quantity : ~ 50 ml

Sample Particulars: One sample described as Leaf - PL Kashaya bearing Batch No.: Not specified was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.008	By HPLC
3)	Fingerprinting	Refer Annexure	By TLC

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
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 7) Sample not drawn by us.

Natural Remedies Private Limited

Regd. Office & R&D

CIN No.: U24232KA1998PTC023573

Plot No. 5 B, Veerasaandra Industrial Area, 19th K.M Stone, Hosur Road, Electronic City Post, Bangalore 560 100, INDIA

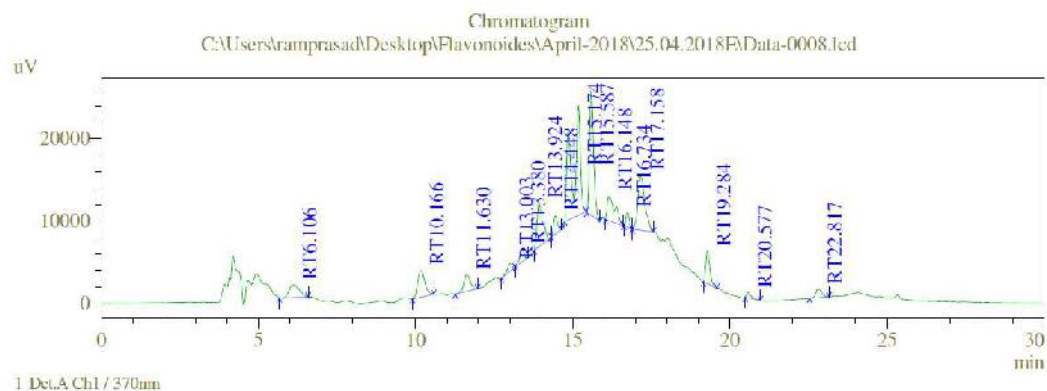
Tel: 91 80 4020 9999 / 8/7, 2783 2265, Fax: 91 80 4020 9817, Email: research@naturalremedy.com, Web: www.naturalremedy.com

=====**Natural Remedies Pvt.Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018\FData-0008.lcd

Sample Name : Leaf - Pl. Kashaya
 Sample ID : 1804052E
 Tray# : 1
 Vial# : 6
 Injection Volume : 5 uL
 Data Filename : Data-0008.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 25-04-2018 23:13:16
 Data Processed : 26-04-2018 15:12:24



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018\FData-0008.lcd

Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	6.106	RT6.106	34424	4.258
2	10.166	RT10.166	51797	6.408
3	11.630	RT11.630	28900	3.575
4	13.003	RT13.003	9834	1.216
5	13.380	RT13.380	15133	1.872
6	13.924	RT13.924	64594	7.991
7	14.448	RT14.448	19996	2.474
8	15.174	RT15.174	225598	27.907
9	15.587	RT15.587	134481	16.636
10	16.148	RT16.148	52179	6.455
11	16.734	RT16.734	14027	1.735
12	17.158	RT17.158	102054	12.625
13	19.284	RT19.284	34663	4.288
14	20.577	RT20.577	6566	0.812
15	22.817	RT22.817	14137	1.749
Total			808383	100.000





TEST REPORT

Report No: NRPL/QCO/04/051

Issued to:
Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804051E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Leaf - SL Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.027	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
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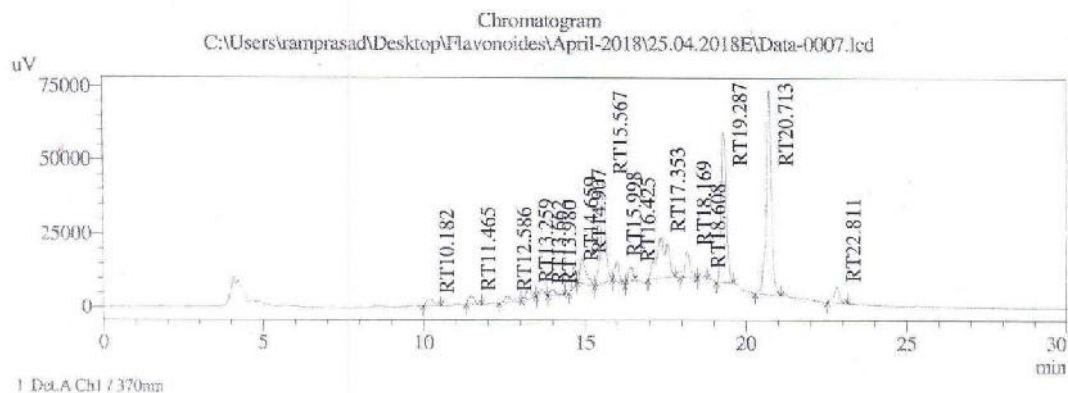
Natural Remedies Private Limited
Regd. Office & Factory
CIN No.: U24232KA1998PTC023573
Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100. INDIA
Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====**Natural Remedies Pvt Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0007.lcd

Sample Name : Leaf - SL Kashaya
 Sample ID : 1804051E
 Tray# : 1
 Vail# : 5
 Injection Volume : 5 uL
 Data Filename : Data-0007.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 25-04-2018 22:42:36
 Data Processed : 26-04-2018 15:10:42



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0007.lcd

Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	10.182	RT10.182	36979	1.391
2	11.465	RT11.465	32558	1.225
3	12.586	RT12.586	33999	1.279
4	13.259	RT13.259	38468	1.448
5	13.662	RT13.662	19653	0.740
6	13.980	RT13.980	22116	0.832
7	14.659	RT14.659	46114	1.735
8	14.907	RT14.907	113026	4.253
9	15.567	RT15.567	366419	13.788
10	15.998	RT15.998	61506	2.314
11	16.425	RT16.425	50769	1.910
12	17.353	RT17.353	337915	12.715
13	18.169	RT18.169	92791	3.492
14	18.608	RT18.608	13659	0.514
15	19.287	RT19.287	567868	21.368
16	20.713	RT20.713	754230	28.381
17	22.811	RT22.811	69482	2.614
Total			2657553	100.000



TEST REPORT



Report No: NRPL/QCO/04/049

Issued to:

Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804049E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Leaf - GL Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Dark Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.020	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

- Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
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Natural Remedies Private Limited

Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100. INDIA

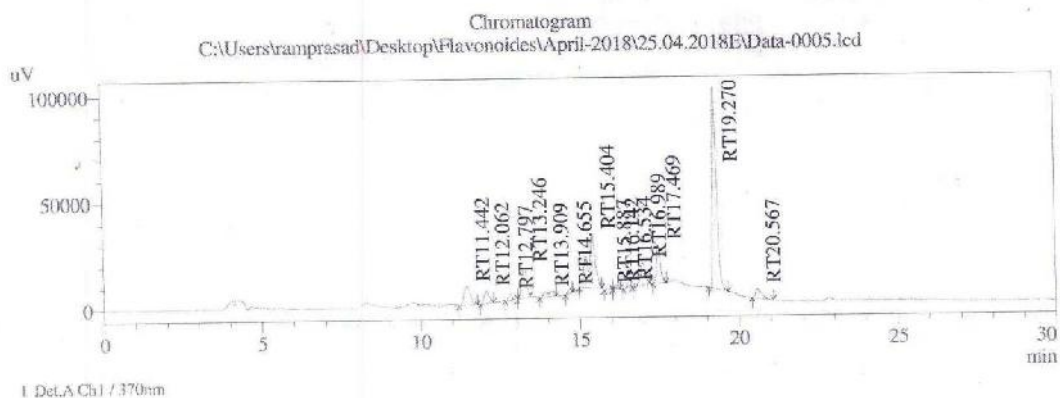
Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====Natural Remedies Pvt Ltd=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0005.lcd

Sample Name : Leaf - GL Kashaya
 Sample ID : 1804049E
 Tray# : 1
 Vial# : 3
 Injection Volume : 5 uL
 Data Filename : Data-0005.lcd
 Method Filename : Data-0004.lcd
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 25-04-2018 21:41:14
 Data Processed : 27-04-2018 10:32:28



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0005.lcd

Peak#	Ret. Time	Name	Area	Area %
1	11.442	RT11.442	120902	6.006
2	12.062	RT12.062	65258	3.242
3	12.797	RT12.797	24366	1.210
4	13.246	RT13.246	148933	7.399
5	13.909	RT13.909	41707	2.072
6	14.655	RT14.655	11950	0.594
7	15.404	RT15.404	413907	20.562
8	15.887	RT15.887	5337	0.265
9	16.142	RT16.142	8533	0.424
10	16.534	RT16.534	9598	0.477
11	16.989	RT16.989	106852	5.308
12	17.469	RT17.469	153653	7.633
13	19.270	RT19.270	842804	41.869
14	20.567	RT20.567	59135	2.938
Total			2012935	100.000



TEST REPORT

Report No: NRPL/QCG/04/053



Issued to:
 Mr. Ajit Chandrashekhar Lingayat
 Assistant Professor
 B. M.K. Ayurved College,
 Shahapur, Belagavi - 590003
 Karnataka
 Mob: 9620165655
 E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804053E
 Your Test Requisition No. : E-mail
 Date : 16.04.2018
 Date of Receipt : 16.04.2018
 Date of Report : 27.04.2018
 Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Leaf - BPL Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Dark Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.012	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

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 6) The client asked for above tests only.
 7) Sample not drawn by us.

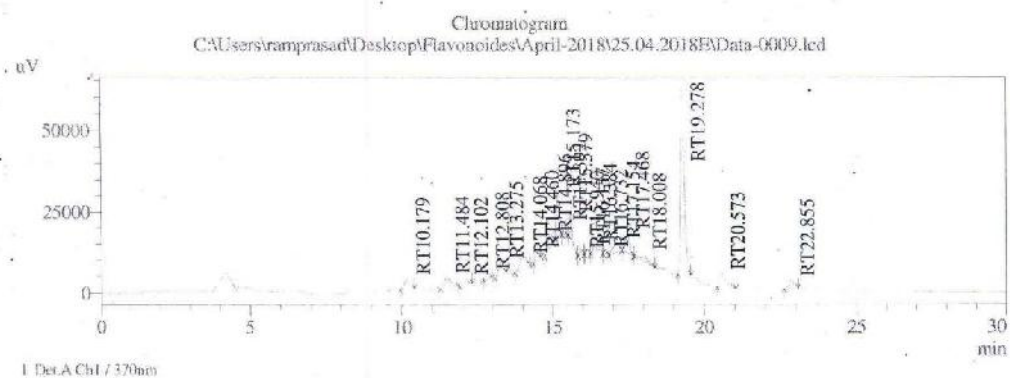
Natural Remedies Private Limited
 Regd. Office & Factory
 CIN No.: U24232KA1998PTC023573
 Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100. INDIA
 Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====**Natural Remedies Pvt Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0009.lcd

Sample Name : Leaf - BPL Kashaya
 Sample ID : 1804053E
 Tray# : 1
 Vial# : 7
 Injection Volume : 5 uL
 Data Filename : Data-0009.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 25-04-2018 23:43:58
 Date Processed : 26-04-2018 15:14:29



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0009.lcd
 Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	10.179	RT10.179	39473	3.394
2	11.484	RT11.484	43198	3.714
3	12.102	RT12.102	17606	1.514
4	12.808	RT12.808	12674	1.090
5	13.275	RT13.275	38363	3.298
6	14.068	RT14.068	57751	4.965
7	14.460	RT14.460	20007	1.720
8	14.896	RT14.896	30769	2.645
9	15.173	RT15.173	96886	8.330
10	15.392	RT15.392	15796	1.358
11	15.579	RT15.579	45810	3.938
12	15.940	RT15.940	3744	0.322
13	16.137	RT16.137	9551	0.821
14	16.384	RT16.384	25378	2.182
15	16.732	RT16.732	5557	0.478
16	17.154	RT17.154	38879	3.343
17	17.468	RT17.468	51890	4.461
18	18.008	RT18.008	27055	2.326
19	19.278	RT19.278	497881	42.805
20	20.573	RT20.573	58078	4.993
21	22.855	RT22.855	26798	2.304
Total			1163143	100.000



TEST REPORT

Report No: NRPL/QCO/04/054



Issued to:
Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804054E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Root - BR Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.003	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

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7) Sample not drawn by us.

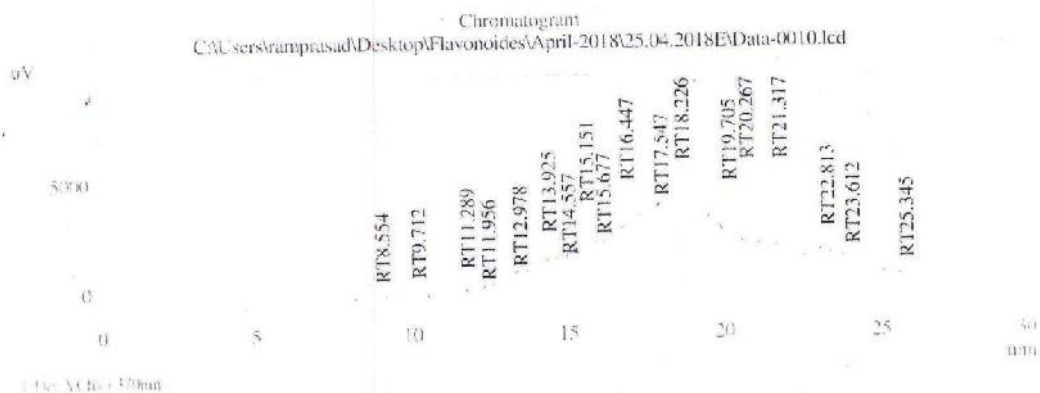
Natural Remedies Private Limited
Regd. Office & Factory
CIN No.: U24232KA1998PTC023573
Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100, INDIA
Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====**Natural Remedies Pvt Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0010.lcd

Sample Name : Root - BR Kashaya
 Sample ID : 1804054E
 Tray# : 1
 Vial# : 8
 Injection Volume : 5 uL
 Data Filename : Data-0010.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 26-04-2018 00:14:38
 Data Processed : 26-04-2018 15:16:19



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0010.lcd

Peak#	Ret. Time	Name	Area	Area %
1	8.554	RT8.554	11349	3.287
2	9.712	RT9.712	10273	2.975
3	11.289	RT11.289	19313	5.594
4	11.956	RT11.956	2878	0.834
5	12.978	RT12.978	3956	1.146
6	13.925	RT13.925	24937	7.222
7	14.557	RT14.557	-244	-0.071
8	15.151	RT15.151	18846	5.458
9	15.677	RT15.677	5517	1.598
10	16.447	RT16.447	27930	8.089
11	17.547	RT17.547	4254	1.232
12	18.226	RT18.226	76782	22.238
13	19.705	RT19.705	15075	4.366
14	20.267	RT20.267	60817	17.614
15	21.317	RT21.317	49219	14.255
16	22.813	RT22.813	10332	2.992
17	23.612	RT23.612	780	0.226
18	25.345	RT25.345	3265	0.946
Total			345278	100.000



TEST REPORT

Report No: NRPL/QCO/04/056



Issued to:
Mr. Ajit Chandrashekhara Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804056E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Root - AR Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.001	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

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7) Sample not drawn by us.

Natural Remedies Private Limited

Regd. Office & Factory

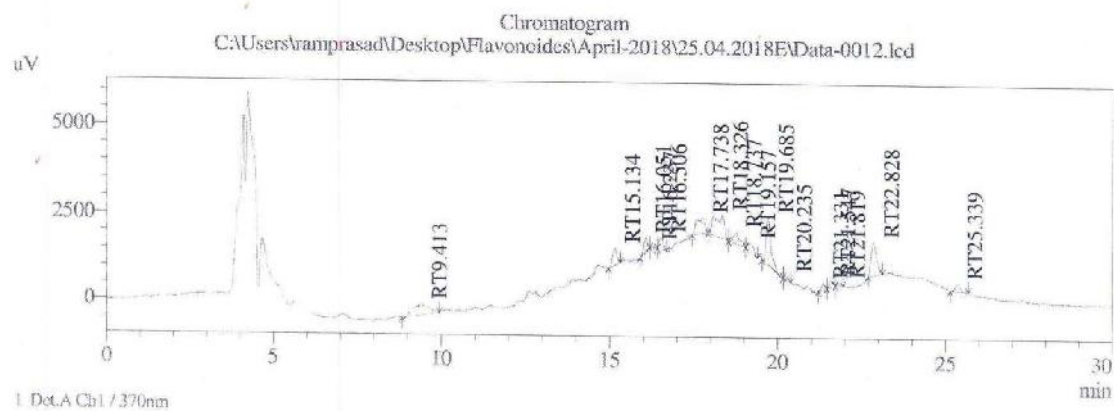
CIN No.: U24232KA1998PTC023573

Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100, INDIA

Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====Natural Remedies Pvt Ltd=====
 Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0012.lcd
 Sample Name : Root - AR Kashay
 Sample ID : 1804056E
 Tray# : 1
 Vial# : 10
 Injection Volume : 5 uL
 Data Filename : Data-0012.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 26-04-2018 01:15:59
 Data Processed : 26-04-2018 15:21:59



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0012.lcd
 Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	9.413	RT9.413	10194	13.083
2	15.134	RT15.134	4585	5.884
3	16.051	RT16.051	3256	4.178
4	16.237	RT16.237	348	0.447
5	16.506	RT16.506	2838	3.642
6	17.738	RT17.738	7598	9.751
7	18.326	RT18.326	12824	16.459
8	18.737	RT18.737	4307	5.528
9	19.157	RT19.157	2567	3.295
10	19.685	RT19.685	12436	15.961
11	20.235	RT20.235	570	0.731
12	21.331	RT21.331	1221	1.567
13	21.547	RT21.547	1528	1.961
14	21.819	RT21.819	605	0.776
15	22.828	RT22.828	11099	14.244
16	25.339	RT25.339	1943	2.494
Total			77918	100.000



TEST REPORT

Report No: NRPL/QCO/04/057



Issued to:
Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804057E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as Root - SR Kashaya bearing Batch No.: Not specified was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.005	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

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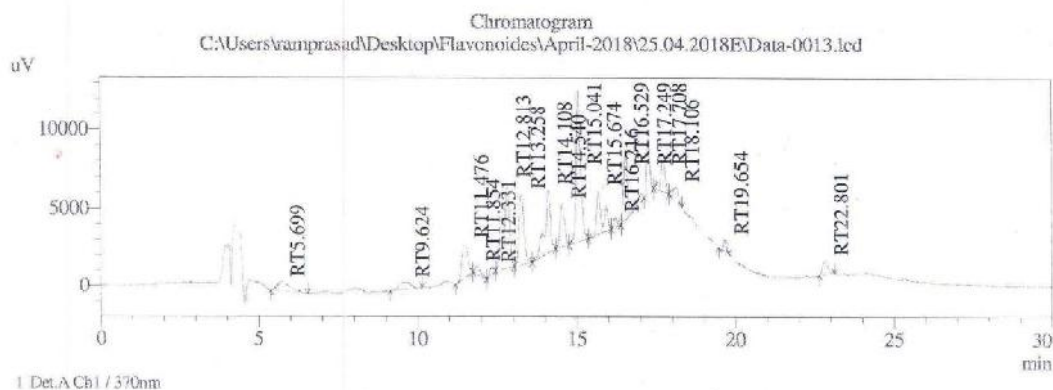
Natural Remedies Private Limited
Regd. Office & Factory
CIN No.: U24232KA1998PTC023573
Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100, INDIA
Tel: 91 80 4020 9999 / 8 / 7, 2/783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====**Natural Remedies Pvt Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0013.lcd

Sample Name : Root - SR Kashaya
 Sample ID : 1804057E
 Tray# : 1
 Vail# : 11
 Injection Volume : 5 uL
 Data Filename : Data-0013.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 26-04-2018 01:46:39
 Data Processed : 26-04-2018 15:23:32



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0013.lcd

Peak#	Ret. Time	Name	Area	Area %
1	5.699	RT5.699	17478	3.404
2	9.624	RT9.624	10594	2.063
3	11.476	RT11.476	28364	5.525
4	11.854	RT11.854	6110	1.190
5	12.331	RT12.331	3564	0.694
6	12.813	RT12.813	71958	14.016
7	13.258	RT13.258	50407	9.818
8	14.108	RT14.108	51042	9.942
9	14.540	RT14.540	26444	5.151
10	15.041	RT15.041	95232	18.550
11	15.674	RT15.674	36250	7.061
12	16.216	RT16.216	4574	0.891
13	16.529	RT16.529	39985	7.788
14	17.249	RT17.249	24576	4.787
15	17.708	RT17.708	20801	4.052
16	18.106	RT18.106	9641	1.878
17	19.654	RT19.654	4791	0.933
18	22.801	RT22.801	11581	2.256
Total			513391	100.000



TEST REPORT

Report No: NRPL/QCO/04/058

Issued to:
Mr. Ajit Chandrashekar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com


Lab Reference No. : 1804058E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml


Sample Particulars: One sample described as **Root - PR Kashaya** bearing Batch No.: **Not specified** was received.

ANALYTICAL RESULTS

Sl. No.	Tests	Results	Protocol
1)	Description	Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.001	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC

Note: The results are reported on "As is" basis


ANALYST


AUTHORISED

SIGNATORY

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
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7) Sample not drawn by us.

Natural Remedies Private Limited

Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100. INDIA

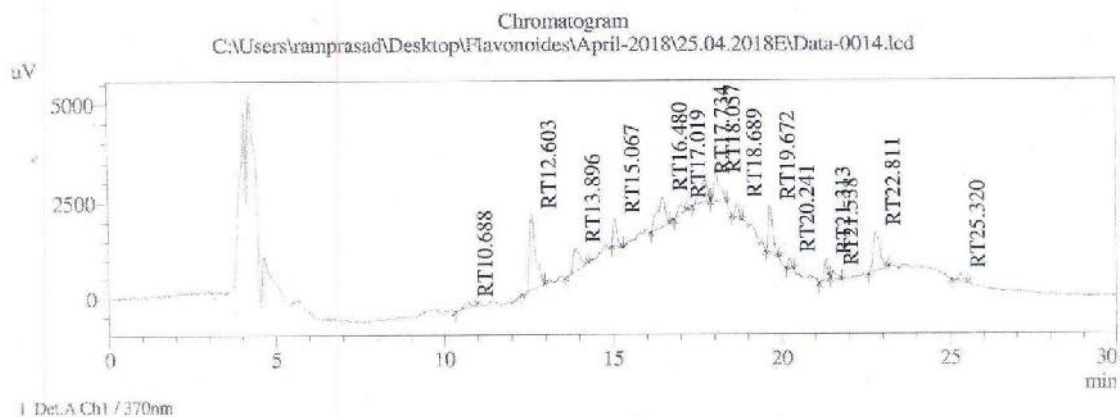
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=====**Natural Remedies Pvt Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0014.lcd

Sample Name : Root - PR Kashaya
 Sample ID : 1804058E
 Tray# : 1
 Vial# : 12
 Injection Volume : 5 uL
 Data Filename : Data-0014.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 26-04-2018 02:17:19
 Data Processed : 26-04-2018 15:25:06



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0014.lcd

Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	10.688	RT10.688	1307	1.199
2	12.603	RT12.603	24808	22.753
3	13.896	RT13.896	7894	7.241
4	15.067	RT15.067	5485	5.031
5	16.480	RT16.480	12573	11.531
6	17.019	RT17.019	2903	2.662
7	17.734	RT17.734	8539	7.832
8	18.057	RT18.057	9631	8.833
9	18.689	RT18.689	3220	2.953
10	19.672	RT19.672	10927	10.022
11	20.241	RT20.241	1710	1.569
12	21.313	RT21.313	3510	3.220
13	21.538	RT21.538	1530	1.403
14	22.811	RT22.811	13967	12.811
15	25.320	RT25.320	1024	0.940
Total			109028	100.000



TEST REPORT

Report No: NRPL/QCO/04/055

Issued to:
 Mr. Ajit Chandrashekhhar Lingayat
 Assistant Professor
 B. M.K. Ayurved College,
 Shahapur, Belagavi - 590003
 Karnataka
 Mob: 9620165655
 E-mail: ajitlingayat26@gmail.com



Lab Reference No. : 1804055E
 Your Test Requisition No. : E-mail
 Date : 16.04.2018
 Date of Receipt : 16.04.2018
 Date of Report : 27.04.2018
 Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Root - GR Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS

Sl. No.	Tests	Results	Protocol
1)	Description	Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.002	By HPLC
3)	Fingerprinting	Attached	By HPTLC

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

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 7) Sample not drawn by us.

Natural Remedies Private Limited

Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100, INDIA

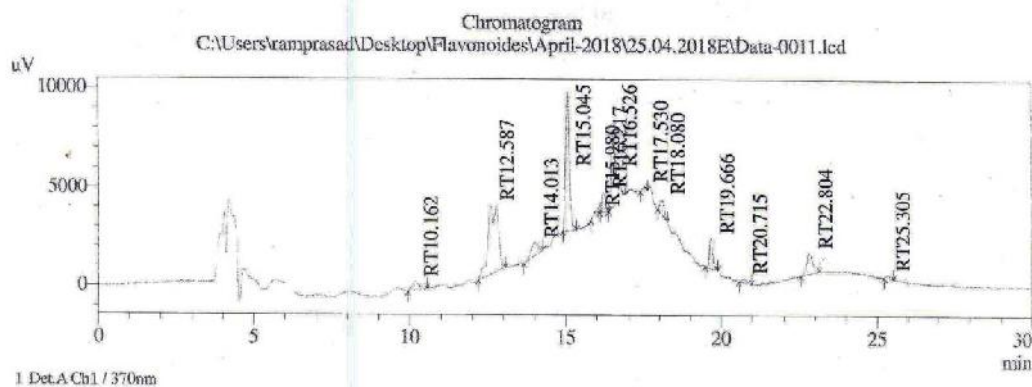
Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====**Natural Remedies Pvt Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0011.lcd

Sample Name : Root - GR Kashaya
 Sample ID : 1804055E
 Tray# : 1
 Vial# : 9
 Injection Volume : 5 uL
 Data Filename : Data-0011.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 26-04-2018 00:45:18
 Data Processed : 26-04-2018 15:19:49



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0011.lcd

Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	10.162	RT10.162	6273	2.609
2	12.587	RT12.587	75954	31.589
3	14.013	RT14.013	10191	4.238
4	15.045	RT15.045	58042	24.139
5	15.980	RT15.980	2341	0.974
6	16.217	RT16.217	7877	3.276
7	16.526	RT16.526	42303	17.594
8	17.530	RT17.530	1266	0.526
9	18.080	RT18.080	7577	3.151
10	19.666	RT19.666	11545	4.802
11	20.715	RT20.715	1883	0.783
12	22.804	RT22.804	13998	5.822
13	25.305	RT25.305	1196	0.497
Total			240445	100.000



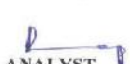

TEST REPORT

Report No: NRPL/QCO/04/059

Issued to:
Mr. Ajit Chandrashekhhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804059E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Root - BPR Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.004	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
2) The client asked for above tests only.
3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
4) Total liability of our laboratory is limited to the invoice amount.
5) This report should not be reproduced, used as evidence in the court of law or it should not be used in any kind of advertising /media without our prior written content.
6) The client asked for above-tests only.
7) Sample not drawn by us.

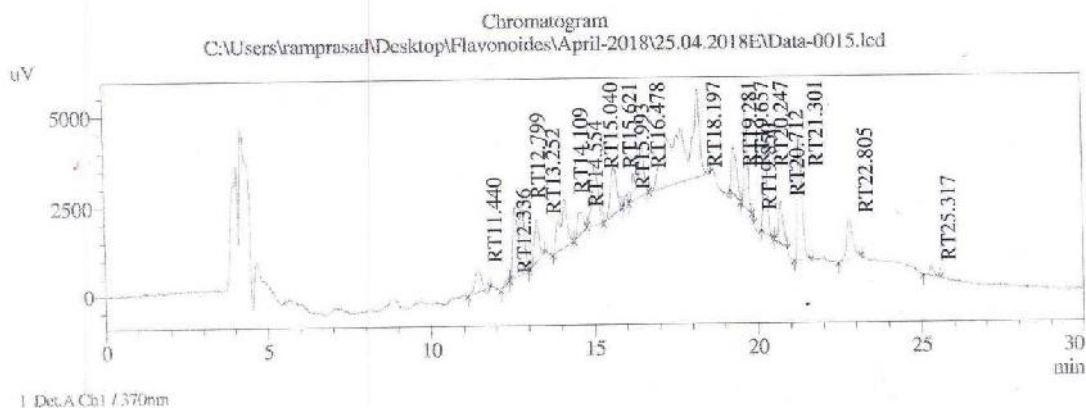
Natural Remedies Private Limited
Regd. Office & Factory
CIN No.: U24232KA1998PTC023573
Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100, INDIA
Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====**Natural Remedies Pvt Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0015.lcd

Sample Name : Root - BPR Kashaya
 Sample ID : 1804059E
 Tray# : 1
 Vial# : 13
 Injection Volume : 5 uL
 Data Filename : Data-0015.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 26-04-2018 02:47:59
 Data Processed : 26-04-2018 15:27:09



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0015.lcd

Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	11.440	RT11.440	8101	2.226
2	12.336	RT12.336	1205	0.331
3	12.799	RT12.799	39008	10.716
4	13.252	RT13.252	11774	3.235
5	14.109	RT14.109	22931	6.300
6	14.554	RT14.554	7935	2.180
7	15.040	RT15.040	21854	6.004
8	15.621	RT15.621	18319	5.033
9	15.993	RT15.993	1980	0.544
10	16.478	RT16.478	21284	5.847
11	18.197	RT18.197	92526	25.419
12	19.281	RT19.281	14467	3.974
13	19.657	RT19.657	23467	6.447
14	19.850	RT19.850	-72	-0.020
15	20.247	RT20.247	19847	5.452
16	20.712	RT20.712	11026	3.029
17	21.301	RT21.301	31694	8.707
18	22.805	RT22.805	14561	4.000
19	25.317	RT25.317	2095	0.576
Total			364001	100.000



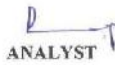

TEST REPORT

Report No: NRPL/QCO/04/060

Issued to:
Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804060E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Stem - BS Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.0005	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

- Note:
- 1) The results listed above pertain only to the tested samples and applicable parameters.
 - 2) The client asked for above tests only.
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 - 6) The client asked for above tests only.
 - 7) Sample not drawn by us.

Natural Remedies Private Limited

Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

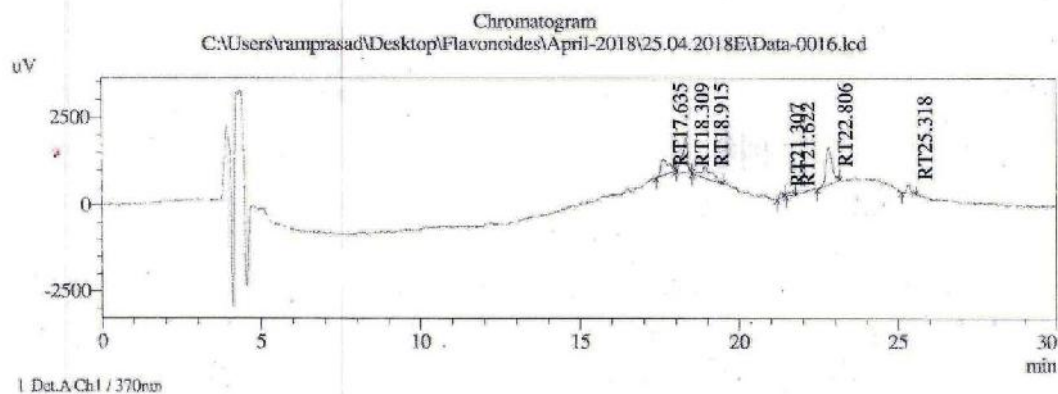
Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100, INDIA

Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====Natural Remedies Pvt Ltd=====
Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0016.lcd

Sample Name : Stem - BS Kashaya
Sample ID : 1804060E
Tray# : 1
Vial# : 14
Injection Volume : 5 uL
Data Filename : Data-0016.lcd
Method Filename : Flavonoides100mm rp.Met.lcm
Batch Filename : Batch-0001.lcb
Report Filename : ram.lcr(Read only)-38.lcr
Date Acquired : 26-04-2018 03:18:38
Data Processed : 26-04-2018 15:29:01



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0016.lcd

Peak#	Ret. Time	Name	Area	Area %
1	17.635	RT17.635	7878	16.938
2	18.309	RT18.309	12026	25.858
3	18.915	RT18.915	8226	17.687
4	21.307	RT21.307	1175	2.527
5	21.622	RT21.622	947	2.036
6	22.806	RT22.806	14196	30.523
7	25.318	RT25.318	2061	4.431
Total			46509	100.000





TEST REPORT

Report No: NRPL/QCO/04/062

Issued to:
Mr. Ajit Chandrashekhhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804062E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Stem - AS Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Light Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.001	By HPLC
3)	Fingerprinting	Attached	By HPTLC
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

- Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
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4) Total liability of our laboratory is limited to the invoice amount.
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6) The client asked for above tests only.
7) Sample not drawn by us.

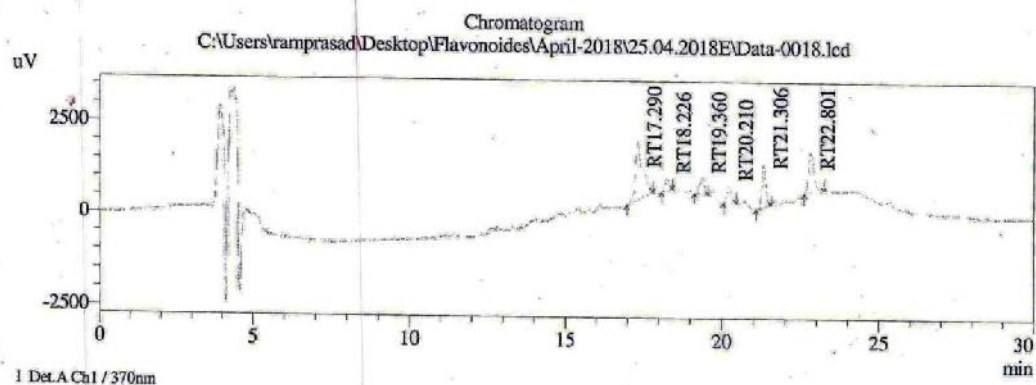
Natural Remedies Private Limited
Regd. Office & Factory
CIN No.: U24232KA1998BPTC023573
Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100. INDIA
Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====**Natural Remedies Pvt Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0018.lcd

Sample Name : Stem - AS Kashaya
 Sample ID : 1804062E
 Tray# : 1
 Vial# : 16
 Injection Volume : 5 uL
 Data Filename : Data-0018.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 26-04-2018 04:20:00
 Data Processed : 26-04-2018 15:33:42



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0018.lcd

Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	17.290	RT17.290	25540	40.996
2	18.226	RT18.226	3024	4.855
3	19.360	RT19.360	5032	8.077
4	20.210	RT20.210	4955	7.954
5	21.306	RT21.306	9853	15.815
6	22.801	RT22.801	13895	22.304
Total			62299	100.000





TEST REPORT

Report No: NRPL/QCO/04/064

Issued to:
 Mr. Ajit Chandrashekhar Lingayat
 Assistant Professor
 B. M.K. Ayurved College,
 Shahapur, Belagavi - 590003
 Karnataka
 Mob: 9620165655
 E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804064E
 Your Test Requisition No. : E-mail
 Date : 16.04.2018
 Date of Receipt : 16.04.2018
 Date of Report : 27.04.2018
 Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Stem - PS Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Light Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.002	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC
Note: The results are reported on "As is" basis			
 ANALYST		 AUTHORISED SIGNATORY	

- Note:**
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 - 2) The client asked for above tests only.
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 - 4) Total liability of our laboratory is limited to the invoice amount.
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 - 6) The client asked for above tests only.
 - 7) Sample not drawn by us.

Natural Remedies Private Limited

Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100, INDIA

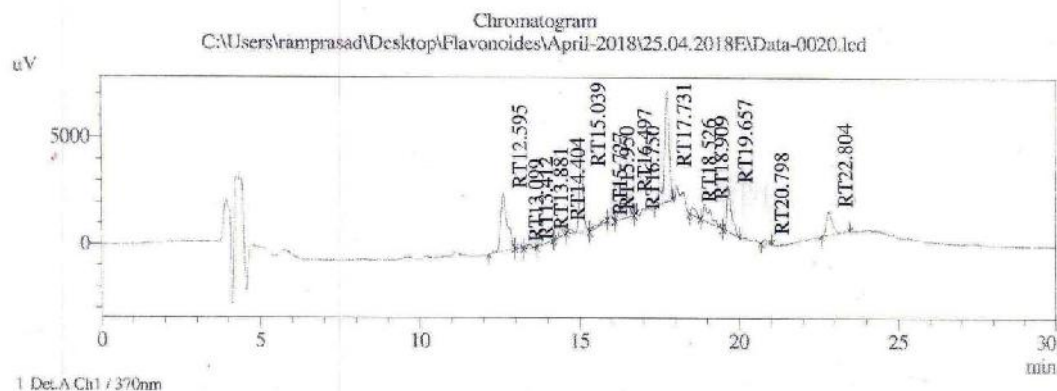
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=====**Natural Remedies Pvt Ltd**=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0020.lcd

Sample Name : Stem - PS Kashaya
 Sample ID : 1804064E
 Tray# : 1
 Vial# : 18
 Injection Volume : 5 uL
 Data Filename : Data-0020.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 26-04-2018 05:21:25
 Data Processed : 26-04-2018 15:36:51



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0020.lcd

Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	12.595	RT12.595	38431	17.910
2	13.099	RT13.099	863	0.402
3	13.412	RT13.412	1423	0.663
4	13.881	RT13.881	6042	2.816
5	14.404	RT14.404	3115	1.452
6	15.039	RT15.039	33154	15.451
7	15.727	RT15.727	3080	1.435
8	15.950	RT15.950	2144	0.999
9	16.497	RT16.497	18313	8.534
10	16.750	RT16.750	34	0.016
11	17.731	RT17.731	53404	24.888
12	18.526	RT18.526	4172	1.944
13	18.909	RT18.909	12525	5.837
14	19.657	RT19.657	21104	9.835
15	20.798	RT20.798	1899	0.885
16	22.804	RT22.804	14875	6.932
Total			214576	100.000



TEST REPORT

Report No: NRPL/QCO/04/063



Issued to:
Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804063E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Stem - SS Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Light Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.002	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

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6) The client asked for above tests only.
7) Sample not drawn by us.

Natural Remedies Private Limited
Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

Plot No. 5 B, Veerasandra-Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100, INDIA

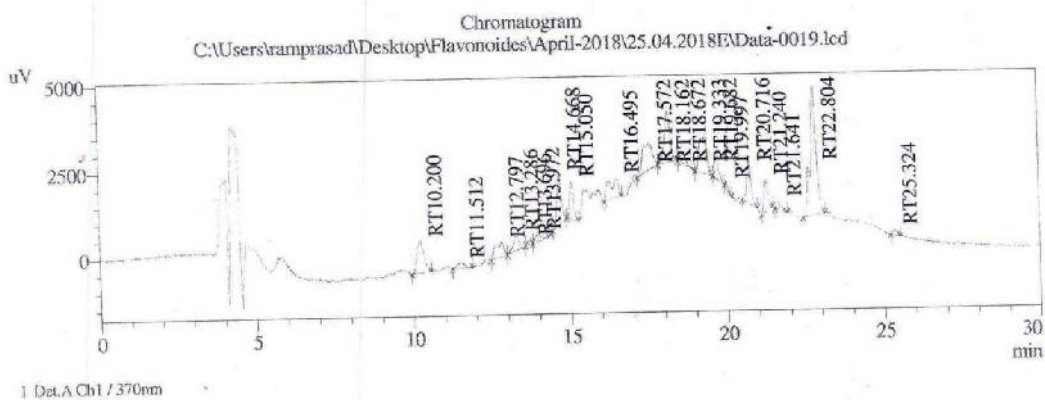
Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====Natural Remedies Pvt Ltd=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0019.lcd

Sample Name : Stem - SS Kashaya
 Sample ID : 1804063E
 Tray# : 1
 Vial# : 17
 Injection Volume : 5 uL
 Data Filename : Data-0019.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 26-04-2018 04:50:42
 Data Processed : 26-04-2018 15:35:34



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0019.lcd

Detector A Ch1 370nm

Peak#	Ret. Time	Name	Area	Area %
1	10.200	RT10.200	14439	7.204
2	11.512	RT11.512	2207	1.101
3	12.797	RT12.797	8499	4.241
4	13.286	RT13.286	5260	2.625
5	13.696	RT13.696	964	0.481
6	13.972	RT13.972	2717	1.356
7	14.668	RT14.668	13460	6.715
8	15.050	RT15.050	8761	4.371
9	16.495	RT16.495	11683	5.829
10	17.572	RT17.572	16446	8.205
11	18.162	RT18.162	17446	8.704
12	18.672	RT18.672	3566	1.779
13	19.333	RT19.333	17380	8.671
14	19.682	RT19.682	5938	2.963
15	19.997	RT19.997	1025	0.511
16	20.716	RT20.716	11089	5.533
17	21.240	RT21.240	8042	4.012
18	21.641	RT21.641	2237	1.116
19	22.804	RT22.804	47985	23.940
20	25.324	RT25.324	1289	0.643
Total			200435	100.000



TEST REPORT

Report No: NRPL/QCO/04/061

Issued to:



Mr. Ajit Chandrashekhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com

Lab Reference No. : 1804061E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml

Sample Particulars: One sample described as **Stem - GS Kashaya** bearing Batch No.: **Not specified** was received.

ANALYTICAL RESULTS			
Sl. No.	Tests	Results	Protocol
1)	Description	Light Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.001	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC

Note: The results are reported on "As is" basis

 ANALYST	 AUTHORISED SIGNATORY
--	---

- Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
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7) Sample not drawn by us.

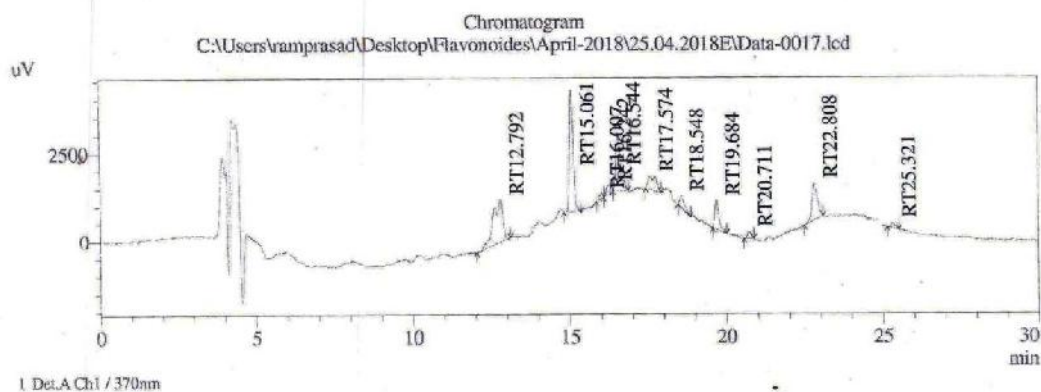
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Regd. Office & Factory
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Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====Natural Remedies Pvt Ltd=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0017.lcd

Sample Name : Stem - GS Kashaya
 Sample ID : 1804061E
 Tray# : 1
 Vial# : 15
 Injection Volume : 5 uL
 Data Filename : Data-0017.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 26-04-2018 03:49:18
 Data Processed : 26-04-2018 15:32:00



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0017.lcd

Peak#	Ret. Time	Name	Area	Area %
1	12.792	RT12.792	25855	24.570
2	15.061	RT15.061	28059	26.665
3	16.007	RT16.007	941	0.894
4	16.242	RT16.242	1815	1.725
5	16.544	RT16.544	15560	14.787
6	17.574	RT17.574	6910	6.567
7	18.548	RT18.548	3438	3.268
8	19.684	RT19.684	7042	6.692
9	20.711	RT20.711	1463	1.391
10	22.808	RT22.808	12917	12.275
11	25.321	RT25.321	1228	1.167
Total			105227	100.000



TEST REPORT

Report No: NRPL/QCO/04/065

Issued to:

Mr. Ajit Chandrashekhhar Lingayat
Assistant Professor
B. M.K. Ayurved College,
Shahapur, Belagavi - 590003
Karnataka
Mob: 9620165655
E-mail: ajitlingayat26@gmail.com


Lab Reference No. : 1804065E
Your Test Requisition No. : E-mail
Date : 16.04.2018
Date of Receipt : 16.04.2018
Date of Report : 27.04.2018
Sample quantity : ~ 50 ml


Sample Particulars: One sample described as **Stem - BPS Kashaya** bearing **Batch No.: Not specified** was received.

ANALYTICAL RESULTS

Sl. No.	Tests	Results	Protocol
1)	Description	Light Brown Liquid	By Visual
2)	Total Flavonoides as Quercetin %(w/w)	0.001	By HPLC
3)	Fingerprinting	Refer Annexure - 1	By HPTLC

Note: The results are reported on "As is" basis


ANALYST


AUTHORISED SIGNATORY

Note: 1) The results listed above pertain only to the tested samples and applicable parameters.
2) The client asked for above tests only.
3) Samples will be disposed after one month from the date of issue of test certificate unless specified.
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6) The client asked for above tests only.
7) Sample not drawn by us.

Natural Remedies Private Limited

Regd. Office & Factory

CIN No.: U24232KA1998PTC023573

Plot No. 5 B, Veerasandra Industrial Area, 19th K M Stone, Hosur Road, Electronic City Post, Bangalore 560 100, INDIA

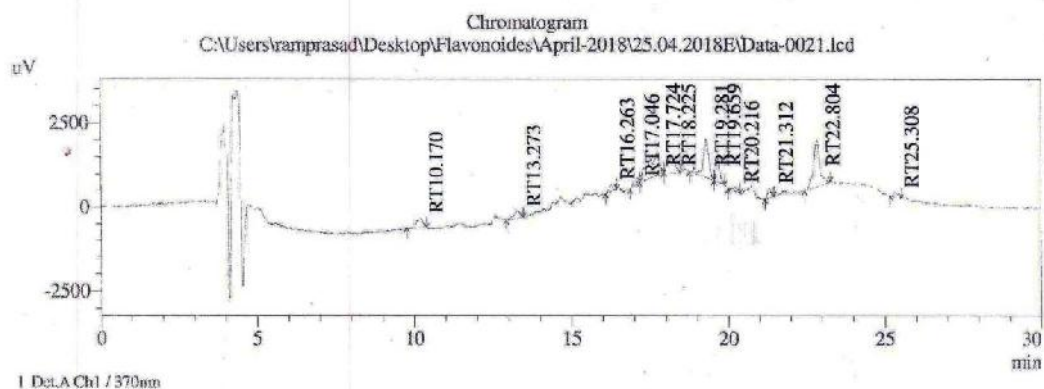
Tel: 91 80 4020 9999 / 8 / 7, 2783 2265, Fax: 91 80 4020 9817, Email: info@naturalremedy.com Web: www.naturalremedy.com

=====Natural Remedies Pvt Ltd=====

Analytical Chemistry Department

Sample Information C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0021.lcd

Sample Name : Stem - BPS Kashaya
 Sample ID : 1804065E
 Tray# : 1
 Vial# : 19
 Injection Volume : 5 uL
 Data Filename : Data-0021.lcd
 Method Filename : Flavonoides100mm rp.Met.lcm
 Batch Filename : Batch-0001.lcb
 Report Filename : ram.lcr(Read only)-38.lcr
 Date Acquired : 26-04-2018 05:52:04
 Data Processed : 26-04-2018 15:39:08



PeakTable C:\Users\ramprasad\Desktop\Flavonoides\April-2018\25.04.2018E\Data-0021.lcd

Detector A Ch1 370nm

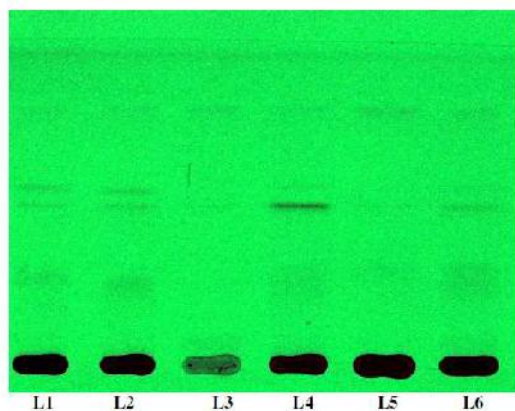
Peak#	Ret. Time	Name	Area	Area %
1	10.170	RT10.170	3490	4.531
2	13.273	RT13.273	3158	4.100
3	16.263	RT16.263	1566	2.033
4	17.046	RT17.046	1334	1.731
5	17.724	RT17.724	16576	21.520
6	18.225	RT18.225	7285	9.458
7	19.281	RT19.281	14256	18.507
8	19.659	RT19.659	5959	7.736
9	20.216	RT20.216	1174	1.524
10	21.312	RT21.312	2084	2.706
11	22.804	RT22.804	19222	24.955
12	25.308	RT25.308	924	1.200
Total			77028	100.000

Photo plate-11

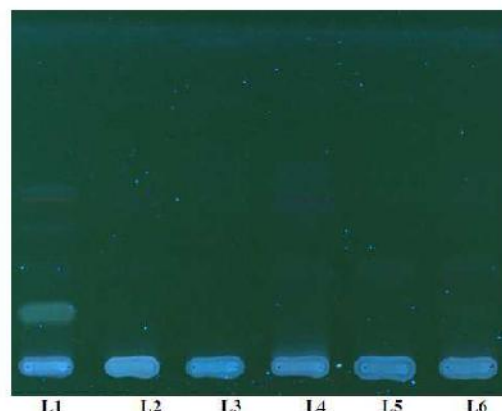
HPTLC Profile of Leaves individual and combination

HPTLC Profile

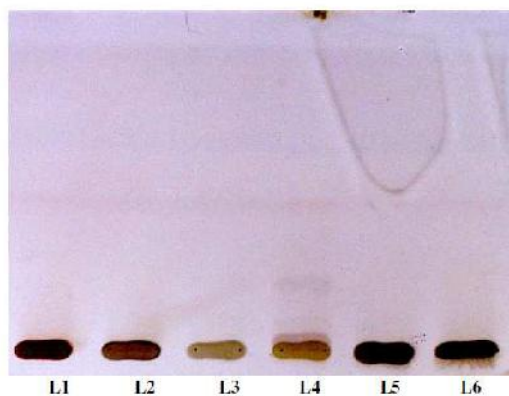
Profile under 254 nm Light



Profile under 366 nm Light



Profile under Visible light after Derivatization



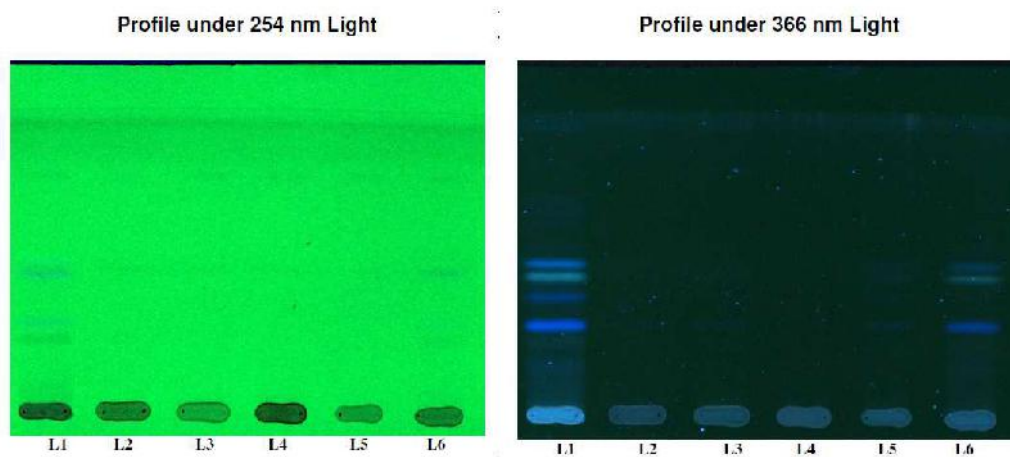
Lane 1	Leaf - BL Kashaya
Lane 2	Leaf - GL Kashaya
Lane 3	Leaf - AL Kashaya
Lane 4	Leaf - SL Kashaya
Lane 5	Leaf - PL Kashaya
Lane 6	Leaf - BPL Kashaya

Mobile phase	Toluene (55) : Ethyl acetate (45) : Acetic acid (2)
Spray Reagent	Anisaldehyde reagent

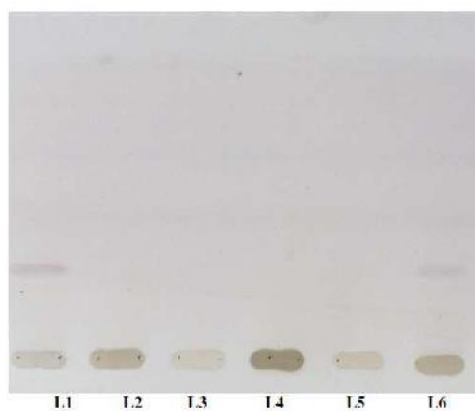
Photo plate-12

HPTLC Profile of Roots individual and combination

HPTLC Profile



Profile under Visible light after Derivatization



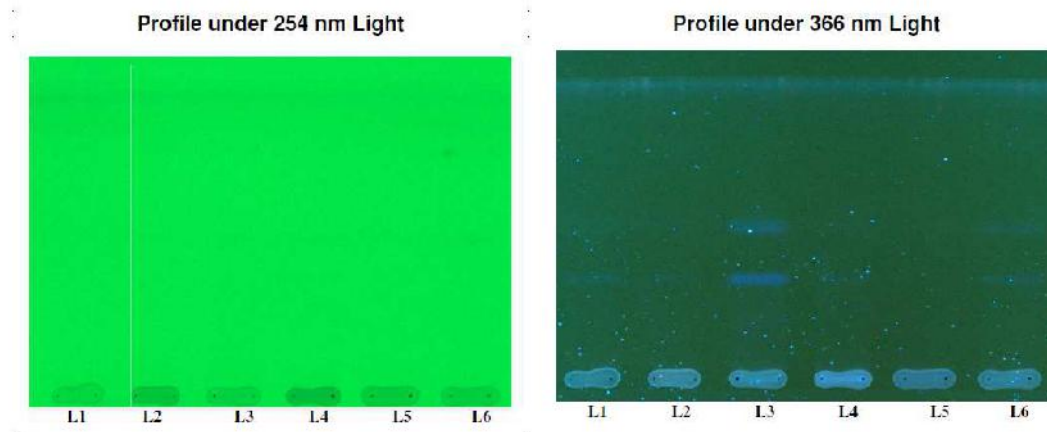
Lane 1	Root - BR Kashaya
Lane 2	Root - GR Kashaya
Lane 3	Root - AR Kashaya
Lane 4	Root - SR Kashaya
Lane 5	Root - PR Kashaya
Lane 6	Root - BPR Kashaya

Mobile phase	Toluene (55) : Ethyl acetate (45) :Acetic acid (2)
Spray Reagent	Anisaldehyde reagent

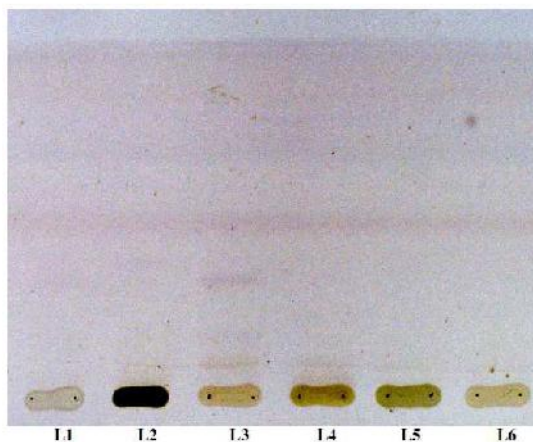
Photo plate-13

HPTLC Profile of Stembark individual and combination

HPTLC Profile



Profile under Visible light after Derivatization



Lane 1	Stem - BS Kashaya
Lane 2	Stem - GS Kashaya
Lane 3	Stem - AS Kashaya
Lane 4	Stem - SS Kashaya
Lane 5	Stem - PS Kashaya
Lane 6	Stem - BPS Kashaya

Mobile phase	Toluene (55) : Ethyl acetate (45) :Acetic acid(2)
Spray Reagent	Anisaldehyde reagent

ANNEXURES-8

winCATS Planar Chromatography Manager

Analysis Report

SOP document	Design
Validated	
Description :	
Analysis	D:\CA\2018\April-2018\20.04.2018\Froot Kashaya .ona
Created/used by	Natural Remedies Thursday, April 26, 2018 2:51:01 PM
Current user	Natural Remedies

Stationary phase

Executed by	Natural Remedies	Thursday, April 26, 2018 1:24:29 PM
Plate size (X x Y)	20.0 x 10.0 cm	
Material	HPTLC plates silica gel 60 F 254	
Manufacturer	E. MERCK KGaA	
Batch		
GLP code		
Pre-washing	No	
Modification	No	

Definitions - Quantification

Executed by	Natural Remedies	Thursday, April 26, 2018 1:16:08 PM
-------------	------------------	-------------------------------------

Calibration parameters

Calibration mode	Single level
Statistics mode	CV
Evaluation mode	Peak height

Samples

Sample ID: Blank
 Sample ID: Leaf - BL Kashaya
 Sample ID: Leaf - GL Kashaya
 Sample ID: Leaf - AL Kashaya
 Sample ID: Leaf - SL Kashaya
 Sample ID: Leaf - PL Kashaya
 Sample ID: Leaf - BPL Kashaya
 Sample ID: Stem - BS Kashaya
 Sample ID: Stem - GS Kashaya
 Sample ID: Stem - AS Kashaya
 Sample ID: Stem - SS Kashaya
 Sample ID: Stem - PS Kashaya
 Sample ID: Stem - BPS Kashaya
 Sample ID: Root - BR Kashaya
 Sample ID: Root - GR Kashaya
 Sample ID: Root - AR Kashaya
 Sample ID: Root - SR Kashaya
 Sample ID: Root - PR Kashaya
 Sample ID: Root - BPR Kashaya

User : Natural Remedies
 Thursday, April 26, 2018 2:51:08 PM

Approved :
 Report ID : 07E2041A050E3301

SN 1408W003, V1.4.3
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winCATS Planar Chromatography Manager

7	130.0 mm	20.0 µl	6	Leaf - BPL Kashaya	Yes
8	150.0 mm	20.0 µl	6	Leaf - BPL Kashaya	Yes
9	170.0 mm	20.0 µl	7	Blank	Yes
10	190.0 mm	20.0 µl	7	Blank	Yes

Pre-Chromatographic Derivatization

Instrument		
Executed by	Natural Remedies	Thursday, April 26, 2018 1:16:07 PM
Comment		
Solution		
Volume	ml	
Drying device	Oven	
Temperature	120 °C	
Time	20 Minutes	
Notes		

Development - Automated Multiple Development

Instrument:	CAMAG AMD	Serial No.
Executed by	Natural Remedies	Thursday, April 26, 2018 1:16:07 PM
Comment		
Pre-conditioning		
Drying		
Solvent front position	50 mm	
Content bottle 1		
Content bottle 2		
Content bottle 3		
Content bottle 4		
Content bottle 5		
Content bottle 6		
Gradient description		
Notes		

Post-Chromatographic Derivatization

Instrument		
Executed by	Natural Remedies	Thursday, April 26, 2018 1:16:08 PM
Comment		
Solution		
Volume	mL	
Drying device	Oven	
Temperature	120 °C	
Time	20 Minutes	
Notes		

Detection - CAMAG TLC Scanner 3

Information		
Application position	10.0 mm	
Solvent front position	50.0 mm	
Instrument	CAMAG TLC Scanner 3 "Scanner3_140525" S/N 140525 (1.14.28)	
Executed by	Natural Remedies	Thursday, April 26, 2018 2:30:19 PM
Number of tracks	10	
Position of first track X	10.0 mm	
Distance between tracks	20.0 mm	
Scan start pos. Y	10.0 mm	
Scan end pos. Y	95.0 mm	
Slit dimensions	10.00 x 0.90 mm, Macro	
Optimize optical system	Light	
Scanning speed:	20 mm/s	
Data resolution:	100 µm/step	

User : Natural Remedies
Thursday, April 26, 2018 2:30:57 PM

Approved
Report ID : 07E2041A050E1E16

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winCATS Planar Chromatography Manager

Measurement Table

Wavelength	580
Lamp	D2 & W
Measurement Type	Remission
Measurement Mode	Absorption
Optical filter	Second order
Detector mode	Automatic
PM high voltage	286 V

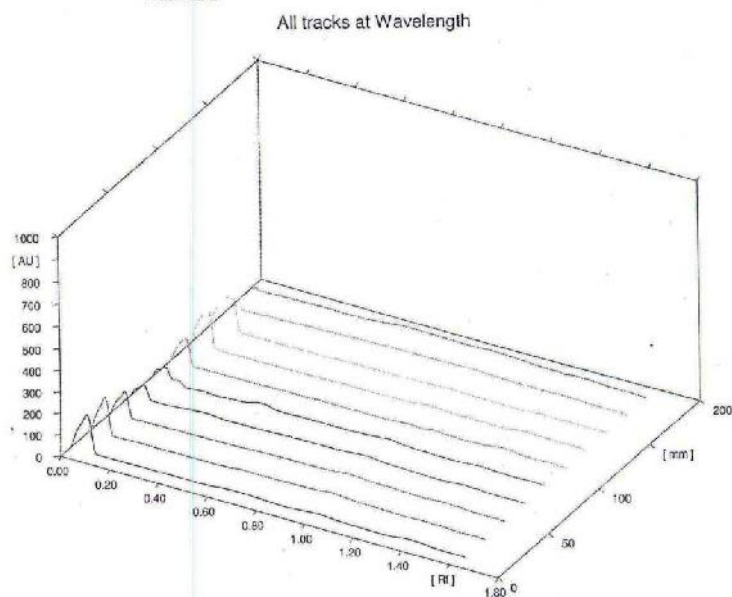
Detector properties

Y-position for 0 adjust	10.0 mm
Track # for 0 adjust	0
Analog Offset	10%
Sensitivity	Automatic (11)

Integration

Properties

Data filtering	Savitsky-Golay 7
Baseline correction	Lowest Slope
Peak threshold min. slope	5
Peak threshold min. height	10 AU
Peak threshold min. area	50
Peak threshold max. height	990 AU
Track start position	10.0 mm
Track end position	75.0 mm
Display scaling	Automatic



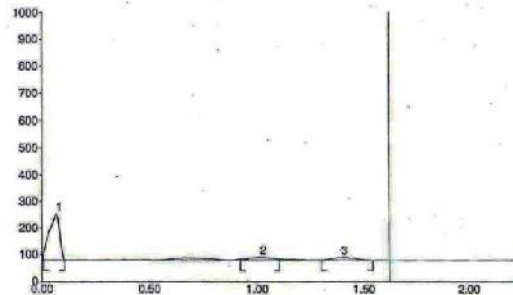
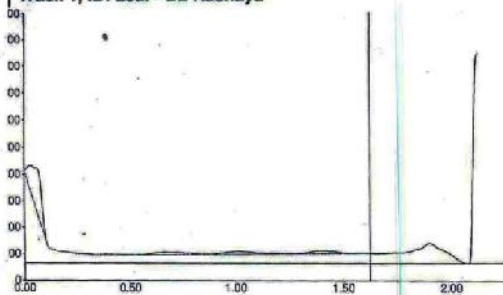
User : Natural Remedies
Thursday, April 26, 2018 2:30:57 PM

Approved :
Report ID : 07E2041A050E1E16

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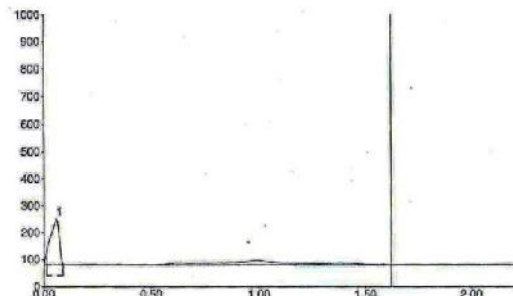
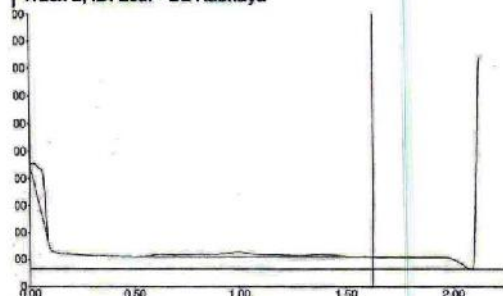
winCATS Planar Chromatography Manager

Track 1, ID: Leaf - BL Kashaya



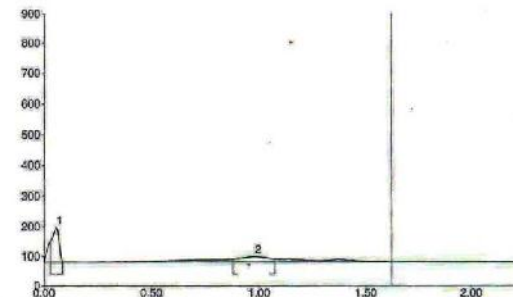
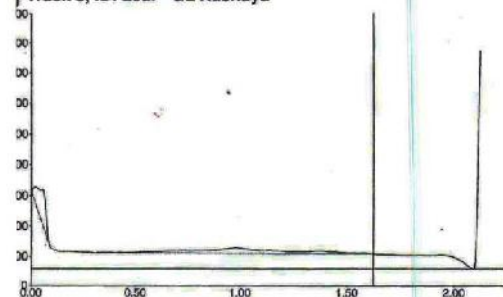
Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	25.5	0.07	174.1	88.66	0.11	1.3	3944.1	76.66	unknown *
2	0.92	4.3	1.01	11.3	5.75	1.11	4.7	608.5	11.73	unknown *
3	1.30	1.3	1.40	11.0	5.59	1.54	0.5	597.1	11.61	unknown *

Track 2, ID: Leaf - BL Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	47.2	0.06	171.9	100.00	0.09	0.8	3267.2	100.00	unknown *

Track 3, ID: Leaf - GL Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.03	70.5	0.06	118.2	85.86	0.09	0.9	1824.7	60.27	unknown *
2	0.88	10.6	0.98	19.5	14.14	1.08	11.1	1202.7	39.73	unknown *

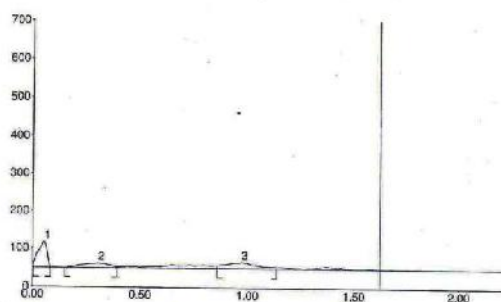
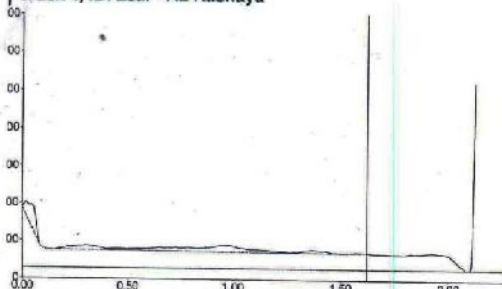
User : Natural Remedies
Thursday, April 26, 2018 2:30:57 PM

Approved :
Report ID : 07E2041A050E1E16

SN 1408W003, V1.4.3
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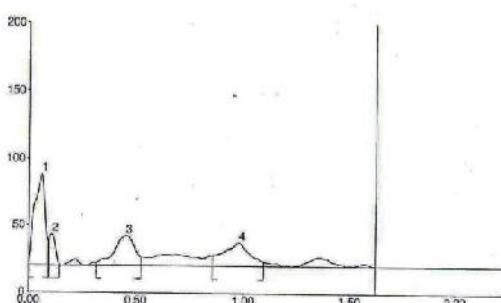
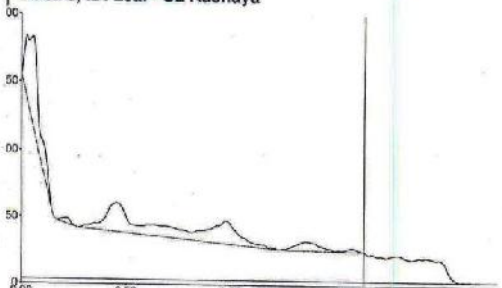
winCATS Planar Chromatography Manager

Track 4, ID: Leaf - AL Kashaya



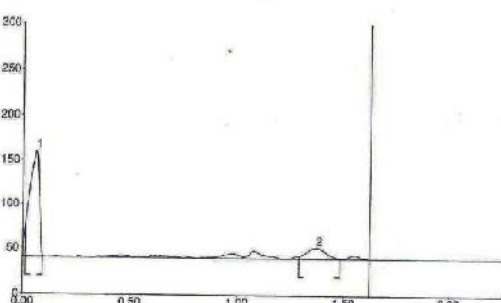
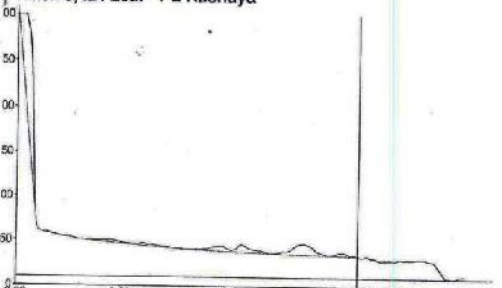
Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	10.5	0.06	67.2	70.14	0.09	0.1	1286.3	39.94	unknown *
2	0.15	0.2	0.30	12.0	12.49	0.40	3.6	713.3	22.15	unknown *
3	0.86	8.7	0.97	16.6	17.37	1.14	5.5	1220.9	37.91	unknown *

Track 5, ID: Leaf - SL Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.00	2.4	0.06	68.5	52.14	0.09	18.3	1574.1	40.61	unknown *
2	0.10	18.9	0.11	23.0	17.55	0.14	0.2	314.0	8.10	unknown *
3	0.32	2.3	0.46	22.1	16.87	0.53	6.3	980.0	25.28	unknown *
4	0.86	7.9	0.98	17.7	13.44	1.10	3.2	1008.2	26.01	unknown *

Track 6, ID: Leaf - PL Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	35.1	0.06	120.1	90.74	0.09	2.0	2526.5	82.62	unknown *
2	1.29	2.7	1.37	12.3	9.26	1.49	0.6	531.6	17.38	unknown *

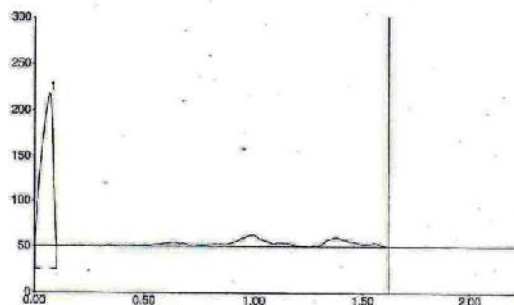
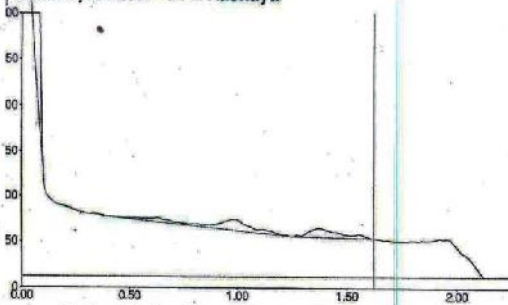
User : Natural Remedies
Thursday, April 26, 2018 2:30:57 PM

Approved :
Report ID : 07E2041A050E1E16

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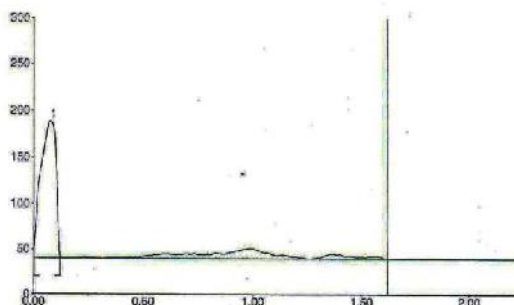
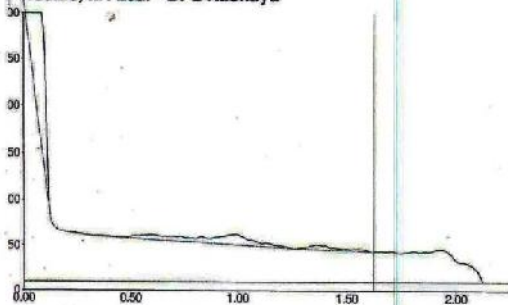
winCATS Planar Chromatography Manager

Track 7, ID: Leaf - BPL Kashaya



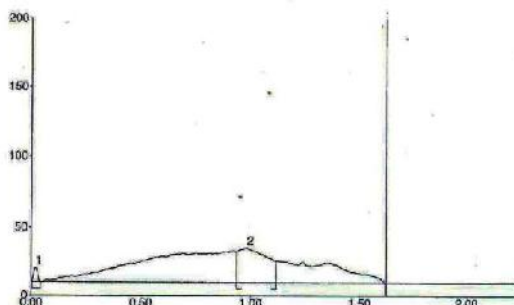
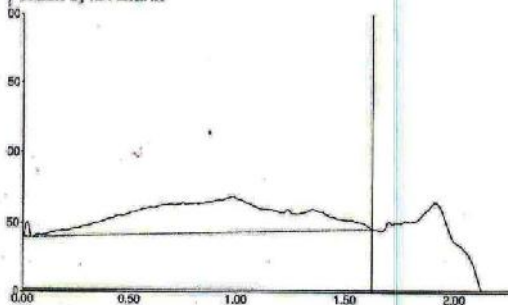
Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.00	7.1	0.07	168.0	100.00	0.10	0.4	4023.3	100.00	unknown *

Track 8, ID: Leaf - BPL Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.00	9.7	0.08	149.0	100.00	0.12	1.3	4826.6	100.00	unknown *

Track 9, ID: Blank



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	0.3	0.02	10.5	29.29	0.04	0.0	91.1	5.34	unknown *
2	0.94	22.9	0.98	25.3	70.71	1.12	16.0	1613.7	94.66	unknown *

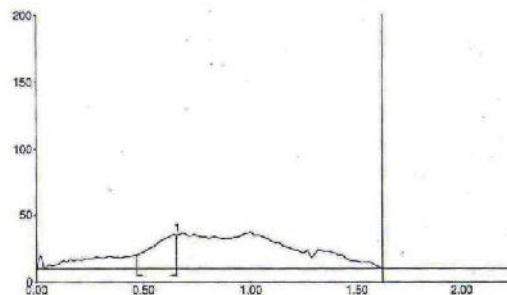
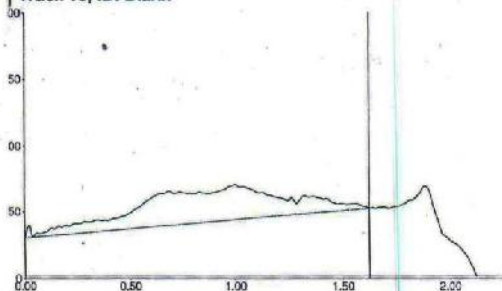
User : Natural Remedies
Thursday, April 26, 2018 2:30:57 PM

Approved :
Report ID : 07E2041A050E1E16

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Track 10, ID: Blank



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.47	10.2	0.65	25.2	100.00	0.66	24.9	1339.8	100.00	unknown *

Evaluation results

Evaluation Sequence

Track	Track type	Vial	Sample ID
1	Sample	1	Leaf - BL Kashaya
2	Sample	1	Leaf - BL Kashaya
3	Sample	2	Leaf - GL Kashaya
4	Sample	3	Leaf - AL Kashaya
5	Sample	4	Leaf - SL Kashaya
6	Sample	5	Leaf - PL Kashaya
7	Sample	6	Leaf - BPL Kashaya
8	Sample	6	Leaf - BPL Kashaya
9	Sample	7	Blank
10	Sample	7	Blank

Table of substances

Substance	Position Tracks											
	MD	mm	1	2	3	4	5	6	7	8	9	0
												1

Results per track

winCATS summary report

Calibration results per Analysis

No results can be calculated due to the following error(s):
No substances assigned

Documentation

Executed by Natural Remedies Thursday, April 26, 2018 1:16:05 PM

User : Natural Remedies
Thursday, April 26, 2018 2:30:57 PM

Approved :
Report ID : 07E2041A050E1E18

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winCATS Planar Chromatography Manager

No.	Appl. position	Appl. volume	Vial #	Sample ID	Active
1	10.0 mm	20.0 µl	1	Stem - BS Kashaya	Yes
2	30.0 mm	20.0 µl	1	Stem - BS Kashaya	Yes
3	50.0 mm	20.0 µl	2	Stem - GS Kashaya	Yes
4	70.0 mm	20.0 µl	3	Stem - AS Kashaya	Yes
5	90.0 mm	20.0 µl	4	Stem - SS Kashaya	Yes
6	110.0 mm	20.0 µl	5	Stem - PS Kashaya	Yes
7	130.0 mm	20.0 µl	6	Stem - BPS Kashaya	Yes
8	150.0 mm	20.0 µl	6	Stem - BPS Kashaya	Yes
9	170.0 mm	20.0 µl	7	Blank	Yes
10	190.0 mm	20.0 µl	7	Blank	Yes

Pre-Chromatographic Derivatization

Instrument
 Executed by Natural Remedies Thursday, April 26, 2018 1:16:07 PM
 Comment
 Solution
 Volume ml
 Drying device Oven
 Temperature 120 °C
 Time 20 Minutes
 Notes

Development - Automated Multiple Development

Instrument: CAMAG AMD Serial No.
 Executed by Natural Remedies Thursday, April 26, 2018 1:16:07 PM
 Comment
 Pre-conditioning
 Drying
 Solvent front position 50 mm
 Content bottle 1
 Content bottle 2
 Content bottle 3
 Content bottle 4
 Content bottle 5
 Content bottle 6
 Gradient description
 Notes

Post-Chromatographic Derivatization

Instrument
 Executed by Natural Remedies Thursday, April 26, 2018 1:16:06 PM
 Comment
 Solution
 Volume mL
 Drying device Oven
 Temperature 120 °C
 Time 20 Minutes
 Notes

User : Natural Remedies
Thursday, April 26, 2018 2:46:32 PM

Approved :
Report ID : 07E2041A050E2E12

SN 1408W003, V1.4.3
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winCATS Planar Chromatography Manager

Detection - CAMAG TLC Scanner 3

Information

Application position 10.0 mm
Solvent front position 50.0 mm

Instrument

Executed by CAMAG TLC Scanner 3 "Scanner3_140525" S/N 140525 (1.14.28)
Natural Remedies Thursday, April 26, 2018 2:16:15 PM
Number of tracks 10
Position of first track X 10.0 mm
Distance between tracks 20.0 mm
Scan start pos. Y 10.0 mm
Scan end pos. Y 95.0 mm
Slit dimensions 10.00 x 0.90 mm, Macro
Optimize optical system Light
Scanning speed: 20 mm/s
Data resolution: 100 µm/step

Measurement Table

Wavelength 580
Lamp D2 & W
Measurement Type Remission
Measurement Mode Absorption
Optical filter Second order
Detector mode Automatic
PM high voltage 286 V

Detector properties

Y-position for 0 adjust 10.0 mm
Track # for 0 adjust 0
Analog Offset 10%
Sensitivity Automatic (12)

Integration

Properties

Data filtering Savitsky-Golay 7
Baseline correction Lowest Slope
Peak threshold min. slope 5
Peak threshold min. height 10 AU
Peak threshold min. area 50
Peak threshold max. height 990 AU
Track start position 10.0 mm
Track end position 75.0 mm
Display scaling Automatic

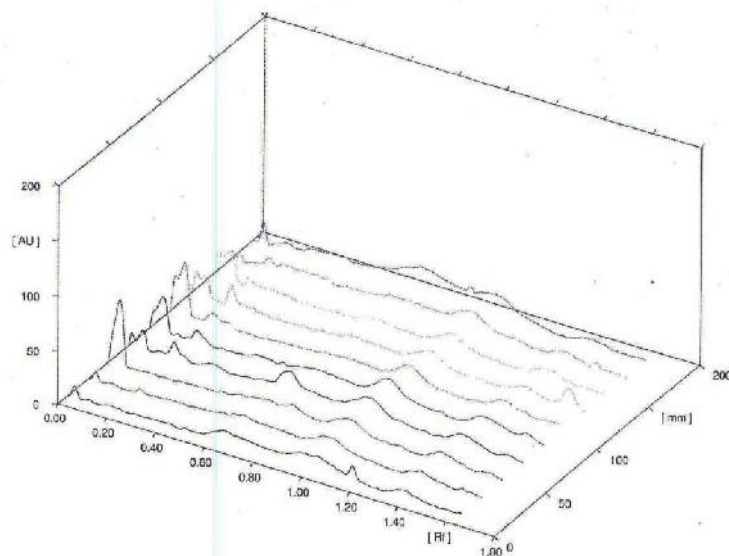
User : Natural Remedies
Thursday, April 26, 2018 2:46:32 PM

Approved :
Report ID : 07E2041A050E2E12

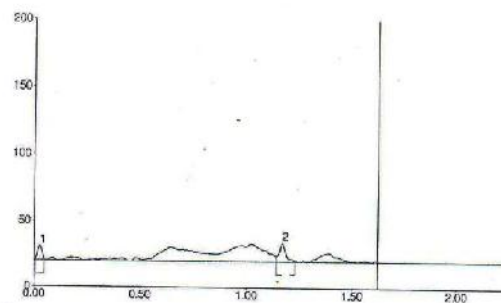
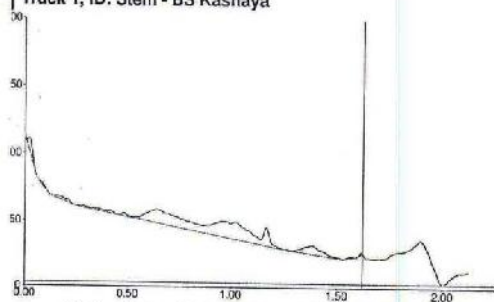
SN 1408W003, V1.4.3
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winCATS Planar Chromatography Manager

All tracks at Wavelength



Track 1, ID: Stem - BS Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	0.6	0.03	10.6	43.13	0.05	0.2	102.1	33.09	unknown *
2	1.14	4.3	1.17	14.0	56.87	1.23	0.7	206.3	66.91	unknown *

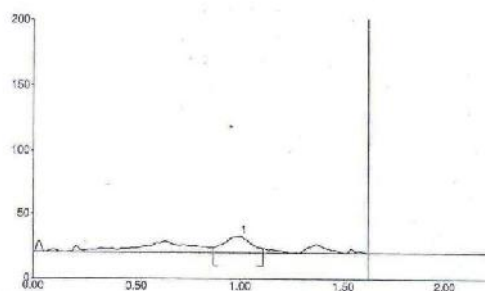
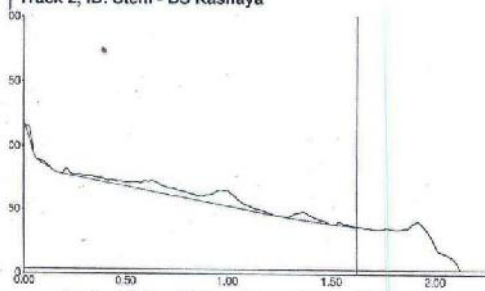
User : Natural Remedies
Thursday, April 26, 2018 2:46:32 PM

Approved :
Report ID : 07E2041A050E2E12

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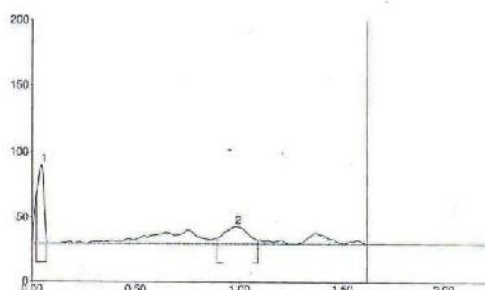
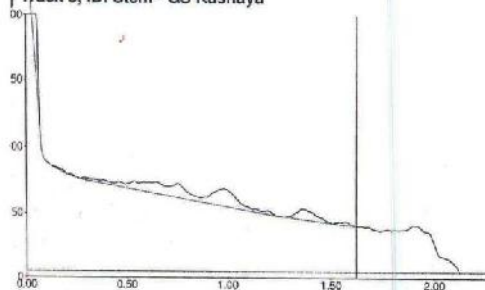
winCATS Planar Chromatography Manager

Track 2, ID: Stem - BS Kashaya



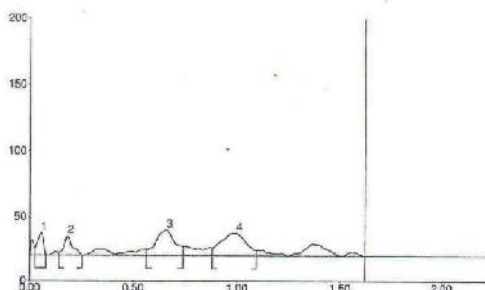
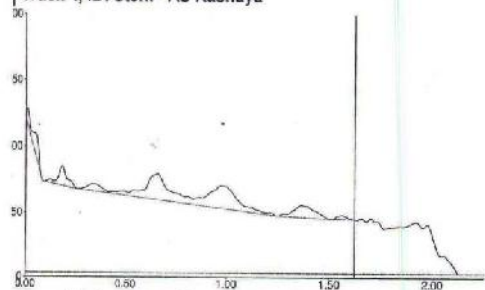
Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.87	3.9	1.00	12.8	100.00	1.11	3.2	768.3	100.00	unknown *

Track 3, ID: Stem - GS Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.02	38.0	0.04	60.1	81.75	0.07	1.9	866.5	55.08	unknown *
2	0.90	4.6	0.98	13.4	18.25	1.09	2.9	707.1	44.94	unknown *

Track 4, ID: Stem - AS Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.03	5.4	0.06	17.2	24.88	0.08	0.2	227.4	9.72	unknown *
2	0.14	1.9	0.19	14.8	21.36	0.26	0.1	279.5	11.95	unknown *
3	0.56	4.7	0.66	19.8	28.60	0.74	7.1	832.1	35.57	unknown *
4	0.88	5.9	1.00	17.4	25.16	1.10	4.1	1000.5	42.77	unknown *

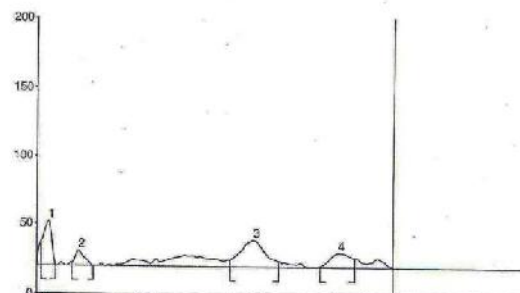
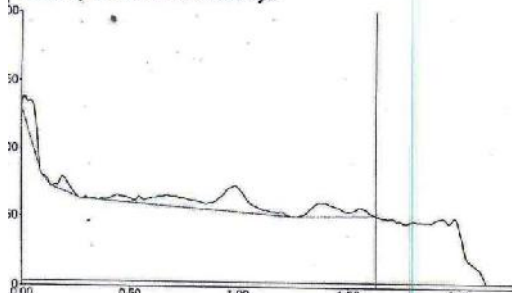
User : Natural Remedies
Thursday, April 26, 2018 2:46:32 PM

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Report ID : 07E2041A050E2E12

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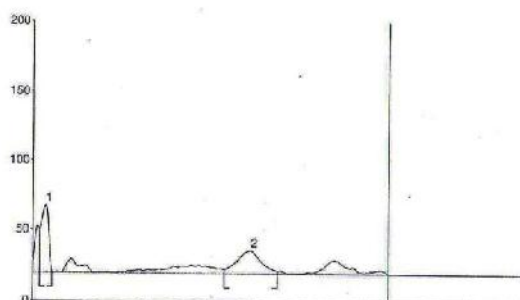
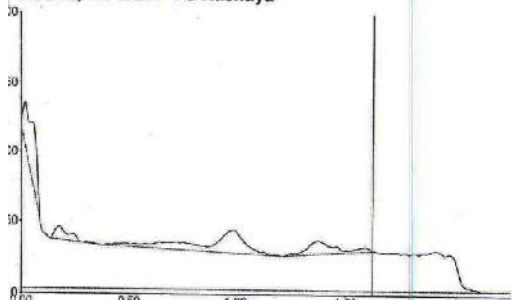
winCATS Planar Chromatography Manager

Track 5, ID: Stem - SS Kashaya



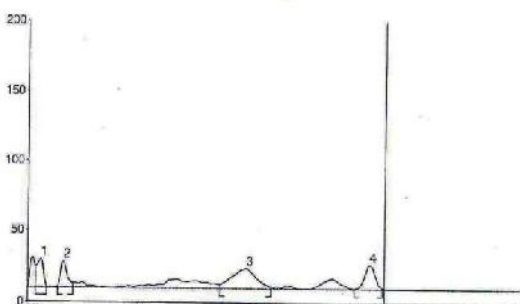
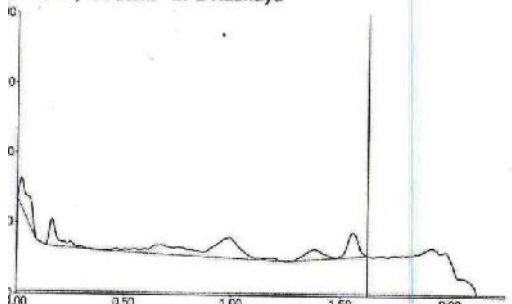
Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.02	17.4	0.06	31.7	44.27	0.09	0.3	578.5	25.82	unknown *
2	0.16	2.3	0.19	10.7	14.94	0.26	0.1	210.6	9.40	unknown *
3	0.88	4.9	0.98	19.0	26.57	1.10	4.1	999.7	44.62	unknown *
4	1.29	0.8	1.37	10.2	14.21	1.45	6.6	451.4	20.15	unknown *

Track 6, ID: Stem - PS Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.03	30.5	0.06	47.3	74.27	0.09	0.1	772.7	47.88	unknown *
2	0.87	3.2	0.99	16.4	25.73	1.11	1.9	841.2	52.12	unknown *

Track 7, ID: Stem - BPS Kashaya



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hursday, April 26, 2018 2:46:32 PM

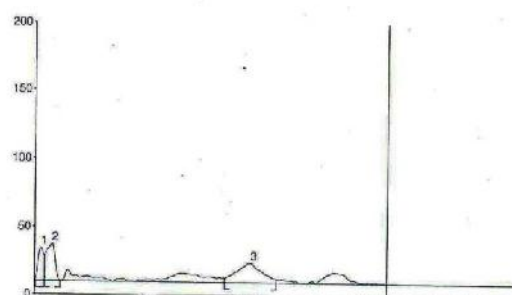
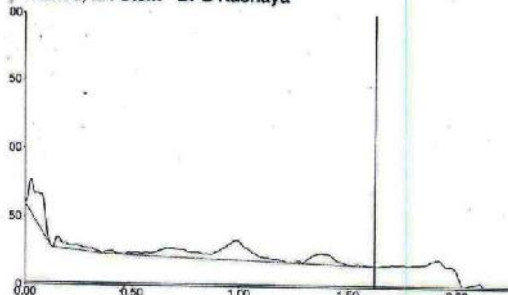
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Report ID : 07E2041A050E2E12

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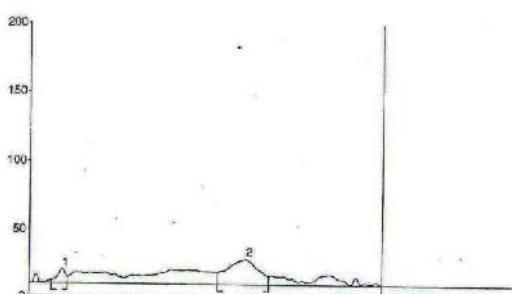
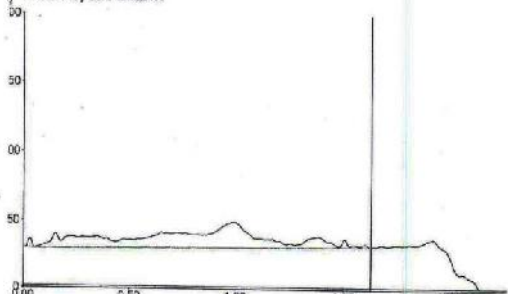
Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.04	15.0	0.06	19.9	28.66	0.09	0.4	288.7	17.51	unknown *
2	0.14	0.3	0.17	18.4	26.50	0.21	3.4	253.0	15.35	unknown *
3	0.87	2.8	0.99	14.1	20.32	1.11	1.3	726.2	44.05	unknown *
4	1.49	0.2	1.56	17.0	24.52	1.62	0.8	380.8	23.10	unknown *

Track 8, ID: Stem - BPS Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	2.5	0.03	24.5	37.03	0.04	18.8	283.5	17.76	unknown *
2	0.05	19.3	0.08	27.4	41.30	0.12	0.1	512.8	32.13	unknown *
3	0.87	3.4	0.99	14.4	21.67	1.11	2.9	799.7	50.11	unknown *

Track 9, ID: Blank



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.10	2.5	0.15	10.6	35.78	0.18	5.1	192.3	13.23	unknown *
2	0.86	9.3	1.00	19.1	64.22	1.10	6.7	1261.3	86.77	unknown *

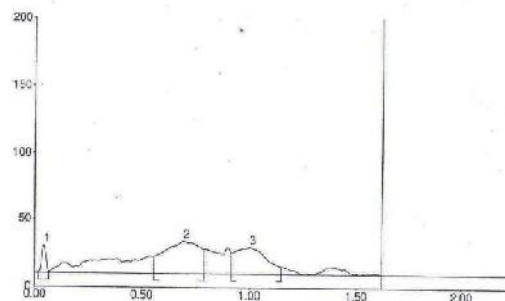
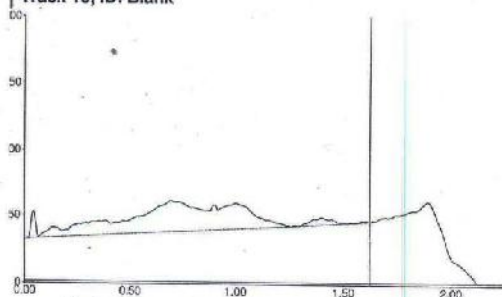
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Track 10, ID: Blank



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.02	0.7	0.04	20.3	31.80	0.07	0.7	189.7	5.62	unknown *
2	0.56	12.6	0.69	23.8	37.26	0.79	17.8	1893.8	54.35	unknown *
3	0.92	15.0	1.00	19.7	30.94	1.15	5.7	1350.6	40.03	unknown *

Evaluation results

Evaluation Sequence

Track	Track type	Vial	Sample ID
1	Sample	1	Stem - BS Kashaya
2	Sample	1	Stem - BS Kashaya
3	Sample	2	Stem - GS Kashaya
4	Sample	3	Stem - AS Kashaya
5	Sample	4	Stem - SS Kashaya
6	Sample	5	Stem - PS Kashaya
7	Sample	6	Stem - BPS Kashaya
8	Sample	6	Stem - BPS Kashaya
9	Sample	7	Blank
10	Sample	7	Blank

Table of substances

Substance	Position Tracks									
	1	2	3	4	5	6	7	8	9	0
										1

Results per track

winCATS summary report

Calibration results per Analysis

No results can be calculated due to the following error(s):
No substances assigned

Documentation

Executed by: Natural Remedies Thursday, April 26, 2018 1:16:05 PM

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Thursday, April 26, 2018 2:46:32 PM

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Report ID: 07E2041A056E2E12

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Sample application - CAMAG Linomat 5

Instrument
 Executed by CAMAG Linomat 5 "Manually set to 'Executed'" S/N * ()
 Natural Remedies Thursday, April 26, 2018 2:33:10 PM

Linomat 5 application parameters

Spray gas : Inert gas
 Sample solvent type : Methanol
 Dosage speed : 150 nl/s
 Precosage volume : 0.2 ul

Sequence

Syringe size: 100 µl
 Number of tracks: 10
 Application position Y : 10.0 mm
 Band length : 10.0 mm

No.	Appl. position	Appl. volume	Vial #	Sample ID	Active
1	10.0 mm	20.0 µl	1	Root - BR Kashaya	Yes
2	30.0 mm	20.0 µl	1	Root - BR Kashaya	Yes
3	50.0 mm	20.0 µl	2	Root - GR Kashaya	Yes
4	70.0 mm	20.0 µl	3	Root - AR Kashay	Yes
5	90.0 mm	20.0 µl	4	Root - SR Kashaya	Yes
6	110.0 mm	20.0 µl	5	Root - PR Kashaya	Yes
7	130.0 mm	20.0 µl	6	Root - BPR Kashaya	Yes
8	150.0 mm	20.0 µl	6	Root - BPR Kashaya	Yes
9	170.0 mm	20.0 µl	7	Blank	Yes
10	190.0 mm	20.0 µl	7	Blank	Yes

Pre-Chromatographic Derivatization

Instrument
 Executed by Natural Remedies Thursday, April 26, 2018 1:16:07 PM
 Comment
 Solution
 Volume ml
 Drying device Oven
 Temperature 120 °C
 Time 20 Minutes
 Notes

Development - Automated Multiple Development

Instrument: CAMAG AMD Serial No.
 Executed by Natural Remedies Thursday, April 26, 2018 1:16:07 PM
 Comment
 Pre-conditioning
 Drying
 Solvent front position 50 mm
 Content bottle 1
 Content bottle 2
 Content bottle 3
 Content bottle 4
 Content bottle 5
 Content bottle 6
 Gradient description
 Notes

User : Natural Remedies
 Thursday, April 26, 2018 2:51:08 PM

Approved :
 Report ID : 07E2041A050E3301

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Post-Chromatographic Derivatization

Instrument	Natural Remedies	Thursday, April 26, 2018 1:16:06 PM
Executed by		
Comment		
Solution		
Volume	mL	
Drying device	Oven	
Temperature	120 °C	
Time	20 Minutes	
Notes		

Detection - CAMAG TLC Scanner 3

Information	
Application position	10.0 mm
Solvent front position	50.0 mm
Instrument	CAMAG TLC Scanner 3 "Scanner3_140525" S/N 140525 (1.14.28)
Executed by	Natural Remedies Thursday, April 26, 2018 2:51:01 PM
Number of tracks	10
Position of first track X	10.0 mm
Distance between tracks	20.0 mm
Scan start pos. Y	10.0 mm
Scan end pos. Y	95.0 mm
Slit dimensions	10.00 x 0.90 mm, Macro
Optimize optical system	Light
Scanning speed:	20 mm/s
Data resolution:	100 µm/step
Measurement Table	
Wavelength	580
Lamp	D2 & W
Measurement Type	Remission
Measurement Mode	Absorption
Optical filter	Second order
Detector mode	Automatic
PM high voltage	286 V
Detector properties	
Y-position for 0 adjust	10.0 mm
Track # for 0 adjust	0
Analog Offset	10%
Sensitivity	Automatic (11)

Integration

Properties	
Data filtering	Savitsky-Golay 7
Baseline correction	Lowest Slope
Peak threshold min. slope	5
Peak threshold min. height	10 AU
Peak threshold min. area	50
Peak threshold max. height	990 AU
Track start position	10.0 mm
Track end position	75.0 mm
Display scaling	Automatic

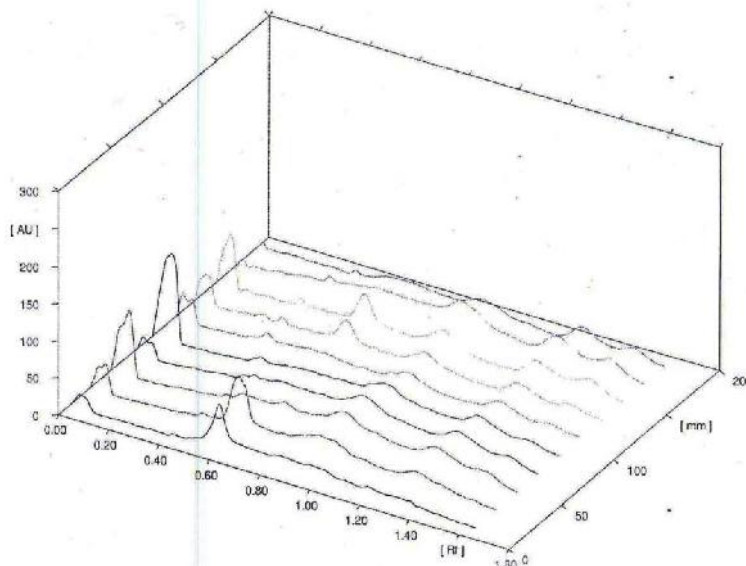
User : Natural Remedies
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Report ID : 07E2041A050E3301

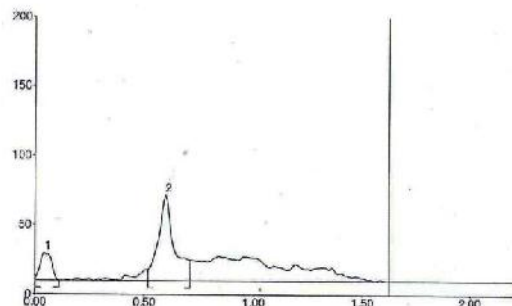
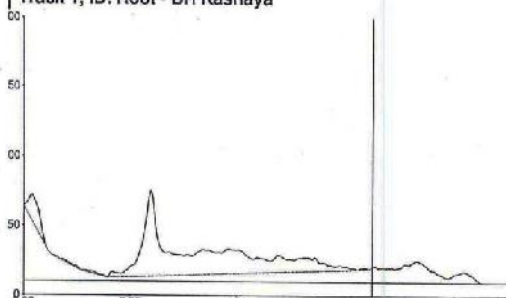
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All tracks at Wavelength



Track 1, ID: Root - BR Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.00	0.8	0.04	19.5	24.05	0.11	0.0	474.7	18.56	unknown *
2	0.52	8.4	0.60	81.7	75.95	0.71	15.0	2083.5	81.44	unknown *

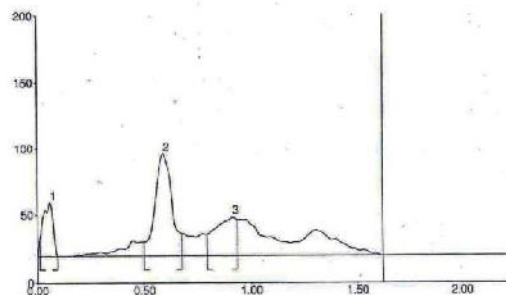
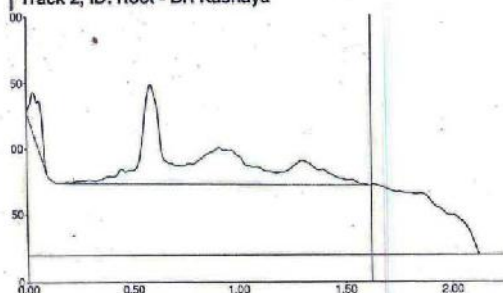
User : Natural Remedies
Thursday, April 26, 2018 2:51:08 PM

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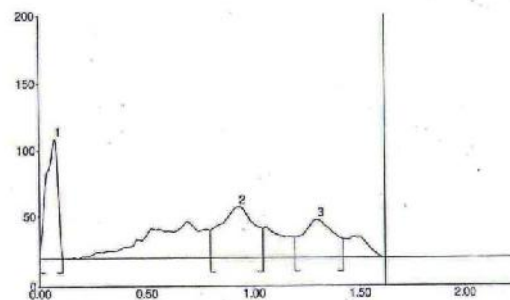
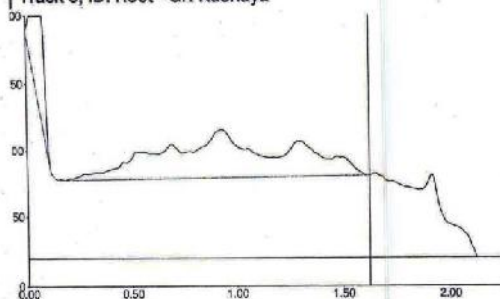
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Track 2, ID: Root - BR Kashaya



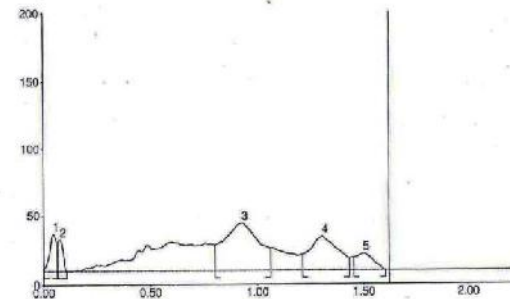
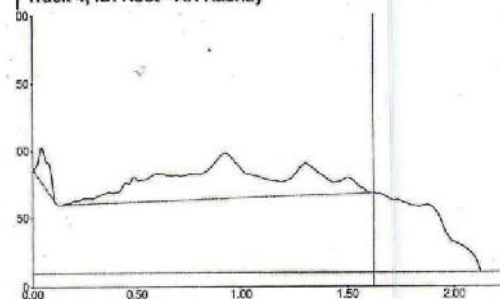
Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	11.8	0.06	39.1	27.31	0.10	0.0	840.6	17.16	unknown *
2	0.50	10.3	0.59	75.8	52.91	0.68	16.2	2749.7	56.13	unknown *
3	0.80	15.7	0.91	28.3	19.77	0.94	26.2	1308.6	26.71	unknown *

Track 3, ID: Root - GR Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.00	3.9	0.07	88.7	58.15	0.11	0.8	2212.9	32.59	unknown *
2	0.80	19.9	0.93	36.8	24.10	1.04	21.4	2741.0	40.37	unknown *
3	1.20	14.7	1.30	27.1	17.75	1.42	13.3	1835.2	27.03	unknown *

Track 4, ID: Root - AR Kashay



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Thursday, April 26, 2018 2:51:08 PM

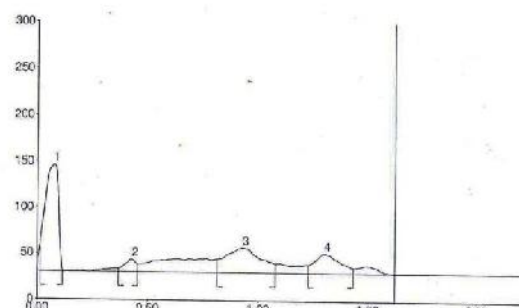
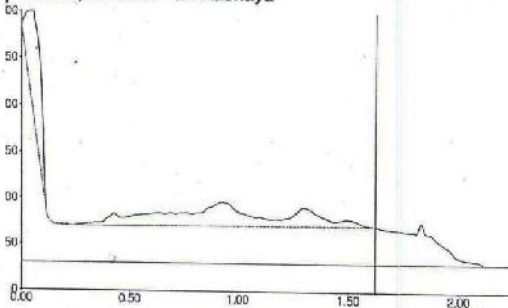
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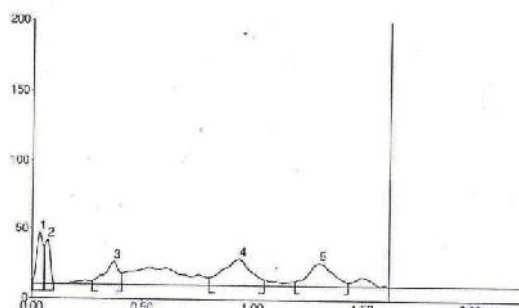
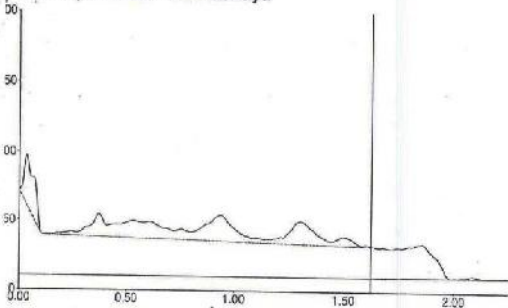
Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	1.9	0.04	26.9	22.42	0.07	20.9	399.0	7.67	unknown *
2	0.07	21.0	0.08	22.6	18.83	0.11	0.1	252.3	4.85	unknown *
3	0.80	18.5	0.93	34.2	28.50	1.06	16.3	2597.9	49.92	unknown *
4	1.21	11.5	1.30	24.2	20.21	1.44	8.9	1502.9	28.88	unknown *
5	1.46	9.3	1.50	12.0	10.03	1.61	0.3	462.2	8.69	unknown *

Track 5, ID: Root - SR Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	35.6	0.07	116.8	65.54	0.12	0.6	3290.4	48.82	unknown *
2	0.37	3.1	0.43	13.4	7.54	0.46	8.6	321.9	4.78	unknown *
3	0.82	14.3	0.93	26.8	15.04	1.08	9.9	1979.4	29.37	unknown *
4	1.23	9.1	1.30	21.2	11.88	1.43	6.0	1148.2	17.04	unknown *

Track 6, ID: Root - PR Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.01	2.7	0.04	37.0	30.66	0.06	27.2	494.6	14.56	unknown *
2	0.06	27.6	0.07	31.7	26.32	0.10	0.1	367.9	10.83	unknown *
3	0.28	2.6	0.37	16.5	13.67	0.41	8.2	493.2	14.53	unknown *
4	0.81	5.9	0.94	18.9	15.69	1.05	4.5	1144.6	33.71	unknown *
5	1.20	3.2	1.30	16.5	13.66	1.44	3.1	895.5	26.37	unknown *

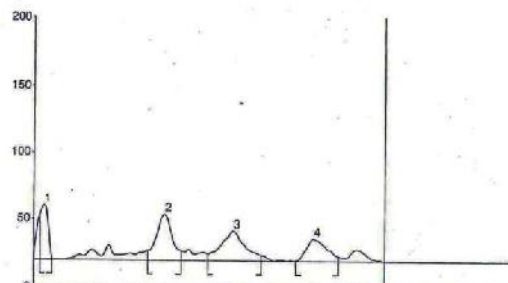
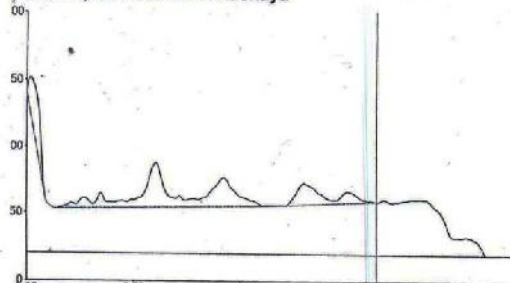
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Report ID : 07E2041A050E3301

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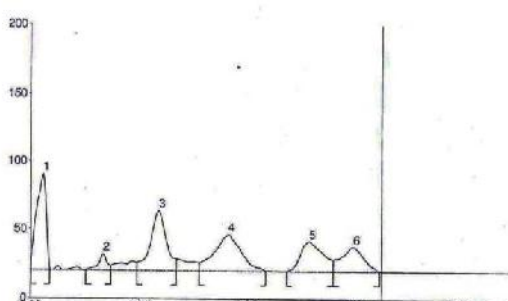
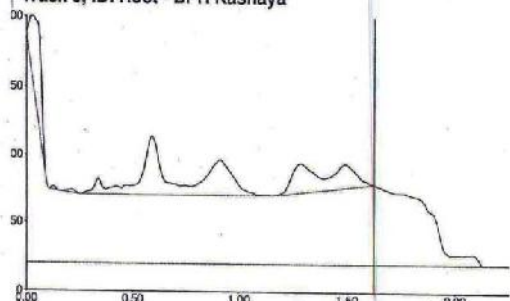
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Track 7, ID: Root - BPR Kashaya



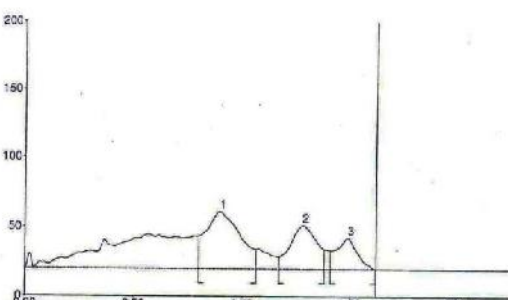
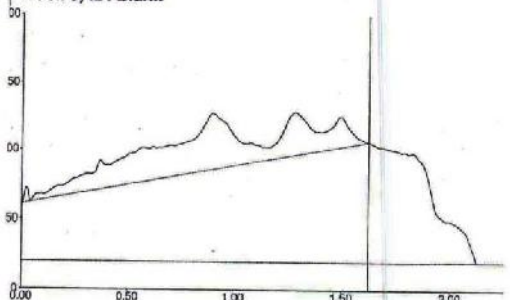
Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.03	33.3	0.05	39.8	35.92	0.09	0.2	666.0	18.41	unknown *
2	0.53	7.0	0.60	33.5	30.16	0.68	7.2	1119.4	30.94	unknown *
3	0.80	5.0	0.92	21.6	19.47	1.05	4.0	1120.4	30.97	unknown *
4	1.21	0.3	1.29	16.0	14.44	1.41	3.4	711.7	19.67	unknown *

Track 8, ID: Root - BPR Kashaya



Peak	Start Rf	Start Height	Max Rf	Max Height	Max %	End Rf	End Height	Area	Area %	Assigned substance
1	0.00	3.7	0.06	70.6	36.73	0.09	1.0	1456.3	21.98	unknown *
2	0.26	0.1	0.34	12.0	6.22	0.37	3.5	220.0	3.32	unknown *
3	0.49	6.3	0.59	43.7	22.70	0.67	8.8	1470.8	22.20	unknown *
4	0.78	6.1	0.91	26.5	13.77	1.09	0.4	1522.3	22.96	unknown *
5	1.18	0.2	1.28	21.7	11.31	1.40	8.8	1069.6	16.14	unknown *
6	1.40	8.9	1.49	17.8	9.27	1.62	0.6	886.3	13.38	unknown *

Track 9, ID: Blank



User : Natural Remedies
Thursday, April 26, 2018 2:51:08 PM

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ANNEXURE 10

Institutional Animal Ethics certificate



K.L.E. UNIVERSITY'S
SHRI B.M. KANKANAWADI AYURVED MAHAVIDYALAYA
(A Constituent unit of KLE University, Belgaum)
 SHAHAPUR, BELGAUM – 590 003 (KARNATAKA STATE)



Dr. P.A. Patil,
 Chairman,
 Prof & HOD, Pharmacology,
 J.N.M.C. Belgaum

Mr. Mohammed Sanahullah. S.H
 IAEC Nominee of CPCSEA

Dr. R.S. Hiremath,
 Member Secretary
 Asst.Prof ,P.G.Dept of Rasashastra

IAEC Reg. No. 1017/C/06/CPCSEA dtd:19.12.2006

Dr. Vinaykumar
Veterinarian
 Belgaum.

Dr. S.D. Kolkute
Scientist
 RMRC (ICMR)
 Belgaum.

Dr. Vijayakumar
Rasal
Scientist
 KLES College of
 Pharmacy
 Belgaum

Shri. M.C. Antin
 Social Worker,
 Belgaum

Dr. P.G. Jadar
 Asst. Prof
 P.G. Dept. of
 Rasashastra

Dr. Aroon.
Chougale
 Lecturer
 P.G. Dept. of
 Dravyaguna

Certificate

This is to certify that, the research project "Phytochemical and Pharmacological studies on Leaves,Roots and Stem Barks of five perennial plants " .


Submitted by **Mr.Ajit.C.Lingayat** Ph.D. scholar has been approved in the Institutional Animal ethics Committee meeting held on 19th Dec 2009 resolution No **BMK/IAEC/Res-06/2009** and was permitted to use **102** Rats /Mice/Rabbits.

You are here by informed to strictly adhere to the protocol submitted for approval.In case the project needs to be modified later, the modified version of the protocol should be submitted to the committee, stating valid reasons for such modifications for fresh approval.

You are required to keep the account of animals used for the project in specified proforma, **Form-D**

You have to submit the brief report to the committee after completion of the project along with Form-D.


Member Secretary
 Institutional Animal Ethics Committee
 KLE'S Shri B. M. Kankanawadi Ayurved
 Mahavidyalaya. Shahapur-Belgaum


CPC SEA Nominee
Mohammad. Sanahulla S. H.

Ph.No. +91 831-248
 Email : bmkayurveda@rediffmail.com

Fax : +91 831-2424157
 Web site: www.bmkayurveda.org


SHRI BM KANKANAWADI AYURVED MAHAVIDYALAYA
Post Graduate Studies & Research Centre

(Approved by Central Council of Indian Medicine, New Delhi & M/o AYUSH, GoI)

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH

(DEEMED-TO-BE-UNIVERSITY)

 (Re-Accredited 'A' Grade by NAAC (2nd Cycle) || Placed under Category 'A' by MHRD GoI)


Dr. B.S. Prasad
Chairman/ Biological Scientist
 Shri B.M.K. Ayurved Mahavidyalaya
 Shahapur- Belagavi

Mr. Mallikarjun Kolhar
Nominee of CPCSEA
 H.S.K College of Pharmacy,
 Bagaikot

Dr. Rudamma R. Hiremath
Member Secretary
 Scientist In charge of Animal House Facility
 Shri B.M.K. Ayurved Mahavidyalaya Shahapur Belagavi

File No.25/369/2010-AWD Government of India Ministry of Environment & Forests (Animal Welfare Division) Dated: 24/11/2016

Dr. Giridhar Vedantam
 Scientist-Biological Discipline
 Shri B.M.K. Ayurved
 Mahavidyalaya Shahapur
 Belagavi

Dr. Santosh Patil
 Scientist-Biological Discipline
 Shri B.M.K. Ayurved
 Mahavidyalaya Shahapur
 Belagavi

Dr. Vinaykumar S
 Veterinarian
 Vadgaon, Belagavi

Shri. Sunil Patil
 Goshala Secretary
 Socially Aware Nominee
 Nidasoshi, Belagavi

Mr. Prakash Geriyol
 Scientist from outside the
 Institute Honnali, Davangere

CERTIFICATE

This is to certify that the P.G./Ph.D/Research project entitled:

**“Phytochemical And Pharmacological Studies On Leaves, Roots
 And Stem Barks of Five Perennial Plants”**

 Submitted by: **Mr. Ajit Chandrashekhhar Lingayat**

Has been approved by the Institutional Animal Ethical Committee
 meeting held on **13th January 2018** vide Resolution No.
BMK/IAEC/Res.No.-17/2018- 01

Dr. B.S. Prasad
 Chairman
 IAEC, Shri B.M.K.A.M Belagavi
Chairman
Institutional Animal Ethics Committee
KLEU Shri B.M. Kankanawadi Ayurved
Mahavidyalaya, Shahapur, Belgaum.

Mr. Mallikarjun Kolhar
 CPCSEA Nominee
 IAEC, Shri B.M.K.A.M. Belagavi
CPCSEA Nominee
Institutional Animal Ethics Committee
KLEU Shri B.M. Kankanawadi Ayurved
Mahavidyalaya, Shahapur, Belgaum.

Shahapur, Belagavi – 590 003, Karnataka, India
 Phone: +91 831 2486286 Fax: +91 831 2424157
 Website: www.kleayurworld.edu.in Email: bmprincipal@gmail.com

Photo plate no 14

ACUTE ANTI-INFLAMMATORY STUDY



Marking of Animals



Dosing of Animals



Injecting Edema



Measuring Paw Volume

Photo plate no 15

Experimental Study photograph



Preparation for Implantation



Implantation Cotton Pellet & Grass Pith
Implantation



Removal of Cotton pellet



Removal of Grass pith

Photo plate no 16

Wet & Dry Pellets Individual drug Stem bark Group





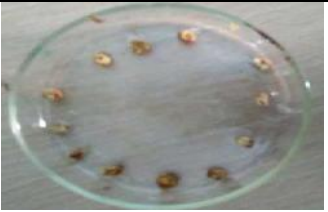




Sample Name	Wet Pellet	Dry Pellet
Bilwa Stem bark kashaya		
Agnimantha Stem barkKashaya		
Patala Stem barkbarkkashaya		
Shyonak Stem bark Kashaya		
Gambhari Stem bark Kashaya		

Photo plate no 17

Individual drug Root Kashaya Group







Bilwa Root kashaya		
Agnimantha Root Kashaya		
Patala Root kashaya		
Shyonak Root Kashaya		
Gambhari Root Kashaya		

Photo plate no 18

Combined Root & Stem bark Kashsya

Bruhatpanch Root Kashaya		
Bruhatpanch Stem bark Kashaya		

Control & Standard Group










Control Group		
Standard Drug Ibuprofen		






Photo plate no 19

GRASS PITH PHOTOS

Individual drug Stem bark & Group

Sample name	Bilwa	Agnimath	Patala	Shyonak	Gambhari
Grass Pith photo					

Individual drug Root Group

Sample name	Bilwa	Agnimath	Patala	Shyonak	Gambhari
Grass Pith photo					

Stem bark Combination, Root Combination, Combination Standard, Control





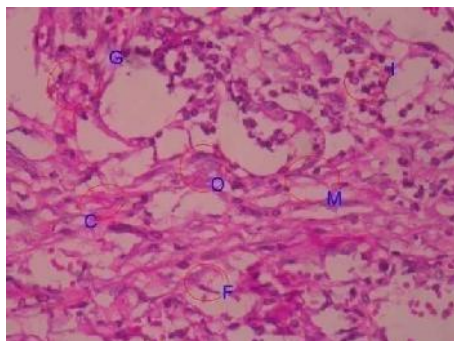
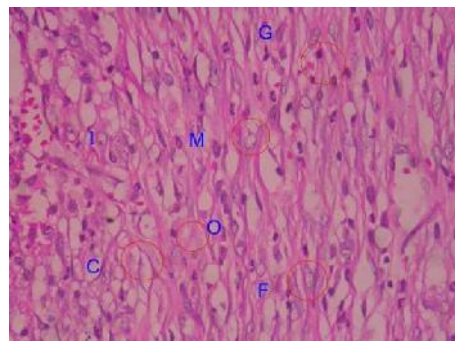
Sample name	Bruhatpanch Stem bark Kashaya	Bruhatpanch Root Kashaya	Ibuprofen	Control
Grass Pith photo				

Photo plate no 20

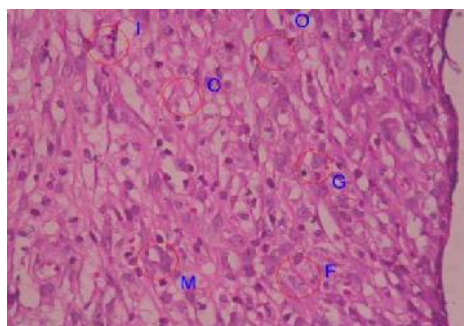
Grasspith histopath photographs of Stem bark kashaya group



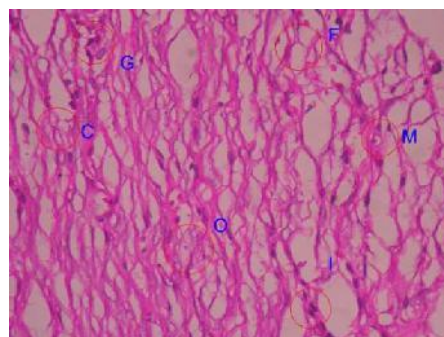
Bilwa



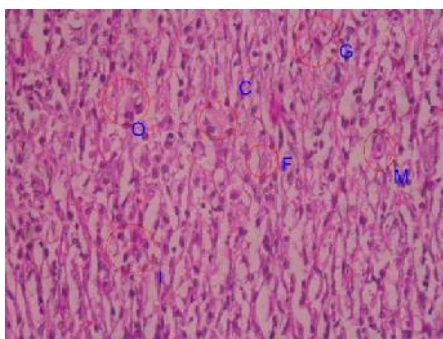
Agnimath



Patala



Shyonak

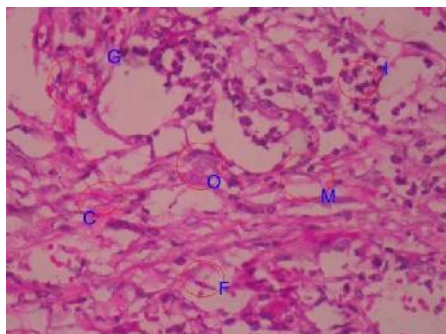


Gambhari

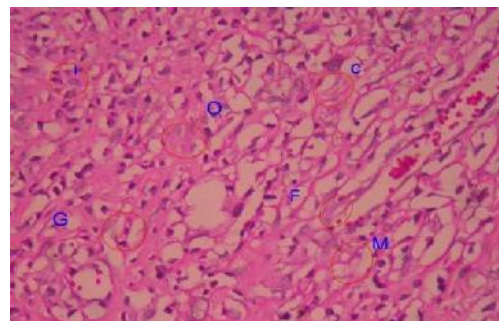
Abbreviations: O : Odema, I: Inflammatory infiltration, M: Macrophage, G: Granulation Tissues, F: Fibroblast, C: Collagen formation

Photo plate no 21

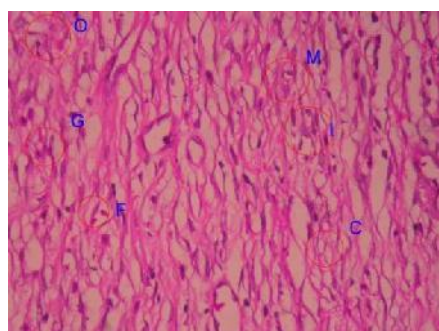
Grasspith histopath photographs of Root kashaya group



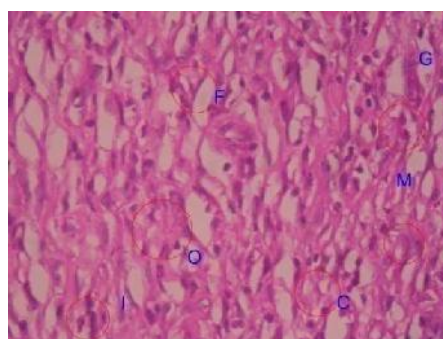
Bilwa



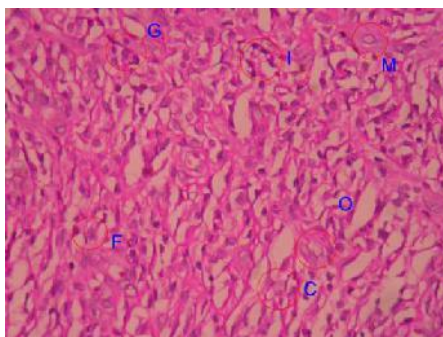
Agnimath



Patala



Shyonak

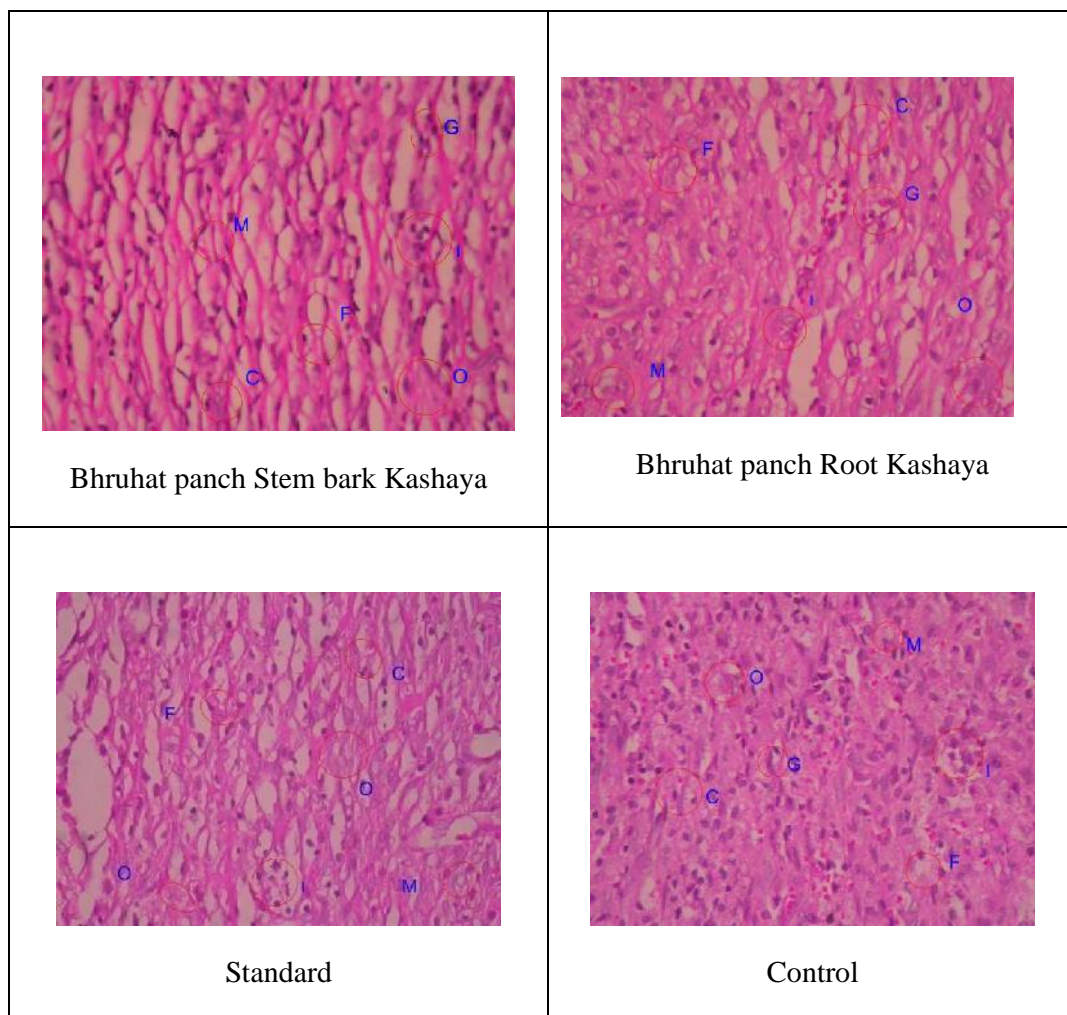


Gambhari

Abbreviations: O : Odema, I: Inflammatory infiltration, M: Macrophage, G: Granulation Tissues, F: Fibroblast, C: Collagen formation

Photo plate no 22

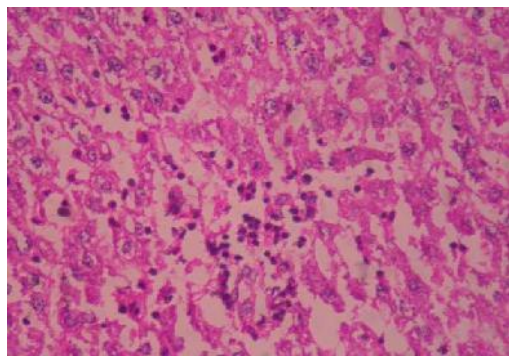
Grasspith histopath photographs of Bhruhat panch Stem bark kashaya, Bhruhatpanch root kashaya, Standard drug & Control group



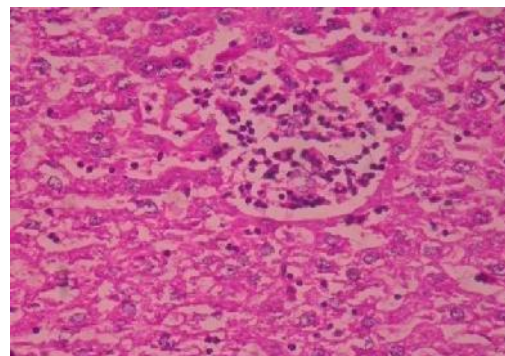
Abbreviations: O : Odema, I: Inflammatory infiltration, M: Macrophage, G: Granulation Tissues, F: Fibroblast, C: Collagen formation

Photo plate no 23

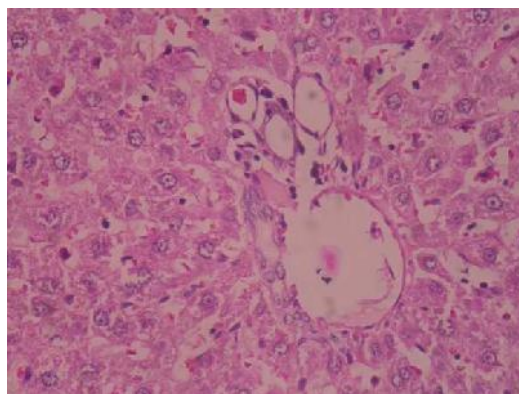
Liver Histopath study of Stem bark Group (Individual & Combination)



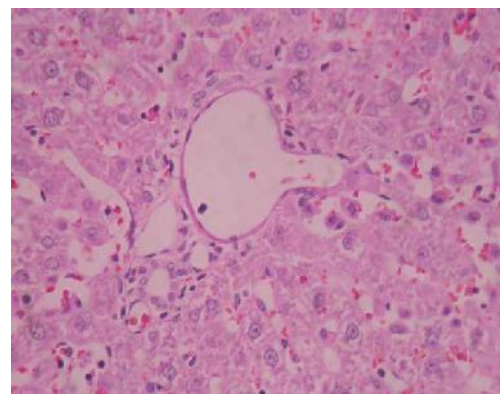
Bilwa stem Bark



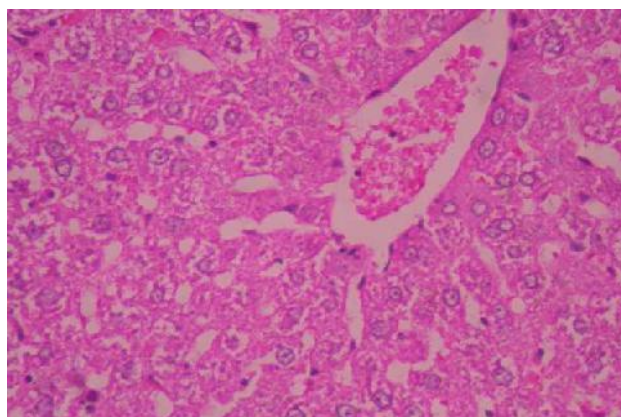
Agnimanth Stem Bark



Gambhari stem bark



Patala stem bark



Shyonak stem bark

.Photo plate no 24

Liver Histopath study of Root Group (Individual & Combination)

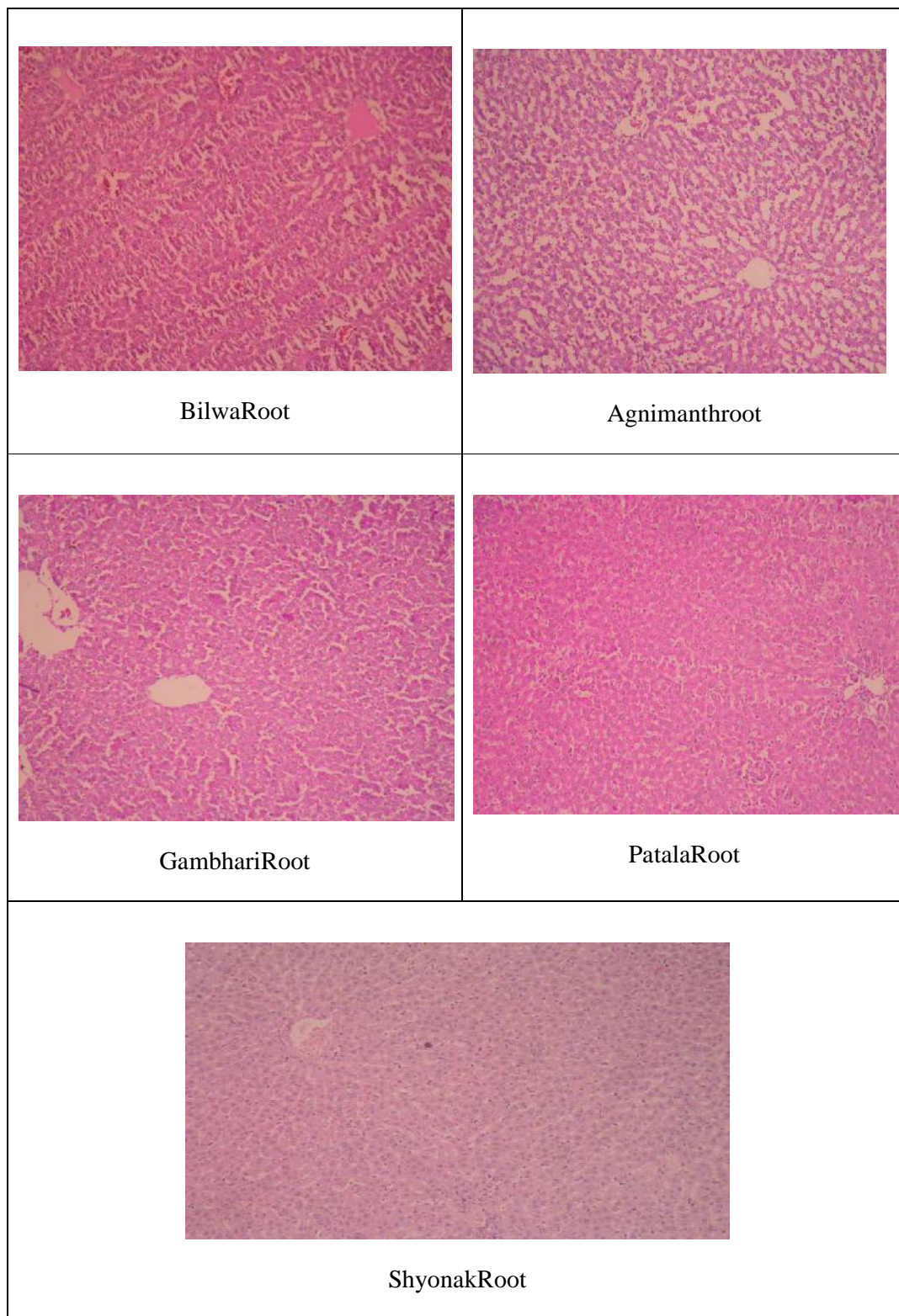


Photo plate no 25

Liver Histopath study of Standard, Control, Bhruhat panch Stem bark kashaya & Bhruhatpanch root kashay

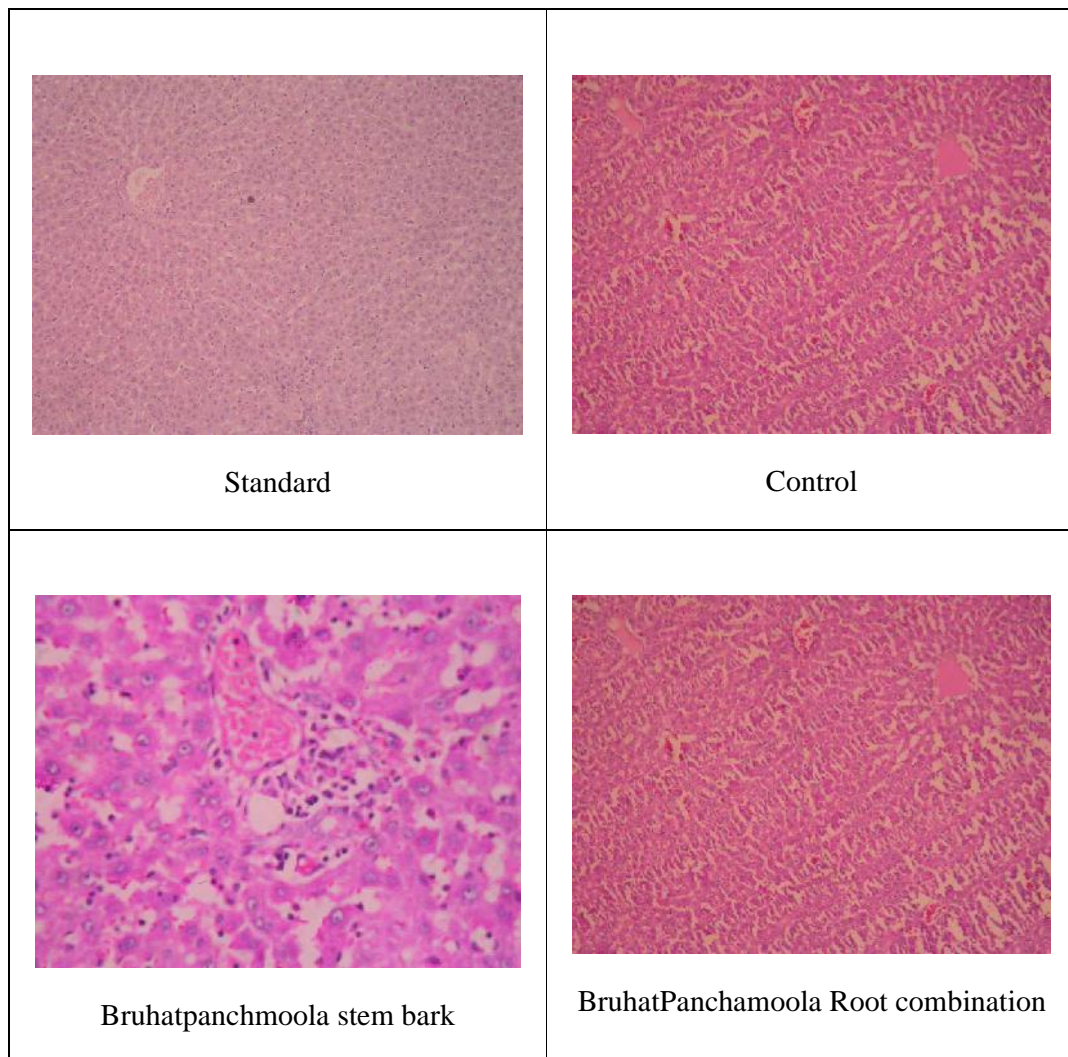
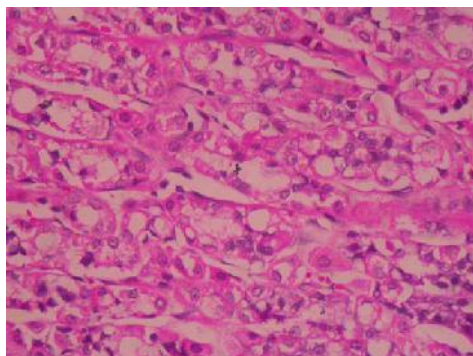
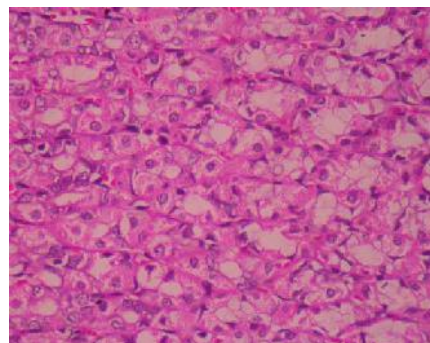


Photo plate no 26

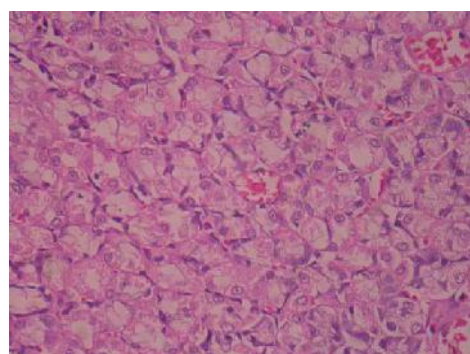
Stomach Histopath study of Stem bark Group (Individual & Combination)



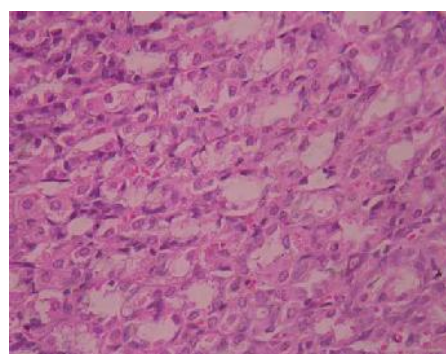
Bilwa stem Bark



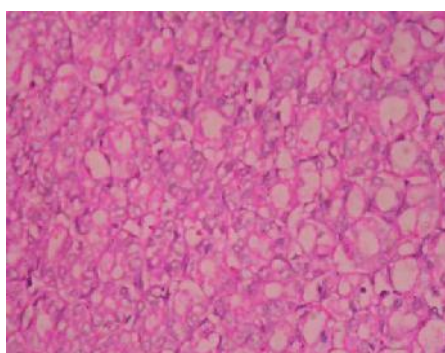
Agnimanth Stem Bark



Gambhari stem bark



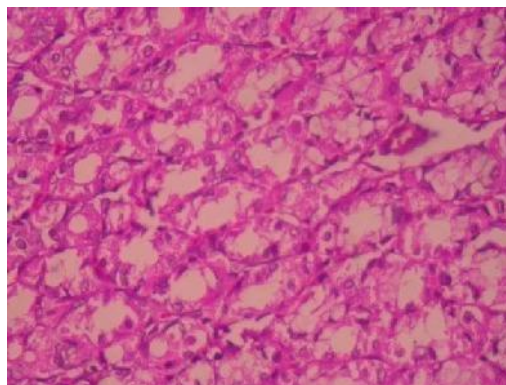
Patala stem Bark



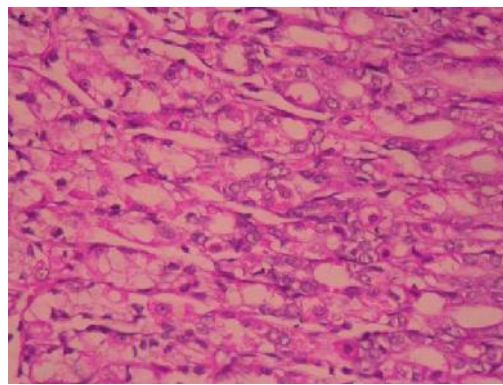
Shyonak stem Bark

Photo plate no 27

Stomach Histopath study of Root Group (Individual & Combination)



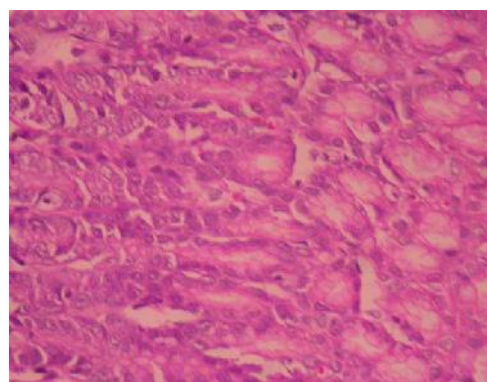
BilwaRoot



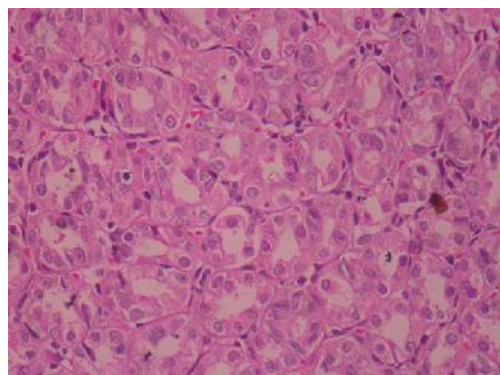
AgnimanthRoot



GambhariRoot



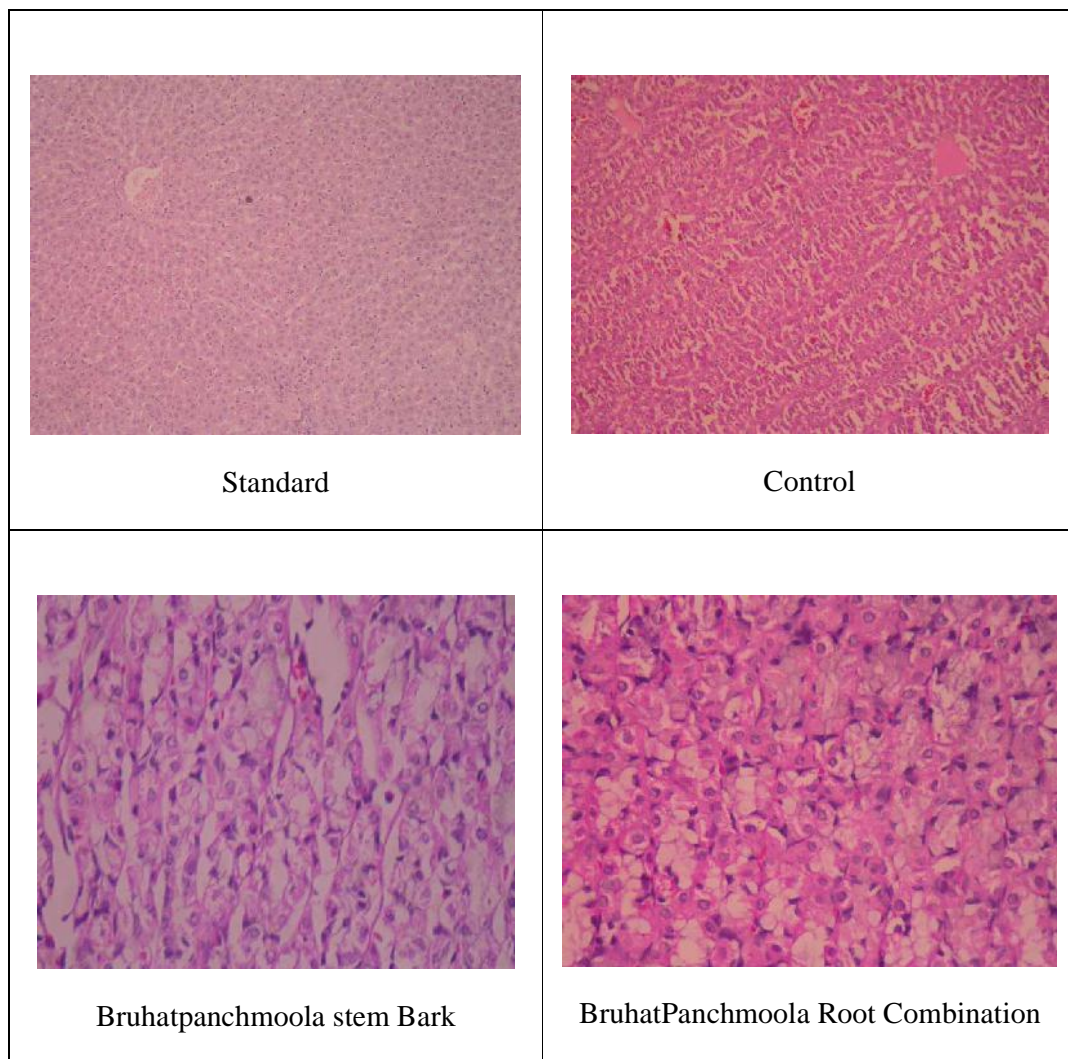
PatalaRoot



Shyonak Root

Photo plate no 28

Stomach Histopath study of Standard & Control



ANNEXURES-11

Histopathological observations of Grass piths



JEEVAN REGIONAL DIAGNOSTICS
 REGD. OFFICE: 6331, OPPOSITE LINGARAU COLLEGE,
 COLLEGE ROAD, BELGAUM-02.

Thesis of:

DR. AJIT LINGAVAT

Referred by Dr:

SELF

Received on:

13/03/2018

Lab No: TH - 37

HISTOPATHOLOGY REPORT

MACROSCOPY

Received greyish white membranous tissue with grass pith labelled as G1, G2, G3, G4, G5, G6, S1, S2, S3, S4, S5, S6, P1, P2, P3, P4, P5, P6, A4, A5, A6, SR1, SR2, SR3, SR4, SR5 and SR6.

MICROSCOPY	A4	A5	A6
Oedema	Nil	Nil	Nil
Inflammatory infiltration	Moderate	Mild	Moderate
Macrophages	Moderate	Mild	Mild
Granulation tissue	Mild	Mild	Mild
Fibroblasts	Mild	Moderate	Moderate
Collagen formation	Mild	Marked	Moderate

THANKS FOR YOUR REFERENCE

DR.V.V.YENNI MD
 CONSULTANT PATHOLOGIST

DR.A.S.AMMANAGI MD DNB MNAMS MSSC
 CONSULTANT PATHOLOGIST

VSC I

JRI



JEEVAN REGIONAL DIAGNOSTICS
 REGD. OFFICE: 6331, OPPOSITE LINGARAU COLLEGE,
 COLLEGE ROAD, BELGAUM-02.

0831-2467495, 2461355

Thesis of : DR. AJIT LINGAYAT

Referred by Dr: SELF

Received on: 13/03/2018

Lab No: TH - 37

HISTOPATHOLOGY REPORT**MACROSCOPY**

Received greyish white membranous tissue with grass pith labelled as G1, G2, G3, G4, G5, G6, S1, S2, S3, S4, S5, S6, P1, P2, P3, P4, P5, P6, A4, A5, A6, SR1, SR2, SR3, SR4, SR5 and SR6.

MICROSCOPY	G1	G2	G3	G4	G5	G6	S1	S2	S3	S4	S5	S6
Oedema	Mild	Nil	Nil	Nil	Nil	Nil	Mild	Mild	Mild	Mild	Nil	Mild
Inflammatory infiltration	Mild	Marked	Mild	Mild	Mild	Moderate	Moderate	Mild	Marked	Moderate	Mild	Mild
Macrophages	Mild	Moderate	Mild	Mild	Mild	Moderate	Moderate	Nil	Moderate	Mild	Mild	Moderate
Granulation tissue	Moderate	Moderate	Mild	Mild	Mild	Mild	Moderate	Mild	Moderate	Mild	Mild	Mild
Fibroblasts	Moderate	Mild	Mild	Mild	Moderate	Moderate	Mild	Mild	Mild	Moderate	Moderate	Mild
Collagen formation	Mild	Mild	Mild	Mild	Moderate	Moderate	Mild	Mild	Mild	Moderate	Moderate	Moderate

THANKS FOR YOUR REFERENCE

DR.V.V.YENNI MD
 CONSULTANT PATHOLOGIST

DR.A.S.AMMANAGI MD DNB MINAMS MSSC
 CONSULTANT PATHOLOGIST



JEEVAN REGIONAL DIAGNOSTICS

REGD. OFFICE: 63331, OPPOSITE LINGARAJU COLLEGE,
COLLEGE ROAD, BELGAUM-02.

0831-2467495, 2461355

Thesis of: DR. AJIT LINGAYAT

Referred by Dr. SELF

Received on: 13/03/2018

Lab No: TH - 37

HISTOPATHOLOGY REPORT

MACROSCOPY

Received greyish white membranous tissue with grass pith labelled as G1, G2, G3, G4, G5, G6, S1, S2, S3, S4, S5, S6, P1, P2, P3, P4, P5, P6, A4, A5, A6, SR1, SR2, SR3, SR4, SR5 and SR6.

MICROSCOPY	P1	P2	P3	P4	P5	P6	SR1	SR2	SR3	SR4	SR5	SR6
Oedema	Nil	Mild	Mild	Mild	Mild	Nil	Mild	Mild	Mild	Nil	Mild	Nil
Inflammatory infiltration	Mild	Marked	Mild	Moderate	Mild	Moderate	Mild	Moderate	Mild	Mild	Moderate	Moderate
Macrophages	Mild	Moderate	Mild	Moderate	Mild	Mild	Mild	Moderate	Mild	Mild	Moderate	Mild
Granulation tissue	Mild	Moderate	Mild	Mild	Mild	Mild	Mild	Moderate	Mild	Mild	Moderate	Mild
Fibroblasts	Mild	Moderate	Moderate	Moderate	Moderate	Mild	Moderate	Mild	Moderate	Mild	Mild	Moderate
Collagen formation	Mild	Mild	Mild	Mild	Mild	Moderate	Mild	Mild	Moderate	Moderate	Mild	Moderate

THANKS FOR YOUR REFERENCE

DR.V.V.YENNI MD
CONSULTANT PATHOLOGIST

DR.A.S.AMMANAGI MD DNB MNAMS MSSC
CONSULTANT PATHOLOGIST

VSJ

JRD



JEEVAN REGIONAL DIAGNOSTICS
 REGD. OFFICE: 6331, OPPOSITE LINGARAJU COLLEGE,
 COLLEGE ROAD, BELGAUM-02.

0831-2467495, 2461355

Thesis of : DR. AJIT LINGAYAT
 Referred by Dr: SELF
 Received on: 26/03/2018

Lab No: TH - 42

HISTOPATHOLOGY REPORT

MACROSCOPY Received nine containers labelled as C1, C2, C3, C4, C5, C6, ST1, ST2, ST3, ST4, ST5 and ST6 each Containing grayish white membranous tissue specimen with grass pith

MICROSCOPY	C1	C2	C3	C4	C5	C6	ST1	ST2	ST3	ST4	ST5	ST6
Oedema	Mild	Nil	Moderate	Mild	Mild	Moderate	Mild	Nil	Nil	Nil	Mild	Mild
Inflammatory infiltration	Mild	Mild	Moderate	Mild	Moderate	Moderate	Moderate	Mild	Mild	Mild	Moderate	Mild
Macrophages	Mild	Mild	Moderate	Mild	Mild	Mild	Mild	Mild	Mild	Mild	Moderate	Mild
Granulation tissue	Moderate	Mild	Moderate	Mild	Mild	Moderate	Nil	Nil	Mild	Nil	Mild	Nil
Fibroblasts	Moderate	Moderate	Mild	Moderate	Moderate	Mild	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Collagen formation	Moderate	Moderate	Mild	Moderate	Moderate	Mild	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate

THANKS FOR YOUR REFERENCE

DR.V.V.YENNI MD
 CONSULTANT PATHOLOGIST

DR.A.S.AMMANAGI MD DNB MNAMS MSSC
 CONSULTANT PATHOLOGIST

VSJ

JRD

**JEEVAN REGIONAL DIAGNOSTICS**

0831-2467495, 2461355

REGD. OFFICE: 6331, OPPOSITE LINGARAJ COLLEGE,
COLLEGE ROAD, BELGAUM-02.

Thesis of: DR. AJIT LINGAYAT

Referred by Dr: SELF

Received on: 09/03/2018


Lab No: TH - 34

HISTOPATHOLOGY REPORT**MACROSCOPY**

Received nine containers labelled as A1, A2, A3, B1, B2, B3, B4, B5 and B6 each containing greyish white membranous tissue specimen with grass pith

MICROSCOPY	A1	A2	A3	B1	B2	B3	B4	B5	B6
Odema	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Inflammatory infiltration	Mild	Mild	Mild	Moderate	Moderate	Mild	Mild	Moderate	Mild
Macrophages	Mild	Mild	Mild	Mild	Moderate	Mild	Mild	Mild	Mild
Granulation tissue	Mild	Mild	Mild	Mild	Moderate	Mild	Mild	Mild	Mild
Fibroblasts	Moderate	Moderate	Moderate	Moderate	Mild	Mild	Mild	Mild	Mild
Collagen formation	Moderate	Moderate	Moderate	Moderate	Mild	Mild	Mild	Mild	Moderate

THANKS FOR YOUR REFERENCE

DR.V.V.YENNI MD
CONSULTANT PATHOLOGIST

 DR.A.S.AMMANAGI MD DNB MNAMS MSSC
CONSULTANT PATHOLOGIST



JEEVAN REGIONAL DIAGNOSTICS
 REGD. OFFICE: 6331, OPPOSITE LINGARAJU COLLEGE,
 COLLEGE ROAD, BELGAUM-02.

0831-2467495, 2461355

Thesis of: DR. AJIT LINGAYAT
 Referred by Dr: SELF
 Received on: 23/03/2018

Lab No: TH - 40

HISTOPATHOLOGY REPORT

MACROSCOPY Received greyish white membranous tissue with grass pith labelled as AR1, AR2, AR3, AR4, AR5, AR6, PR1, PR2, PR3, PR4, PR5, PR6, GR1, GR2, GR3, GR4, GR5, GR6, BR1, BR2, BR3, BR4, BR5, BR6, BPR1, BPR2, BPR3, BPR4, BPR5, BPR6, BPS1, BPS2, BPS3, BPS4, BPS5 and BPS6.

MICROSCOPY	BPR1	BPR2	BPR3	BPR4	BPR5	BPR6	BPS1	BPS2	BPS3	BPS4	BPS5	BPS6
Oedema	Moderate	Nil	Mild	Nil	Nil	Mild	Mild	Moderate	Mild	Mild	Mild	Moderate
Inflammatory infiltration	Mild	Mild	Mild	Mild	Mild	Mild	Moderate	Mild	Mild	Mild	Mild	Mild
Macrophages	Moderate	Mild	Mild	Mild	Mild	Mild	Mild	Mild	Mild	Mild	Mild	Mild
Granulation tissue	Moderate	Mild	Mild	Mild	Mild	Mild	Mild	Moderate	Mild	Mild	Mild	Mild
Fibroblasts	Mild	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Collagen formation	Mild	Moderate	Moderate	Moderate	Mild	Moderate	Marked	Mild	Moderate	Moderate	Moderate	Moderate

THANKS FOR YOUR REFERENCE

DR.V.V.YENNI MD
 CONSULTANT PATHOLOGIST

DR.A.S.AMMANAGI MD DNB MNAMS MSSC
 CONSULTANT PATHOLOGIST

VSJ

JRL



JEEVAN REGIONAL DIAGNOSTICS
 REGD. OFFICE: 6331, OPPOSITE LINGARAJ COLLEGE,
 COLLEGE ROAD, BELGAUM-02.

0831-2467496, 2467355

Thesis of : DR. AJIT LINGAYAT

Referred by Dr: SELF

Received on: 23/03/2018

Lab No: TH - 40

HISTOPATHOLOGY REPORT

MACROSCOPY

Received greyish white membranous tissue with grass pith labelled as AR1, AR2, AR3, AR4, AR5, AR6, PR1, PR2, PR3, PR4, PR5, PR6, GR1, GR2, GR3, GR4, GR5, GR6, BR1, BR2, BR3, BR4, BR5, BR6, BPR1, BPR2, BPR3, BPR4, BPR5, BPR6, BPS1, BPS2, BPS3, BPS4, BPS5 and BPS6.

MICROSCOPY	GR1	GR2	GR3	GR4	GR5	GR6	BR1	BR2	BR3	BR4	BR5	BR6
Oedema	Nil	Mild	Nil	Nil	Mild	Nil	Mild	Mild	Mild	Nil	Mild	Moderate
Inflammatory infiltration	Mild	Moderate	Mild	Mild	Mild	Mild	Moderate	Moderate	Moderate	Marked	Moderate	Moderate
Macrophages	Moderate	Moderate	Mild	Moderate	Mild	Mild	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Granulation tissue	Mild	Moderate	Nil	Mild	Moderate	Nil	Moderate	Mild	Moderate	Mild	Mild	Moderate
Fibroblasts	Moderate	Moderate	Moderate	Moderate	Mild	Moderate	Mild	Moderate	Moderate	Moderate	Mild	Mild
Collagen formation	Marked	Moderate	Marked	Marked	Moderate	Marked	Moderate	Moderate	Moderate	Moderate	Mild	Mild

THANKS FOR YOUR REFERENCE

DR.V.V.YENNI MD
 CONSULTANT PATHOLOGIST

DR.A.S.AMMANAGI MD DNB MNAMS MSSC
 CONSULTANT PATHOLOGIST

V.S.J

J.F



JEEVAN REGIONAL DIAGNOSTICS
REGD. OFFICE: 6331, OPPOSITE LINGARAJU COLLEGE,
COLLEGE ROAD, BELGAUM-02.

0831-2467495, 2461355

DR. AJIT LINGAYAT

Thesis of:
Referred by Dr:

SELF

Received on:

23/03/2018

Lab No: TH - 40

HISTOPATHOLOGY REPORT

MACROSCOPY

Received greyish white membranous tissue with grass pith labelled as AR1, AR2, AR3, AR4, AR5, AR6, PR1, PR2, PR3, PR4, PR5, PR6, GR1, GR2, GR3, GR4, GR5, GR6, BR1, BR2, BR3, BR4, BR5, BR6, BPR1, BPR2, BPR3, BPR4, BPR5, BPR6, BPS1, BPS2, BPS3, BPS4, BPS5 and BPS6.

MICROSCOPY	AR1	AR2	AR3	AR4	AR5	AR6	PR1	PR2	PR3	PR4	PR5	PR6
Oedema	Mild	Mild	Mild	Mild	Mild	Nil	Moderate	Mild	Nil	Nil	Mild	Nil
Inflammatory infiltration	Marked	Mild	Moderate	Mild	Moderate	Mild	Mild	Moderate	Moderate	Moderate	Marked	Mild
Macrophages	Moderate	Mild	Moderate	Mild	Moderate	Mild	Mild	Moderate	Mild	Moderate	Moderate	Mild
Granulation tissue	Moderate	Mild	Moderate	Mild	Mild	Mild	Mild	Mild	Mild	Mild	Mild	Mild
Fibroblasts	Mild	Moderate	Mild	Moderate	Moderate	Marked	Moderate	Moderate	Mild	Moderate	Moderate	Mild
Collagen formation	Moderate	Moderate	Mild	Moderate	Moderate	Moderate	Mild	Mild	Mild	Mild	Moderate	Moderate

THANKS FOR YOUR REFERENCE

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Annexure 12

Liver Histopathology Observation in all groups

**JEEVAN REGIONAL DIAGNOSTICS**REGD. OFFICE: 6331, OPPOSITE LINGARAJ COLLEGE,
COLLEGE ROAD, BELGAUM-02.

Thesis of : DR. AJIT LINGAYAT

Referred by Dr: SELF

Received on: 13/03/2018


Lab No: TH - 37

MACROSCOPY

Received specimens of liver labelled as GL1, SL1, PL1, AL2 and SRL1

MICROSCOPY	GL1	SL1	PL1	AL2	SRL1
Central Vein Cong	Mild	Mild	Mild	Mild	Moderate
Sinusoidal congestion	Moderate	Mild	Moderate	Mild	Mild
Focal Haemorrhage	Nil	Nil	Nil	Nil	Nil
Inflammation	Nil	Mild	Nil	Nil	Nil
Fatty change	Nil	Nil	Nil	Nil	Nil
Ballooning Hepatocytes	Nil	Nil	Nil	Nil	Nil
Apoptosis	Nil	Nil	Nil	Nil	Nil
Degeneration	Nil	Nil	Nil	Nil	Nil
Spotty Necrosis	Nil	Nil	Nil	Nil	Nil
Centrilobular necrosis	Nil	Nil	Nil	Nil	Nil
Piecemeal necrosis	Nil	Nil	Nil	Nil	Nil
Confluent necrosis	Nil	Nil	Nil	Nil	Nil
Portal triditis	Nil	Nil	Nil	Nil	Nil
Bile duct proliferation	Nil	Nil	Nil	Nil	Nil
Cholestasis	Nil	Nil	Nil	Nil	Nil
Ground glass change	Nil	Nil	Nil	Nil	Nil
Kupffer cell hyperplasia	Mild	Mild	Mild	Mild	Mild
Fibrosis	Nil	Nil	Nil	Nil	Nil
Regenerative nodules	Nil	Nil	Nil	Nil	Nil
Hepatocellular dysplasia	Nil	Nil	Nil	Nil	Nil
Cirrhosis	Nil	Nil	Nil	Nil	Nil

THANKS FOR YOUR REFERENCE

DR.V.V.YENNI MD
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**JEEVAN REGIONAL DIAGNOSTICS**REGD. OFFICE: 6331, OPPOSITE LINGARAJ COLLEGE,
COLLEGE ROAD, BELGAUM-02.

Thesis of : DR. AJIT LINGAYAT
 Referred by Dr: SELF
 Received on: 09/03/2018 Lab No: TH - 34

MACROSCOPY

Received specimens of liver labelled as AL1, BL1 and BL2.

MICROSCOPY	AL1	BL1	BL2
Central Vein Cong	Mild	Marked	Mild
Sinusoidal congestion	Mild	Mild	Mild
Focal Haemorrhage	Nil	Mild	Nil
Inflammation	Mild	Mild	Mild
Fatty change	Nil	Nil	Nil
Ballooning Hepatocytes	Mild	Nil	Mild
Apoptosis	Nil	Nil	Nil
Degeneration	Nil	Nil	Nil
Spotty Necrosis	Mild	Nil	Mild
Centrilobular necrosis	Nil	Nil	Nil
Piecemeal necrosis	Nil	Nil	Nil
Confluent necrosis	Nil	Nil	Nil
Portal triditis	Mild	Nil	Mild
Bile duct proliferation	Nil	Nil	Nil
Cholestasis	Nil	Nil	Nil
Ground glass change	Nil	Nil	Nil
Kupffer cell hyperplasia	Mild	Mild	Mild
Fibrosis	Nil	Nil	Nil
Regenerative nodules	Nil	Nil	Nil
Hepatocellular dysplasia	Nil	Nil	Nil
Cirrhosis	Nil	Nil	Nil

THANKS FOR YOUR REFERENCE

DR.V.V.YENNI MD
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**JEEVAN REGIONAL DIAGNOSTICS**REGD. OFFICE: 6331, OPPOSITE LINGARAJ COLLEGE,
COLLEGE ROAD, BELGAUM-02.

Thesis of : DR. AJIT LINGAYAT

Referred by Dr: SELF

Received on: 23/03/2018

Lab No: TH - 40

MACROSCOPY

Received specimens of liver labelled as ARL1, PRL1, GRL1, BRL1, BPRL1 and BPSL1.

MICROSCOPY	ARL1	PRL1	GRL1	BRL1	BPRL1	BPSL1
Central Vein Cong	Mild	Mild	Mild	Mild	Mild	Mild
Sinusoidal congestion	Moderate	Mild	Moderate	Mild	Moderate	Mild
Focal Haemorrhage	Nil	Nil	Nil	Nil	Nil	Nil
Inflammation	Mild	Mild	Mild	Mild	Mild	Mild
Fatty change	Nil	Nil	Nil	Nil	Nil	Nil
Ballooning Hepatocytes	Nil	Nil	Nil	Nil	Nil	Nil
Apoptosis	Nil	Nil	Nil	Nil	Nil	Nil
Degeneration	Nil	Nil	Nil	Nil	Nil	Nil
Spotty Necrosis	Nil	Mild	Nil	Nil	Nil	Nil
Centrilobular necrosis	Nil	Nil	Nil	Nil	Nil	Nil
Piecemeal necrosis	Nil	Nil	Nil	Nil	Nil	Nil
Confluent necrosis	Nil	Nil	Nil	Nil	Nil	Nil
Portal triditis	Nil	Nil	Nil	Nil	Nil	Mild
Bile duct proliferation	Nil	Nil	Nil	Nil	Nil	Nil
Cholestasis	Nil	Nil	Nil	Nil	Nil	Nil
Ground glass change	Nil	Nil	Nil	Nil	Nil	Nil
Kupffer cell hyperplasia	Mild	Mild	Mild	Mild	Mild	Mild
Fibrosis	Nil	Nil	Nil	Nil	Nil	Nil
Regenerative nodules	Nil	Nil	Nil	Nil	Nil	Nil
Hepatocellular dysplasia	Nil	Nil	Nil	Nil	Nil	Nil
Cirrhosis	Nil	Nil	Nil	Nil	Nil	Nil

THANKS FOR YOUR REFERENCE

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Annexure 13

Stomach Histopathological Observations in all groups



0831-2467495;2461355

JEEVAN REGIONAL DIAGNOSTICSREGD. OFFICE: 8331, OPPOSITE LINGARAJ COLLEGE,
COLLEGE ROAD, BELGAUM-02.

Thesis of : DR. AJIT LINGAYAT
 Referred by Dr: SELF
 Received on: 13/03/2018 Lab No: TH - 37

MACROSCOPY

Received specimens of stomach labelled as GS1, SS1, PS1, AS2 and SRS1.

MICROSCOPY	GS1	SS1	PS1	AS2	SRS1
Mucosal congestion	Moderate	Mild	Mild	Mild	Mild
Mucosal Odema	Nil	Nil	Nil	Nil	Nil
Mucosal Haemorrhage	Nil	Nil	Nil	Nil	Nil
Desquamation	Nil	Nil	Nil	Nil	Nil
Neutrophilic Infiltration	Nil	Nil	Nil	Nil	Nil
Lymphocytic infiltration	Nil	Nil	Nil	Nil	Nil
Mucosal Ulceration	Nil	Nil	Nil	Nil	Nil
Granulation tissue	Nil	Nil	Nil	Nil	Nil
Cellular degeneration	Nil	Nil	Nil	Nil	Nil

THANKS FOR YOUR REFERENCE

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0831-2467495;2461355

JEEVAN REGIONAL DIAGNOSTICSREGD. OFFICE: 6331, OPPOSITE LINGARAJ COLLEGE,
COLLEGE ROAD, BELGAUM-02.

Thesis of: DR. AJIT LINGAYAT
 Referred by Dr: SELF
 Received on: 26/03/2018 Lab No: TH - 42

MACROSCOPY

Received specimens of stomach labelled as CS1 and STS1

MICROSCOPY	CS1	STS1
Mucosal congestion	Mild	Mild
Mucosal Odema	Nil	Nil
Mucosal Haemorrhage	Nil	Nil
Desquamation	Nil	Nil
Neutrophilic Infiltration	Nil	Nil
Lymphocytic infiltration	Nil	Nil
Mucosal Ulceration	Nil	Nil
Granulation tissue	Nil	Nil
Cellular degeneration	Nil	Nil

THANKS FOR YOUR REFERENCE

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 CONSULTANT PATHOLOGIST

**JEEVAN REGIONAL DIAGNOSTICS**

0831-2467495;2461355

REGD. OFFICE: 8331, OPPOSITE LINGARAJ COLLEGE,
COLLEGE ROAD, BELGAUM-02.

Thesis of: DR. AJIT LINGAYAT
 Referred by Dr: SELF
 Received on: 09/03/2018
 Lab No: TH - 34


MACROSCOPY

Received specimens of stomach labelled as AS1, BS1 and BS2.

MICROSCOPY	AS1	BS1	BS2
Mucosal congestion	Mild	Mild	Mild
Mucosal Odema	Nil	Nil	Nil
Mucosal Haemorrhage	Nil	Nil	Nil
Desquamation	Nil	Nil	Nil
Neutrophilic Infiltration	Nil	Nil	Nil
Lymphocytic infiltration	Nil	Nil	Nil
Mucosal Ulceration	Nil	Nil	Nil
Granulation tissue	Nil	Nil	Nil
Cellular degeneration	Nil	Nil	Nil

THANKS FOR YOUR REFERENCE

DR.V.V.YENNI MD
CONSULTANT PATHOLOGIST


DR.A.S.AMMANAGI MD DNB MNAMS MSSC
CONSULTANT PATHOLOGIST



0831-2467495;2461355

JEEVAN REGIONAL DIAGNOSTICSREGD. OFFICE: 6331, OPPOSITE LINGARAJ COLLEGE,
COLLEGE ROAD, BELGAUM-02.

Thesis of : DR. AJIT LINGAYAT
 Referred by Dr: SELF
 Received on: 23/03/2018 Lab No: TH - 40

MACROSCOPYReceived specimens of stomach labelled as ARS1, PRS1, GRS1, BRS1,
BPRS1 and BPSS1

MICROSCOPY	ARS1	PRS1	GRS1	BRS1	BPRS1	BPSS1
Mucosal congestion	Mild	Mild	Mild	Mild	Mild	Mild
Mucosal Odema	Nil	Nil	Nil	Nil	Nil	Nil
Mucosal Haemorrhage	Nil	Nil	Nil	Nil	Nil	Nil
Desquamation	Nil	Nil	Nil	Nil	Nil	Nil
Neutrophilic Infiltration	Nil	Nil	Nil	Nil	Nil	Nil
Lymphocytic infiltration	Nil	Nil	Nil	Nil	Nil	Nil
Mucosal Ulceration	Nil	Nil	Nil	Nil	Nil	Nil
Granulation tissue	Nil	Nil	Nil	Nil	Nil	Nil
Cellular degeneration	Nil	Nil	Nil	Nil	Nil	Nil

THANKS FOR YOUR REFERENCE

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 DR.A.S.AMMANAGI MD DNB MNAMS MSSC
CONSULTANT PATHOLOGIST



A Comparative Physicochemical and Phytochemical studies of Kashaya's (Aqueous extract) Prepared from Leaves, Roots and Stem Barks of *Bruhatpanchmoola* (A Group of Five Perennial Plants)

Ajit Lingayat¹, M. B. Patil² and B. Shreenivasa Prasad³

¹Research scholar KLE Academy of higher education Belagavi.

²Professor Department of Pharmacognosy KAHER College of Pharmacy Belagavi.

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Corresponding Author Email:

Abstract

Bruhatpanchmoola is a ayurvedic formulation of five perennial plants roots i.e. Bilva {*Aegle marmelos* (L.) Corr.}, Gambhari (*Gmelina arborea*(L.)), Agnimanth (*Clerodendrum phlomoidis* L.f.), Shyonaka {*Oroxylum indicum* (L.) Vent.} and Patla {*Stereospermum suaveolens*(Roxb.) DC.}. Bruhatpanchmoola is also known as Mahatpanchmoola.² Extensive usages of Bruhatpanchmoola plants single or in formulation led to scarcity of the plants, amongst them Shyonaka {*Oroxylum indicum*(L.) Vent.} and Patla {*Stereospermum suaveolens* (Roxb.) DC.} Listed under endangered plants^{4,5}. Bruhat panchmoola taken in Kashaya form (Aqueous Extract). The study reveals that roots of Bruhatpanchmoola can be substituted by stem bark or leaves.

Keywords

Bruhatpanchmoola, ayurved, Bilva {*Aegle marmelos* (L.) Corr.}, Gambhari (*Gmelina arborea* (L.)), Agnimanth (*Clerodendrum phlomoidis* L.f.), Shyonaka {*Oroxylum indicum*(L.) Vent.} and Patla {*Stereospermum suaveolens* (Roxb.) DC.}. physicochemical, phytochemical, roots, leaves, stem barks, Kashaya (Aqueous Extract).

INTRODUCTION

Dashmoola is common ingredient in most of the ayurvedic formulation. The Ayurvedic Patent Medicines mentioned in the Ayurmedline formulary contains Dashmoola drugs about 20 % of total

formulations. In the Ayurvedic formulations of India Part - I & II, the Dashmoola drugs contains minimum 48 & maximum 82 formulations out of 635 total formulations some of the formulae are in kashya form¹.

Dashmoola includes Bruhatpanchmoola i.e. five perennials and Laghupanchmoola i.e. five herbs. Bruhatpanchmoola is a formulation of five perennial plants roots i.e. Bilva {*Aegle marmelos* (L.) Corr.}, Gambhari (*Gmelina arborea* (L.)), Agnimanth (*Clerodendrum phlomoidis* L.f.), Shyonaka {*Oroxylum indicum* (L.) Vent.} and Patla {*Stereospermum suaveolens* (Roxb.) DC.}. Bruhatpanchmoola is also known as Mahatpanchmoola². The Bruhatpanchmoola again mentioned in Bhav Prakash, said to be used as Kapha-vatashamaka (which diminishes Kapha-vata related ailments means Anti-inflammatory and Analgesic activity)³. Bruhatpanchmoola and its components are generally used in Kashaya (Aqueous Extract) form. Extensive usage of Bruhatpanchmoola plants single or in formulation led to scarcity of the plants, amongst them Shyonaka {*Oroxylum indicum*(L.) Vent.} and Patla {*Stereospermum suaveolens* (Roxb.) DC.} Listed under endangered plants^{4,5}. Further other three plants are facing same situations. To meet the increased demand of Bruhatpanchmoola and conservation of plants requirement of substitute the roots by arial parts. With this intention this study was planned to evaluate the physicochemical & phytochemical properties of Roots, Leaves & stembarks of Bruhatpanchmoola.

MATERIAL & METHODS

- Collection of Roots, Leaves & stem barks from natural Habitat.
- Preparation of Kashaya single & Combinations:
- Analytical study of Kashayas
 - Physico-Chemical Analysis of
 - Preliminary phytochemical Studies of Kashayas.

a) Collection of Study Samples:

Roots, Leaves & Stem Barks of Bilwa, Agnimanth & Gambhari were collected from Narsingpur Belagavi Karnataka and Patala & shyonak collected from Rahuri Maharashtra. Collected plant materials were Identified & authenticated from Central Research facility KAHER's Shri. B.M.K. Ayurved College Belagavi.

b) Preparation of kashayas (Aqueous Extract)⁵:

Kashayas were prepared by mixing plant drug (coarse powder) and water in 1:16 ratio, boiled and reducing to 1/8th portion.

Procedure of Kashaya preparation of Single Drugs & Combinations:

i. Soaking of Coarse Powder:

- 20 gm Coarse Powder of Bilva root was taken in stainless steel vessel.
- Added with 320 ml potable water.
- Kept for soaking for overnight.

ii. Boiling

- Vessel containing soaked mixture was kept on gas burner for boiling.
- Boiling was done on moderate fire with intermittent stirring.
- Boiling was done till water reduced to 1/8th portion (40 ml).

iii. Filtering & Storage

- Kashaya was filtered after self-cooling.
- Stored in a sterilized vessel.

Similarly, kashayas of single drugs & combinations were prepared and used for further research studies.

c) Analytical study of Kashayas (Aqueous extracts)^{6,7}

a. Physicochemical study of kashaya:

Parameters selected:

- Organoleptic Evaluation
- Total solids
- Specific gravity
- pH

1) Organoleptic evaluation:

Qualitative evaluation based on sensory profiles refers to observation by colour, odour, taste & Touch were done.

2) Total Solids:

Transferred 5 gm of the clear Kashayain to a pre-weighed evaporable dish, and evaporated to dryness on a water bath, then kept for drying dry at 105°C for 3 hours in oven. After cooling the dish containing the residue kept in a desiccator for 30 min, then weighed it immediately.

$$\text{Total Solids: } \frac{\text{Weight of residue}}{\text{Weight of Kashaya taken}} \times 100$$

3) Specific Gravity:

The specific gravity of a kashaya was the weight of a given volume of the kashaya at 25° (unless otherwise

specified) compared with the weight of an equal volume of water at the same temperature.

$$\text{Specific gravity: } \frac{\text{Weight of Sample}}{\text{Weight of Kashaya water}}$$

4) pH Value:

Operate the pH meter and electrode system according to manufacturer's instructions. Standardize the meter & electrodes with 0.05 M Potassium hydrogen phthalate (pH 4.00) when measuring an acid solution or with 0.05 m sodium borate when measuring an alkaline solution. At the end of a set of measurements take & reading of the solution used to standardize the meter & electrodes. This reading should not differ by more than 0.02 from original value at which the apparatus was standardized.

b. Phytochemical study of kashaya^s:

Kashayas prepared from each plants parts & their combinations were subjected for following phytochemical analysis

Test for Carbohydrates: Molisch's Test (General Test): 2 – 3 ml aq. Extract + few drops of alpha naphthol solution in alcohol shake and add concentrated H₂SO₄ from sides of test tube - Violet ring is formed at the junction of two liquids.

Test for Reducing Sugars: Benedict's test: Mix equal volume of Benedict's reagent and test solution in the test tube. Heat in boiling water bat for 5 minutes. Solution appears green, yellow or red depending on amount of reducing sugar present in test solution.

Test for Monosaccharaides: Barfoed's Test: Mix equal volume of Barfoed's reagent and test solution. Heat for 1 –2 minutes in boiling water bath and cool. Red precipitate is observed

Tests for Hexose Sugars: Selwinoff's Test (for Ketohexose like fructose): Heat 3 ml Selwinoff's reagent and 1 ml test solution in boiling water bath for 1 to 2 minutes. Red colour is found.

Test for Proteins: Million's Test for Proteins: Mix 3 ml. T. S. with 5 ml. Millions Reagent gives white precipitate. Warm precipitate turns brick red or the precipitate dissolves giving red coloured solution.

Tests for Amino Acids: Test for Tyrosine: Heat 3 ml T. S. and 3 drops Million's reagent solution. Solution shows dark red colour.

Tests for Tannins & Phenolic Compounds: To 2–3 ml of aqueous or alcoholic extracts, add few drops Lead acetate solution White Precipitate.

Tests for Steroids: Salkowski reaction: To 2 ml of extract, add 2 ml of chloroform and 2 ml concentrated H₂SO₄. Shake well. Chloroform layer appears. Red and acid layer shows greenish yellow fluorescence.

Tests for Cardiac Glycosides: Test for Deoxysugars (Keller – Killani Test): To 2 ml extract, add glacial acetic acid, one drop 5% FeCl₃ and concentrated H₂SO₄. Reddish brown colour appears at junction of the two liquid layers and upper layer appears bluish green.

Tests for Anthraquinone Glycoside: Borntrager's test: to 3ml extract add dil. H₂SO₄ Boil and filter. To cold filtrate add equal volume of benzene or chloroform. Shake well separate the organic solvent. Add ammonia. Ammonical layer turns pink or red.

Tests for Flavonoids: Take a small quantity of residue. Add lead acetate solution. Yellow coloured precipitate formed.

Test for Pentose Sugar: Bial's Orcinol test: to boiling Bial's reagent add few drops of test solution. Green or purple coloration appears.

Test for Alkaloid Hager's test: 2-3 ml extract add Hager's reagent yellow coloured precipitate formed.

RESULTS

Table No.1 showing organoleptic characters of kashays

Plants	Colour	Odour	Taste	Colour	Odour	Taste	Colour	Odour	Taste
Root kashaya			Stem bark Kashaya			Leaf Kashaya			
Bilwa	Brown	Odourless	Astringent	Brown	Odourless	Astringent	Dark Brown	Astringent	Characteristic
Aagnimanth	Brown	Odourless	Astringent	Brown	Odourless	Astringent	Brown	Odourless	Bitter
Patala	Brown	Odourless	Astringent	Brown	Odourless	Bitter	Light Brown	Odourless	Astringent
Sshyonak	Brown	Odourless	Bitter	Brown	Odourless	Astringent	Brown	Odourless	Bitter
Gambhari	Brown	Odourless	Bitter	Brown	Odourless	Astringent	Brown	Odourless	Bitter
Combinations	Brown	Odourless	Bitter	Brown	Odourless	Astringent	Dark Brown	Chataristic	Astringent

Table No.2 showing Physicochemical analysis of kashayas

Plants	Total Solids	pH	Specific Gravity	Total Solids	pH	Specific Gravity	Total Solids	pH	Specific Gravity
Root Kashaya			Stem Bark kashaya			Leaf kashaya			
Bilwa	9.632 %	6.07	1.038	9.029%	6.05	1.041	10.231%	5.71	1.043
Aagnimanth	5.982%	6.05	1.033	6.076%	6.01	1.042	13.94%	5.81	1.047
Patala	15.231%	5.89	1.048	19.310%	6.01	1.064	17.06%	5.58	1.053
Shyonak	18.172%	5.75	1.042	9.127%	6.03	1.039	13.606%	5.41	1.045
Gambhari	18.409%	5.80	1.061	18.623%	6.05	1.061	8.135%	5.53	1.035
Combinations	18.370%	5.82	1.040	11.120%	5.72	1.037	15.076%	6.03	1.049

Table no. 3 Showing Preliminary Phytochemical Analysis of Kashayas

Parts	CH	RS	MONO	PS	HS	PR	AA	ST	GL	AG	FL	AL	TP
Root													
Bilwa	+ve	+ve	+ve	+ve		+ve	+ve		-ve	+ve	+ve		+ve
Agnimanth	+ve	+ve	+ve	-ve		+ve	+ve		-ve	-ve	+ve		+ve
Patala	+ve	+ve	+ve	+ve	Absent	+ve	+ve	Absent	+ve	-ve	+ve	Absent	+ve
Shyonak	+ve	+ve	+ve	-ve		+ve	+ve		+ve	-ve	+ve		+ve
Gambhari	+ve	+ve	+ve	+ve		+ve	+ve		-ve	-ve	+ve		+ve
BPR	+ve	+ve	+ve	+ve		+ve	+ve		+ve	-ve	+ve		+ve
Stem Bark													
Bilwa	+ve	+ve	+ve	+ve		+ve	+ve		+ve		+ve		+ve
Agnimanth	+ve	+ve	+ve	+ve		+ve	+ve		-ve		+ve		+ve
Patala	+ve	+ve	+ve	+ve	Absent	+ve	+ve	Absent	-ve	Absent	+ve	Absent	+ve
Shyonak	+ve	+ve	+ve	-ve		+ve	+ve		-ve		+ve		+ve
Gambhari	+ve	+ve	+ve	+ve		+ve	+ve		+ve		+ve		+ve
BPS	+ve	+ve	+ve	+ve		+ve	+ve		+ve		+ve		+ve
Leaf													
Bilwa	+ve	+ve	+ve	-ve		+ve	+ve		+ve		+ve		+ve
Agnimanth	+ve	+ve	+ve	-ve		+ve	+ve		-ve		+ve		+ve
Patala	+ve	+ve	+ve	-ve	Absent	+ve	+ve	Absent	+ve	Absent	+ve	Absent	+ve
Shyonak	+ve	+ve	+ve	-ve		+ve	+ve		-ve		+ve		+ve
Gambhari	+ve	+ve	+ve	-ve		+ve	+ve		+ve		+ve		+ve
BPL	+ve	+ve	+ve	-ve		+ve	+ve		+ve		+ve		+ve

Abbreviations: BPR (Bruhatpanchmoola Root) BPS (Bruhatpanchmoola Stem Bark) BPL (Bruhatpanchmoola Stem Bark)

DISCUSSION

Physicochemical studies reveals that Bilwa root kashya contains 9.632% of total solids content and pH was 6.07, stembark kashya contains 9.029% & pH 6.05 while in Bilwa leaf kashya contains 10.21% of Total solid & pH 5.71.

Agnimath root kashya contains 5.982% of total solids content and pH is 6.05, stembark kashya contains 6.076% & pH 6.01 while leaf kashya contains 13.94% of Total solid & pH 5.81.

Patala root kashya contains 15.231% of total solids content and pH is 5.89, stembark kashya contains 19.310% & pH 6.01 while leaf kashya contains 17.06% of Total solid & pH 5.58.

Shyonak root kashya contains 18.172% of total solids and pH was 5.75, stembark kashya contains 9.127%

& pH 6.03 while leaf kashya contains 13.606% & pH 5.41

Gambhari roots kashya contains 18.409% of total solids & pH was 5.80, stembark kashya contains 18.623% & pH 6.05 while leaf kashya contains 8.135% & pH 5.53

Specific gravity of all kashyas were not showed much difference when compared to respective plants parts kashayas.

Phytochemical study kashayas showed that Bilwa, Agnimanth, Patala & Shyonak root, Stem bark & Leaf kashya showed presence of Carbohydrate, reducing sugar, Monosaccharides, Protein, Amino acids, Flavonoids & Tannins.

In Bilwa pentose sugar showed presence in Bilwa root & stem bark kashaya not in leaf kashaya &

Cardiac glycoside showed presence in Bilwa stem bark & leaf Kashaya not in root kashya. Anthraquinone glycosides showed presence in root kashya not in stem bark & leaf kashayas.

In Agnimath kashaya pentose sugar showed presence in stem bark kashaya not in root & leaf kashya. Cardiac glycosides not showed presence in all agnimath kashaya.

In Patala pentose sugar showed presence in root & stem bark kashya not in leaf kashaya. Cardiac glycosides showed presence in root & leaf kashaya not in stem bark.

In shyonak pentose showed presence in stem bark kashya not root & leaf kashayas, cardiac glycosides showed presence in root kashaya not stem bark & leaf kashaya.

In Gambhari pentose sugar showed presence root & stem bark kashaya not in leaf kashaya, Cardiac glycoside showed presence in Gambhari stem bark & leaf kashaya not root kashaya.

Hexose sugar, steroids & Alkaloids not showed presence in Bilwa, Agnimanth, Patala, Shyonak & Gambhari any kashaya.

CONCLUSION

Study reveals all the plants root can be substituted by stem bark or leaves that helps to conserve the

plants. To bring in to therapeutic practice further experimental & clinical studies are required.

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A Comparative Acute Anti-Inflammatory Activity Of Kashaya (Aqueous Extract) Prepared From Leaves, Roots And Stem Barks Of Brihatpanchmoola (A Group Of Five Perennial Plants)

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Abstract: The present study was carried out to evaluate and compare anti-inflammatory activity of Leaves, Roots and Stem Barks of *Brihatpanchmoola* (A Group of Five Perennial Plants) in *kashaya*(Aqueous Extract). *Bruhatpanchmoola* is a formulation of five perennial plants roots i.e. Bilva {*Aegle marmelos* (L.) Corr.}, Gambhari (*Gmelina arborea*(L.)), Agnimanth (*Clerodendrum phlomoidis*L.f.), Shyonaka {*Oroxylum indicum*(L.) Vent.} and Patla {*Stereospermum suaveolens*(Roxb.) DC.}. *Kashaya* prepared by Leaves, root and stem bark of *Brihatpanchmoola* in Carrageenan induced paw oedema model. Wister strain albino rats of either sex were selected and divided in to twenty groups of 6 animals each. The test drug was administered orally at a dose of 0.86 ml/200 gm body weight of rat. Ibuprofen was used as standard anti-inflammatory drug for comparison. The study result shows that Bilwa root can be substituted by stem bark but not with leaf. Agnimanth root cannot be substituted by Stem bark & leaves. Patala root can be substituted by stem bark but not with leaf. Shyonak root cannot be substituted by Stem bark & leaves. Gambhari root can be substituted by stem bark but not with leaf. In combination Root combination can be substituted by Stem bark combination but not with leaves combination of all plants. Bilwa stem or bilwa root or Gmabhari root or Gambhari stem can be in the place of combination of all plants Stern bark or Roots.

Key Words: Bilva {*Aegle marmelos* (L.) Corr.}, Gambhari (*Gmelina arborea* (L.)), Agnimanth (*Clerodendrum phlomoidis* L.f.), Shyonaka{*Oroxylum indicum* (L.)Vent.} and Patla {*Stereospermum suaveolens* (Roxb.) DC.}

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I. INTRODUCTION

Dashmoola is common ingredient in most of the ayurvedic formulation. The Ayurvedic Patent Medicines mentioned in the Ayurmedline formulary contains Dashmoola drugs about 20 % of total formulations. In the Ayurvedic formulations of India Part - I & II, the Dashmoola drugs contains minimum 48 & maximum 82 formulations out of 635 total formulations¹.

Dashmoola includes Bruhatpanchmoola i.e. five perennial and Laghupanchmoola i.e. five herbs. Bruhatpanchmoola is a formulation of five perennial plants roots i.e. Bilva {*Aeglemarmelos* (L.) Corr.}, Gambhari (*Gmelina arborea*(L.)), Agnimanth (*Clerodendrum phlomoidis*L.f.), Shyonaka {*Oroxylum indicum*(L.) Vent.} and Patla {*Stereospermum suaveolens*(Roxb.) DC.}. Bruhatpanchmoola is also known as Mahatpanchmoola². The Bruhatpanchmoola again mentioned in BhavPrakash, said to be used as Kapha-vatashamaka (which diminishes Kapha-vata related ailments means Anti-inflammatory and Analgesic activity)

³.

Extensive usage of Bruhatpanchmoola plants single or in formulation led to scarcity of the plants, amongst them Shyonaka {*Oroxylum indicum*(L.) Vent.} and Patla {*Stereospermum suaveolens*(Roxb.) DC.} Listed under endangered plants^{4,5}. Further other three plants are facing same situations. To meet the increased demand of Bruhatpanchmoola, instead of roots other plant parts are being used in most of formulations.

With the intention that, if it is proven other plant parts such as stem barks and leaves possess similar properties as that of roots of said plants, then further collection of roots may be prevented and does the endangered plants of Bruhatpanchmoola group may be preserved. Also the study may prove other plants parts being used presently instead of roots are effective or not

II. MATERIAL AND METHODS

Test drugs roots, leaves and stem bark of selected plants were collected from the natural habitat from Belagavi Karnataka & Rahuri Maharashtra. Plants were identified & authenticated before collection of Plant parts from Central Research Facility KAHER's Shri.B.M.K.Ayurved college Belagavi. Standard drug Ibuprofen procured from KAHER's College of Pharmacy Belagavi.

Kashaya(Aqueous Extract) (Aqueous Extract) were prepared of individual drug and combination as per parts leaves, roots & stem barks of selected plants by classical method, taking one part drug mixed with sixteen parts water, boiled and Drava (i.e. water) reduced 1 / 8th part⁶. Kashaya(Aqueous Extract) was prepared in the department of Rasashastra and Bhaishajya Kalpana of the institute.

Animals

Wistar rats weighing 150-200 gm were procured from animal house, Jawaharlal Nehru Medical College, a constituent unit of KAHER Belagavi, Karnataka and Experimental study was conducted at the Animal house of Shri B.M.K.Ayurveda Mahavidyala a constituent unit of KAHER Belagavi. All animals were housed in colony cages at an ambient temperature 22°C ± 3°C and 45-55% relative humidity with 12/12 hr natural light & dark cycle. All animals were acclimatized in the laboratory about a week before commencement of the study. They fed with free access of standard pellet diet (Amruta feeds, VRK's Scientist's Choice Laboratory Animal Feed, Baramati, supplied by Sai Durga Feeds and Foods, Bangalore) and fresh water *ad libitum*. Floor bed was changed every day, to maintain hygienic condition. The experiment protocol has been approved by the Institutional Animal Ethics Committee (BMK/IAEC/Res-06/2009 Dated: 19/12/2009).

Experimental Design

- The selected animals were divided into 20 groups of six animals each as follows.
 - Standard (Ibuprofen) : 1
 - Control (Received tap water) : 1
 - Leaves Individual plants : 5
 - Combination of Leaves : 1
 - Stem bark Individual plants : 5
 - Combination of stem barks : 1
 - Roots Individual plants : 5
 - Combination of roots : 1

•Dose Fixation⁷ :- Converted Human dose to animal dose

⇒ **Dose fixation for Kashaya (Aqueous Extract) :**
 Rat dose = Human dose X surface area of Wistar strain rats
 =48ml X 0.018

=0.86 ml for 200gms Rat

⇒ **Dose fixation of Standard Drug Ibuprofen :**
 Rat dose = Human dose X surface area of Wistar strain rats
 =400mg X 0.018
 =7.2 mg for 200gms Rat

➤ Acute Anti-inflammatory study⁸ :-

Each rat in test group will be given test drug one hour before being subjected to edema expect control group animals. Acute inflammation will be induced by injecting carrageenin (0.1ml of 1% suspension in 0.9% saline) in sub-plantar region. Marking were done on leg of rats before dipping in plethysmograph. The paw edema volume was measured with the help of plethysmograph by mercury displacement method at zero hour (immediately after injecting carragenan). The same procedure was repeated at 0.5,1, 2, 3, 4 & 5 hours.

$$\text{Percentage edema inhibition}^9 = \frac{\text{Control mean} - \text{Treated mean}}{\text{Control Mean}} \times 100$$

III. RESULTS

Table 1 : Effect on carrageenan induced paw edema at 5 hrs Stem Bark kashaya(Aqueous Extract)

	Bilwa	Agnimatha	Gambahari	Patala	Shyonak	Control	Standard
Mean of paw Volume	1.4967	1.6867	1.5283	1.5883	1.6997	2.2050	1.4683
SD	0.0197	0.0273	0.0117	0.0172	0.0175	0.1001	0.0075
% Inhibition	32.12	23.50	30.68	27.96	22.91	00	33.41

Table 2 : Effect on carrageenan induced paw edema at 5 hrs Root kashaya(Aqueous Extract)

	Bilwa	Agnimatha	Gambahari	Patala	Shyonak	Control	Standard
Mean	1.6083	1.6150	1.5517	1.5917	1.6233	2.2050	1.4683
SD	0.032	0.0152	0.024	0.0117	0.0082	0.1001	0.0075
% Inhibition	27.06	26.75	29.62	27.81	26.83	00	33.41

Table 3 : Effect on carrageenan induced paw edema at 5th hr Leaf kashaya(Aqueous Extract)

	Bilwa	Agnimatha	Gambahari	Patala	Shyonak	Control	Standard
Mean	1.8233	1.8733	1.8233	1.9116	1.8033	2.2050	1.4683
SD	0.0121	0.0207	0.0117	0.011	0.0116	0.1001	0.0075
% Inhibition	17.31	15.04	17.31	13.30	18.21	00	33.41

Table 4 : Effect on carrageenan induced paw edema at 5th hr Combition of Roots, Leaves & Stem Bark kashaya (Aqueous Extract)

	Root Combination	Stem Combination	Bark Combination	Leaves Combination	Control	Standard
Mean	1.5950	1.5750		1.8300	2.2050	1.4683
SD	0.0104	0.0273		0.0167	0.1001	0.0075
% Inhibition	27.66	28.57		17.00	00	33.41

IV. DISCUSSION

Carrageenan induced paw oedema is considered to represent the first phase of the inflammatory reaction which is characterized by fluid and cell exudation. The development of oedema in the paw of the rat after injection of carrageenan is a biphasic event. The initial phase of the oedema has been attributed to the release of histamine and serotonin, the oedema maintained during the plateau phase to kinin like substances and the second accelerating phase of swelling to the release of prsotablandin like substances¹⁰.

Among the stem kashaya(Aqueous Extract) of all plants Bilwa stem kashaya(Aqueous Extract)(32.12%), Gambhari stem Kashaya(Aqueous Extract) (30.68%) and patala stem kashaya(Aqueous Extract) (27.96%) shows significant result. Among Root kashaya(Aqueous Extract) of all plants Gambhari root kashaya(Aqueous Extract)(29.62%), Bilwa Root Kashaya(Aqueous Extract) (27.06%) and Patala root kashaya(Aqueous Extract) (27.81%) shown significant result. Among leaf all leaf kashaya(Aqueous Extract) very less inhibition below 20%. Among combination of Stem bark, Roots and leaves stem combination(28.57%) shows significant result than root combination(27.66%) and leaf combination (17.00%) shows very less inhibition.

Bilwa stem kashaya(Aqueous Extract)(32.12%), Bilwa Root Kashaya(Aqueous Extract) (2706%) , Gambhari stem Kashaya(Aqueous Extract) (30.68%) and Gambhari root kashaya(Aqueous Extract)(29.62%) significant result over the combination of roots (27.66%) and stem barks (28.57%)

V. CONCLUSION

The study result shows that Bilwa root can be substituted by stem bark but not with leaf. Agnimantha root cannot be substituted by Stem bark & leaves. Patala root can be substituted by stem bark but not with leaf. Shyonak root cannot be substituted by Stem bark & leaves. Gambhari root can be substituted by stem bark but not with leaf.

In combination Root combination can be substituted by Stem bark combination but not with leaves combination of all plants.

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A Comparative Physicochemical & Phytochemical Study of Leaves, Roots and Stem Barks of Bruhatpanchmoola (A Group of Five Perennial Plants)

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Abstract: Bruhatpanchmoola is a ayurvedic formulation of five perennial plants roots i.e. Bilva {Aegle marmelos (L.) Corr.}, Gambhari (Gmelina arborea(L.)), Agnimanth (Clerodendrum phlomoidisL.f.), Shyonaka {Oroxylum indicum(L.) Vent.} and Patla {Stereospermum suaveolens(Roxb.) DC.}. Bruhatpanchmoola is also known as Mahatpanchmoola.² Extensive usage of Bruhatpanchmoola plants single or in formulation led to scarcity of the plants, amongst them Shyonaka {*Oroxylum indicum*(L.) Vent.} and Patla {*Stereospermum suaveolens* (Roxb.) DC.} Listed under endangered plants^{4,5}. The study reveals that roots of bruhatpanchmoola can be substituted by stem bark or leaves.

Keywords: Bruhatpanchmoola, ayurved, Bilva {Aegle marmelos (L.) Corr.}, Gambhari (Gmelina arborea(L.)), Agnimanth (Clerodendrum phlomoidisL.f.), Shyonaka {Oroxylum indicum(L.) Vent.} and Patla {Stereospermum suaveolens(Roxb.) DC.}. physicochemical, phytochemical, roots, leaves, stem barks -

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I. INTRODUCTION

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Dashmoola includes Bruhatpanchmoola i.e. five perennial and Laghupanchmoola i.e. five herbs. Bruhatpanchmoola is a formulation of five perennial plants roots i.e. Bilva {Aegle marmelos (L.) Corr.}, Gambhari (Gmelina arborea(L.)), Agnimanth (Clerodendrum phlomoidisL.f.), Shyonaka {Oroxylum indicum(L.) Vent.} and Patla {Stereospermum suaveolens(Roxb.) DC.}. Bruhatpanchmoola is also known as Mahatpanchmoola². The Bruhatpanchmoola again mentioned in Bhavprakash, said to be used as Kapha-vatashamaka (which diminishes Kapha-vata related ailments means Anti-inflammatory and Analgesic activity)³. Extensive usage of Bruhatpanchmoola plants single or in formulation led to scarcity of the plants, amongst them Shyonaka {*Oroxylum indicum*(L.) Vent.} and Patla {*Stereospermum suaveolens*(Roxb.) DC.} Listed under endangered plants^{4,5}. Further other three plants are facing same situations. To meet the increased demand of Bruhatpanchmoola and conservation of plants requirement of substitute the roots by arial parts. With this intention this study was planned to evaluate the physicochemical & phytochemical properties of Roots, Leaves & stembarks of Bruhatpanchmoola.

II. MATERIAL METHODS

- Collection of Roots, Leaves & stem barks from natural Habitat.
 - Physicochemical analysis:
 - 1) Foreign matter
 - 2) Ash value
 - 3) Acid Insoluble ash
 - 4) Water Soluble extractive Value
 - 5) Alcohol soluble Extractive value
 - Preliminary phytochemical Studies of study samples in water & Alcohol extract.
-

a) Collection of Study Samples:

Roots, Leaves & Stem Barks of Bilwa, Agnimanth & Gambhari were collected from Narsingpur Belagavi Karnataka and Patala & shyonak collected from Rahuri Maharashtra. Collected plant materials were identified & authenticated from Central Research facility KAHER's Shri. B.M.K. Ayurved College Belagavi.

b) Physicochemical Analysis⁶: Each sample subjected following test

1) DETERMINATION OF FOREIGN MATTER:

Weigh 100 grams of the sample. Spread the sample on a white tile or glass plate uniformly without overlapping. Inspect the sample with naked eye or by means of lens 5x or above. Separate the foreign organic matter (mentioned above) manually. After complete separation, weigh the matter and determine the percentage w/w present in the sample.

2) ASH VALUE ESTIMATION:

Weigh accurately 2 grams of the air dried drug in a tared platinum or silica dish and incinerate at a temperature not exceeding 450°C for 3 hours until free from carbon, cool and weigh. Calculate the percentage of ash with reference to air-dried drug

3) ACID INSOLUBLE ASH:

Boil the ash obtained by the method mentioned above. Add 25 ml of dilute hydrochloric acid for 15 mins. Collect the acid insoluble ash in a pre weighed crucible along with the ash less filter paper kept in muffle furnace for an hour at around 450°C ± 5°C. Calculate the percentage of acid insoluble ash with reference to the air dried drug.

4) DETERMINATION OF WATER SOLUBLE EXTRACTIVE

Macerate 5 g of the air dried drug, coarsely powdered, with 100 ml of chloroform water in a closed flask for twenty-four hours, shaking frequently during six hours and allowing to stand for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105°, to constant weight and weigh. Calculate the percentage of alcohol-soluble extractive with reference to the air-dried drug.

5) DETERMINATION OF ALCOHOL SOLUBLE EXTRACTIVE

Steps are similar to those mentioned in the Water soluble extractive. Use alcohol (90%) instead of chloroform water.

c) PRELIMINARY PHYTOCHEMICAL SCREENING⁷:

Extract obtain in Water soluble & Alcohol soluble Extractive value of each sample were subjected for following phytochemical analysis

1) TEST OF CARBOHYDRATES:

Molisch's Test (General Test) : 2 – 3 ml aq. Extract + few drops of alpha naphthol solution in alcohol shake and add concentrated H₂SO₄ from sides of test tube - Violet ring is formed at the junction of two liquids.

2) Test for reducing Sugars

Benedict's test: Mix equal volume of Benedict's reagent and test solution in the test tube. Heat in boiling water bath for 5 minutes. Solution appears green, yellow or red depending on amount of reducing sugar present in test solution.

3) Test for Monosaccharides:

Barfoed's Test: Mix equal volume of Barfoed's reagent and test solution. Heat for 1 –2 minutes in boiling water bath and cool. Red precipitate is observed

4) Tests for Hexose Sugars:

Selwinoff's Test (for Ketohexose like fructose); Heat 3 ml Selwinoff's reagent and 1 ml test solution in boiling water bath for 1 to 2 minutes. Red colour is found.

A Comparative Physicochemical & Phytochemical Study of Leaves, Roots and Stem Barks of Bruhatpanchamoola (A Group of Five Perennial Plants)

5) TEST FOR PROTEINS:

Million's Test for Proteins: Mix 3 ml. T. S. with 5 ml. Millions Reagent gives white precipitate. Warm precipitate turns brick red or the precipitate dissolves giving red coloured solution.

6) TESTS FOR AMINO ACIDS:

Test for Tyrosine: Heat 3 ml T. S. and 3 drops Million's reagent solution. Solution shows dark red colour.

7) TESTS FOR TANNINS AND PHENOLIC COMPOUNDS:

To 2–3 ml of aqueous or alcoholic extracts, add few drops Lead acetate solution White Precipitate

8) TESTS FOR STEROIDS:

Salkowski reaction: To 2 ml of extract, add 2 ml of chloroform and 2 ml concentrated H₂SO₄. Shake well. Chloroform layer appears. Red and acid layer shows greenish yellow fluorescence.

9) TESTS FOR CARDIAC GLYCOSIDES:

Test for Deoxysugars (Keller – Killani Test): To 2 ml extract, add glacial acetic acid, one drop 5% FeCl₃ and concentrated H₂SO₄. Reddish brown colour appears at junction of the two liquid layers and upper layer appears bluish green.

10) TESTS FOR ANTHRAQUINONE GLYCOSIDE:

Borntrager's test: to 3ml extract add dil. H₂SO₄ Boil and filter. To cold filtrate add equal volume of benzene or chloroform. Shake well separate the organic solvent. Add ammonia. Ammonical layer turns pink or red.

11) TESTS FOR FLAVONOIDS:

Take a small quantity of residue. Add lead acetate solution. Yellow coloured precipitate formed.

12) TEST FOR PENTOSE SUGAR:

Bial's Orcinol test: to boiling Bial's reagent add few drops of test solution. Green or purple coloration appears.

13) TEST FOR ALKALOID

Hager's test: 2-3 ml extract add Hager's reagent yellow coloured precipitate formed.

Results of Physicochemical Studies:

Table 1: Showing Physicochemical analysis result of all plants parts

Plant Parameters	Bilwa			Agnimanth			Patala			Shyonak			Gambhari		
	Roots	Stem bark	Leaf	Roots	Stem bark	Leaf	Roots	Stem bark	Leaf	Root	Stem bark	Leaf	Root	Stem bark	Leaf
Foreign matter	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Ash value %	3.040	6.669	7.823	3.364	6.485	2.366	3.364	6.485	2.366	1.633	7.462	8.473	3.770	6.673	9.653
Acid insoluble ash %	0.648	0.597	3.227	0.648	2.227	1.379	0.648	2.227	1.379	0.384	0.696	1.932	0.244	0.197	1.732
Water soluble extractive %	10.421	12.678	11.451	6.947	7.431	14.843	6.947	7.431	14.843	46.172	10.635	16.456	22.208	26.129	8.770
Alcohol soluble extractive %	9.432	9.376	4.544	5.792	3.453	12.308	5.792	3.453	12.308	29.085	4.283	5.671	12.572	13.274	6.995

A Comparative Physicochemical & Phytochemical Study of Leaves, Roots and Stem Barks of Bruhatpanchamoola (A Group of Five Perennial Plants).

RESULT OF PRELIMINARY PHYTOCHEMICAL STUDIES IN WATER EXTRACT

Plants	CH	R.S	MONO	PS	HS	PR	AA	ST	CG	AG	FL	AL	TP
Root													
B	+ ve	+ ve	+ ve	-ve	- ve	+ ve	+ ve	-ve	-ve	-ve	+ ve	-ve	+ ve
A	+ ve	+ ve	+ ve	-ve	- ve	+ ve	+ ve	-ve	-ve	-ve	+ ve	-ve	+ ve
P	+ ve	+ ve	-ve	-ve	- ve	+ ve	+ ve	-ve	-ve	-ve	+ ve	-ve	+ ve
S	+ ve	+ ve	-ve	-ve	- ve	+ ve	+ ve	-ve	-ve	-ve	+ ve	-ve	+ ve
G	+ ve	- ve	+ve	+ve	- ve	+ ve	+ ve	-ve	-ve	-ve	+ ve	-ve	+ ve
Stem bark													
B	+ ve	+ ve	-ve	-ve	- ve	+ ve	+ ve	-ve	-ve	-ve	+ ve	-ve	+ ve
A	+ ve	+ ve	+ ve	-ve	- ve	+ ve	+ ve	-ve	-ve	-ve	+ve	-ve	+ve
P	+ ve	-ve	+ ve	-ve	- ve	-ve	-ve	-ve	-ve	-ve	+ ve	-ve	+ ve
S	+ ve	+ ve	+ ve	-ve	- ve	+ ve	+ ve	-ve	-ve	-ve	+ ve	-ve	+ ve
G	+ ve	+ ve	+ ve	-ve	- ve	+ ve	+ ve	-ve	-ve	-ve	+ve	-ve	+ve
Leaf													
B	+ ve	+ ve	+ ve	-ve	- ve	- ve	- ve	-ve	-ve	-ve	+ ve	-ve	+ ve
A	+ ve	+ ve	-ve	-ve	- ve	+ ve	+ ve	-ve	-ve	-ve	+ ve	-ve	+ ve
P	+ ve	+ ve	+ ve	-ve	- ve	+ve	+ ve	- ve	-ve	-ve	+ ve	-ve	+ ve
S	+ ve	- ve	+ ve	-ve	- ve	- ve	- ve	-ve	-ve	-ve	+ ve	-ve	+ ve
G	+ ve	+ ve	- ve	-ve	- ve	+ve	+ ve	- ve	-ve	-ve	+ ve	-ve	+ ve

RESULT OF PRELIMINARY PHYTOCHEMICAL STUDIES IN ALCOHOL EXTRACT

Plants	CH	RS	MONO	PS	HS	PR	AA	ST	CG	AG	FL	AL	TP
Root													
B	+ ve	+ ve	+ ve	-ve	- ve	+ve	+ ve	+ve	-ve	+ve	+ ve	+ve	+ ve
A	+ ve	+ ve	+ ve	-ve	- ve	+ve	+ ve	+ve	-ve	+ve	+ ve	+ve	+ ve
P	+ ve	+ ve	- ve	+ve	- ve	+ve	+ ve	+ve	-ve	+ve	+ ve	+ve	+ ve
S	+ ve	+ ve	- ve	-ve	- ve	+ve	+ ve	+ve	-ve	-ve	+ ve	+ve	+ ve
G	+ ve	+ ve	+ ve	-ve	- ve	+ve	+ ve	+ve	-ve	-ve	+ ve	-ve	+ ve
Stem bark													
B	+ ve	+ ve	+ ve	-ve	- ve	+ve	+ ve	+ve	-ve	+ve	+ ve	+ve	+ ve
A	+ ve	+ ve	+ ve	-ve	- ve	+ve	+ ve	+ve	-ve	-ve	+ ve	+ve	+ ve
P	+ ve	+ ve	+ ve	-ve	- ve	+ve	+ ve	+ve	-ve	-ve	+ ve	+ve	+ ve
S	+ ve	+ ve	-ve	-ve	- ve	+ve	+ ve	+ve	-ve	-ve	+ ve	+ve	+ ve
G	+ ve	+ ve	+ ve	-ve	- ve	+ve	+ ve	+ve	+ve	+ve	+ ve	+ve	+ ve
Leaf													
B	+ ve	+ ve	+ ve	+ve	- ve	+ve	+ ve	-ve	+ve	-ve	+ ve	-ve	- ve
A	+ ve	+ ve	+ ve	+ve	- ve	+ve	+ ve	+ve	-ve	+ve	+ ve	+ve	+ ve
P	+ ve	+ ve	- ve	+ve	- ve	-ve	+ ve	-ve	-ve	+ve	+ ve	+ve	+ ve
S	+ ve	+ ve	- ve	+ve	- ve	+ve	+ ve	-ve	-ve	+ve	+ ve	-ve	+ ve
G	+ ve	+ ve	-ve	+ve	- ve	+ve	+ ve	-ve	-ve	+ve	+ ve	-ve	+ ve

Abbreviations: B: Bilwa, A: Agnimantha, P:Patala, S: Shyonak, G: Gambhari
 CH: Carbohydrate, RS: Reducing Sugar, Mono: Monosaccharaides, PS: Pentose sugar,
 HS: Hexose sugar, PR: Protein, AA: Amino Acid, ST: Steroids, CG: Cardiac Glycoside,
 AG: Anthraquinone Glycoside. FL: Flavonoids, AL: Alkaloids,
 TP: Tannin & Phenolic compounds

III. DISCUSSION

In Bilwa ash value is more in leaf (7.823%) than Stem bark (6.669%) & roots (3.040%). Acid insoluble ash value is more in leaf (3.227%) than Roots (0.648%) and stem bark (0.597%). Water soluble extractive value is more stem bark (12.678%) than root (10.421%) and leaf (11.451) but the values are very nearer to each other. Alcohol soluble extractive value more in stem bark (9.376%) than root (9.432) & leaf (4.544%) but stem bark value nearer to root.

In Agnimanth ash value is more in stem bark (6.485%) than root (3.364%) & leaf (2.266%). Acid insoluble ash value is more in stem bark (2.227%) than root (0.940%) & leaf (1.379%). Water soluble extractive value is more in leaf (14.843%) than root (6.947%) and stem bark (7.431). Alcohol soluble extractive value is more in leaf (12.308%) than root (5.792%) and stem bark (3.453).

In Patala ash value is more in leaf (7.980%) than root (5.035%) & Stem bark (2.228%). Acid insoluble ash value is more in leaf (5.369%) than root (1.726%) & stem bark (0.149%). Water soluble extractive value is more in stem bark (29.136%) than root (26.841%) and leaf (18.165%). Alcohol soluble extractive value is more in stem bark (18.862%) than root (15.705%) and leaf (10.882%).

In shyonak ash value is more in leaf (7.980%) than root (5.035%) & Stem bark (2.228%). Acid insoluble ash value is more in leaf (5.369%) than root (1.726%) & stem bark (0.149%). Water soluble extractive value is more in stem bark (29.136%) than root (26.841%) and leaf (18.165%). Alcohol soluble extractive value is more in stem bark (18.862%) than root (15.705%) and leaf (10.882%).

In Gambhari ash value is more in leaf (9.653%) than root (6.673%) & Leaves (3.770%) . Acid insoluble ash value is more in leaf (1.732%) than Roots (0.244%) and stem bark (0.197%). Water soluble extractive value is more stem bark (26.129%) than root (22.208%) and leaf (8.770). Alcohol soluble extractive value more in stem bark (13.724%) than root (12.572%) & leaf (6.995%).

Foreign matter is nil in all samples because samples were collected from natural habitat & taken for studies

Preliminary phytochemical in water & alcohol extract shows that similarity in presence of phytochemical like carbohydrate, Monosaccharide, Proteins, Amino acids, Tannins & Flavonoids in individual plants root, stem barks & leaves.

Conclusion: Study results reveals that all the plants root can be substituted by stem bark or leaves. That helps to conserve the plants. To bring in to therapeutic practice further experimental & clinical studies are required.

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