

A Comparative Acute Anti-Inflammatory Activity Of Kashaya (Aqueous Extract) Prepared From Leaves, Roots And Stem Barks Of Brihatpanchamoola (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 *Brihatpanchamoola* (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 *Brihatpanchamoola* 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 Sterm 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)** :

$$\begin{aligned} \text{Rat dose} &= \text{Human dose} \times \text{surface area of Wistar strain rats} \\ &= 48\text{ml} \times 0.018 \\ &= 0.86 \text{ ml for 200gms Rat} \end{aligned}$$

⇒ Dose fixation of **Standard Drug Ibuprofen** :

$$\begin{aligned} \text{Rat dose} &= \text{Human dose} \times \text{surface area of Wistar strain rats} \\ &= 400\text{mg} \times 0.018 \\ &= 7.2 \text{ mg for 200gms Rat} \end{aligned}$$

➤ 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 carragennan). 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. 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.

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