



**ROLE OF BHAVANA PROCESS IN THE ANTIPYRETIC EFFECT OF
HINGULESHWARA RASA**

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ABSTRACT

Bhavana is a unique pharmaceutical procedure, where powdered drugs triturated with liquid media till it becomes dry, performed with intension of enhancing the quality & therapeutic efficacy of the drug. Hinguleshwara rasa is a herbo-mineral solid dosage form of medicine mentioned under Jwaradhikara of Bhaishajya Ratnavali, which comprises purified Hingula, purified Vatsanabha and Pippali as ingredients. Where it is mentioned to administer in powdered form, but later scholars by their experiences tried to prepare it in tablet form by giving bhavana with Nimbu swarasa (Lemon juice). Though all the ingredients Hinguleshwara rasa in combination have jwaraghna (anti pyretic) property, addition of Nimbu swarasa might have shown better therapeutic efficacy in Jwara. Hence in this study an attempt was made to study the anti pyretic effect of Hinguleshwara rasa by preparing it with and without bhavana and subjecting it to experimental study. Long sustained activity profile of antipyretic study was observed in Hinguleshwara rasa prepared by Nimbu swarasa bhavana.

KEYWORDS: Bhavana, Nimbu swarasa, Jwara, Hinguleshwara rasa, Experimental study.

INTRODUCTION

Samskara represents philosophy, concept of technology as early basic knowledge in Indian antiquity. It is a process performed to modify the natural properties of the substances. The textual material of Ayurveda evidently contain multi angled elements and information pertaining to pharmaceutical importance. Charaka Samhita is the foremost classical source of Ayurveda which incorporate various aspects of principles and practice of pharmacy. Acharya Charaka^[1] defines Samskara as transformation of inherent attributes of a substance created by dilution, application of heat, cleansing churning, storing in a specific place, maturing, flavouring, grinding, preservation, container etc. This helps in increasing useful properties as well as decreasing /removing the therapeutically unwanted properties from the drug. Bhavana is one among the Samskara in which powdered form of drug is triturated with liquid media till it becomes dry.^[2] Repetition of this process depends upon the purpose of bhavana and therapeutic indication of the particular product and also based on classical inference.

Hinguleshwara rasa is a unique herbo-mineral combination of the drugs to treat Vataja jwara. It comprises purified Hingula, purified Vatsanabha and Pippali as ingredients.^[3] As per classical reference it is powdered form of medicine prepared by mixing fine powder of all the ingredients. Later scholars modified the

preparation in the form of tablets by giving bhavana with Nimbu swarasa.^[3] This modification might be done to get the better therapeutic efficacy, quality and also for easy administration. On the basis of this, present work has been carried out to find the effect of bhavana process on the therapeutic effect of the drug.

OBJECTIVES OF THE STUDY

- Preparation of Hinguleshwara rasa without and with Nimbu swarasa bhavana as per standard operative procedure
- Experimental study of antipyretic effect of Hinguleshwara rasa prepared without and with Nimbu swarasa bhavana.
- Comparison of results of experimental study of Hinguleshwara rasa prepared without and with Nimbu swarasa bhavana.

MATERIALS AND METHODS

Authenticated raw drugs of Hinguleshwara rasa were collected from SDM Ayurveda pharmacy, Udupi. Purification of Hingula, Vatsanabha and preparation of Hinguleshwara rasa was performed in practical lab of SDM college of Ayurveda, Udupi.

Experimental study

Wister strain albino rats were selected from animal house of SDM Centre for research in Ayurveda and Allied Sciences, Udupi.

Inclusion criteria

- Healthy albino rats of either sex
- weighing about 180-250mg

Exclusion criteria

- Rats less than 180mg-more than 250mg
- Pregnant and diseased rats
- Rats which are under trial of other experiments.

Experimental design^[4]

Total 24 albino rats of either sex weighing between 180 mg to 250 mg were taken and divided randomly into 4 groups, each containing 6 animals. All the healthy rats selected for the experiment was kept under fasting for 18 hours before the commencement of the experiment. Initial normal rectal temperatures of all the animals were recorded by using a digital thermometer. Fever was induced by using 12.5% of Brewer's yeast solution which was injected subcutaneously in all the rats in the dose of 1ml/100g body weight and were replaced in the cages. Then the rectal temperature of each rat was noted 4th hour after injection. This temperature was noted to

confirm the pyrexia. After 6 hours of injection of yeast, corresponding test drugs were administered to respective groups. Rats of group 1 was administered with distilled water served as control. Animals of group 2 were administered with Paracetamol suspension at the dose of 1ml/100mg (200mg/kg) of body weight by using the feeding syringe. Similarly rats of group 3 were administered with the suspension of Hinguleshwara rasa prepared by giving bhavana, group 4 was administered with Hinguleshwara rasa without bhavana. After administering corresponding drugs to each group hourly rectal temperature of each rat was noted for 24 hours.

OBSERVATION

Initially normal body temperature of all the rats on an average recorded. After the administration of Brewer's yeast all the animals were observed for their behaviour and changes. All the symptoms mentioned below confirmed that rats are suffering from fever.

- Temperature of all albino rats increased.
- Trembling is noted after 1 hour of Brewer's yeast injection
- Fur erected
- Face of all the animals bent down.

The actual rectal temperature in each rat in all the four groups have been shown in table 1-4

Control group**Table no. 1:- The comparison of temperature from initial temperature to 24th hour.**

Rat no.	Body weight	Initial temperature	Dose (yeast)	After 4 th hour	After 6 th hour	After 8 th hour	After 10 th hour	After 24 th hour
1.	250g	36.7	2.5ml	36.1	36.9	37.5	37.0	37.7
2.	180g	36.3	1.8ml	36.1	37.4	37.4	36.9	37.1
3.	170g	37.1	1.7ml	37.9	38.9	38.8	38.9	39.0
4.	230g	38.2	2.3ml	38.2	38.4	38.1	38.0	38.5
5.	260g	38	2.6ml	38.0	38.9	38.3	38.9	39.0
6.	190g	37.3	1.9ml	37.3	37.5	38.1	38.6	38.2

Standard group**Table no. 2:- The comparison of temperature from initial temperature to 24th hour.**

Rat no.	Body weight	Initial temperature	Dose (yeast)	After 4 th hour	After 6 th hour	After 8 th Hour (After drug administration)	After 10 th hour	After 24 th hour
1.	160g	36.7	1.60ml	37.5	38.1	37.4	36.7	36.2
2.	225g	37.4	2.25ml	37.6	38.4	36.4	36.1	37.4
3.	230g	38.2	2.30ml	38.2	38.7	36.7	38.1	38.0
4.	220g	38.1	2.20ml	38.1	39.0	37.7	37.9	38.0
5.	225g	36.5	2.25ml	37.9	38.6	36.5	35.0	35.1
6.	200g	36.4	2.0ml	36.7	37.7	35.5	35.1	35.3

Hinguleshwara rasa with bhavana group**Table no. 3:- The comparison of temperature from initial temperature to 24th hour.**

Rat no.	Body weight	Initial temperature	Dose (yeast)	After 4 th hour	After 6 th hour	After 8 th Hour (After drug administration)	After 10 th hour	After 24 th hour
1.	200g	36.5	2.0ml	36.6	37.5	37.4	37.7	37.8
2.	190g	38.0	1.90ml	37.7	38.6	38.5	38.0	38.6
3.	160g	36.7	1.60ml	37.5	38.1	38.0	37.3	36.1
4.	150g	36.3	1.50ml	36.9	37.7	37.4	37.5	36.7
5.	170g	37.4	1.70ml	38.2	38.2	38.0	38.0	36.4
6.	165g	37.8	1.65ml	38.1	38.1	38.4	38.1	36.8

Hinguleshwara rasa without bhavana group**Table no. 4:- The comparison of temperature from initial temperature to 24th hour.**

Rat no.	Body weight	Initial temperature	Dose (yeast)	After 4 th hour	After 6 th hour	After 8 th Hour (After drug administration)	After 10 th hour	After 24 th hour
1.	225g	36.6	2.25ml	37.9	38.0	37.5	37.5	37.4
2.	130g	37.4	1.30ml	38.2	38.4	38.6	38.2	36.1
3.	200g	37.4	2.00ml	37.6	37.7	37.5	38.1	38.1
4.	170g	37.7	1.70ml	37.5	38.4	37.7	38.3	38.3
5.	250g	36.1	2.50ml	37.6	38.3	37.4	37.4	37.3
6.	270g	36.3	2.70ml	37.7	38.1	37.6	38.2	37.5

Table no. 5:- Consolidated data related to the effect of test drugs and reference standard on yeast induced pyrexia in albino rats.

Group	Temperature (Mean \pm SEM)					
	Initial	4 th	6 th	8 th	10 th	24 th hour
Control	37.26 \pm 0.29 (36.49-38.03)	37.26 \pm 0.38 (36.26-38.26)	38.03 \pm 0.34 [@] (37.10-38.89)	38.03 \pm 0.21 [@] (37.48-38.57)	38.05 \pm 0.37 [@] (37.09-39)	38.25 \pm 0.30 ^{@@} (37.49-39)
Standard	37.2 \pm 0.32 36.37	37.6 \pm 0.22 (37.09-38.4)	38.41 \pm 0.18 [@] (3) 7.93-38.9)	36.7 \pm 0.31 (35.87-37.52)	36.48 \pm 0.54 (35.08-37.88)	36.6 \pm 0.53 (35.28-38.04)
Hinguleshwara rasa with bhavana	37.11 \pm 0.29 (36.36-37.86)	37.5 \pm 0.26 (36.26-38.17)	38.083 \pm 1.58 [@] (37.62-38.44)	37.95 \pm 0.19 (37.45-38.44)	37.7 \pm 0.13 (37.43-38.44)	37.06 \pm 0.38 (36.07-38.5)
Hinguleshwara rasa without bhavana	36.91 \pm 0.27 (36.21-37.6)	37.75 \pm 0.10 (37.47-38.02)	38.15 \pm 0.11 ^{@@} (37.86-38.43)	37.7 \pm 0.18 (37.25-38.18)	37.95 \pm 0.16 [@] (37.13-38.36)	37.43 \pm 0.13 (36.03-38.26)

[@] = Significant; ^{@@} = highly significant in comparison to initial temperature (figures in the parentheses represent 95% of confidence limits).

In all the groups' tendency towards elevated temperature was observed at 4th hour. However, the observed increase was found to be statistically non significant. In control group consistently elevated temperature was observed till 24th hour after yeast injection. In reference standard administered group significant elevation was observed only till 6th hour and by 8th it returned to normal level and continued like that till 24th hour. In Hinguleshwara rasa with bhavana treated group significant elevation was observed at 6th hour. Though the elevation was observed at 8th, 10th and 24th hour after yeast injection it was found to be statistically non significant in compare to initial rectal temperature. Thus in comparison to control group both the above groups shown significant anti pyritic activity. In Hinguleshwara rasa without bhavana treated group an apparent temperature elevation was observed at all the time intervals in comparison to initial temperature. However, only the elevation observed at 6th and 10th hour

was found to be statistically significant. The data indicate presence of weak to moderate anti pyritic activity in this group. (Table no.5).

Table no. 6: Shows data related to temperature elevation in terms of °c in comparison to initial values.

Group	Difference in temperature b/w groups (Mean ± SEM)				
	4 th	6 th	8 th	10 th	24 th hour
Control	0.13 ±0.13 (-0.20-0.47)	0.73± 0.26 (0.04-1.4)	0.78± 0.24 (0.14-1.4)	0.81±0.27 (0.122-1.5)	0.98±0.21 (0.43±1.53)
Standard	0.45±0.22 (-0.12-1.02)	1.2±0.22 (0.62-1.7)	0.11±0.11* (-0.18-0.41)	0*	0**
Hinguleshwara rasa with bhavana	0.43±0.14 (0.06-0.08)	0.91±0.17 (0.45-1.37)	0.83±0.13 (0.49-1.17)	0.65±0.19 (0.14-1.15)	0.38±0.21 (-0.15-0.92)
Hinguleshwara rasa without bhavana	0.86±0.26 (0.19-1.5)	1.23±0.28 (0.49-1.97)	0.8±0.24 (0.17-1.43)	0.03±0.19 (0.52-1.5)	0.75±0.18 (0.28-1.21)

* p< 0.05 Significant; ** p< 0.01-highly significant in comparison to control group

In standard drug given group statistically significant decrease in actual temperature raise was observed in comparison to control group at 8th, 10th and 24th hour after yeast injection. In Hinguleshwara rasa with bhavana treated group moderate but statistically non significant decrease was observed in comparison to control group at 10th and 24th hour. In Hinguleshwara rasa without bhavana treated group an apparent moderate and

statistically non significant decrease in elevated temperature was observed in comparison to control group. The observed results indicate presence of moderate antipyretic activity in Hinguleshwara rasa with bhavana group and weak and delayed onset antipyretic activity in Hinguleshwara rasa without bhavana group.(Table no.6).

Table no. 7: Shows data in the form of percentage increase in rectal temperature after yeast injection.

Group	Difference in temperature b/w groups (Mean ± SEM)				
	4 th	6 th	8 th	10 th	24 th hour
Control	0.35±0.35 (-0.56-1.28)	1.97±0.72 (0.11-3.84)	2.54±0.62 (0.81-4.5)	2.63±0.70 (0.67-4.5)	2.64±0.57 (1.17-4.1)
Standard	1.2±0.61 (-0.35-2.81)	3.24±0.62 (1.65-4.84)	0.31±0.31# (-0.49-1.13)	0#	0##
Hinguleshwara rasa with bhavana	1.17±0.38 (0.17-2.17)	2.48±0.50 (1.2-3.7)	2.25±0.36 (1.31-3.20)	1.77±0.54 (0.37-3.16)	1.04±0.57 (-0.43-2.57)
Hinguleshwara rasa without bhavana	2.37±0.72 (0.50-4.24)	3.36±0.50 (1.22-5.4)	2.62±0.62 (0.89-4.35)	2.81±0.56 (1.37-4.25)	2.04±0.50 (0.74-3.34)

p< 0.05-significant; ## p<0.01- highly significant

In standard drug given group statistically significant decrease was observed in comparison to control group at 8th, 10th, and 24th hour after yeast injection. In Hinguleshwara rasa with bhavana treated group moderate but statistically non-significant decrease was observed in comparison to control group at 10th, and 24th hour. In Hinguleshwara rasa without bhavana treated group apparent moderate and statistically non-significant decrease in elevated temperature was observed in comparison to control group. The observed results indicate presence of moderate antipyretic activity in Hinguleshwara rasa with bhavana group and weak and delayed onset of antipyretic activity in Hinguleshwara rasa without bhavana group. (Table no.7).

DISCUSSION

There are two main objectives in under taking this study. The first objective is to ascertain whether Hinguleshwara rasa has anti pyretic activity or not. The second objective was to ascertain which of the two samples of Hinguleshwara rasa- the one with bhavana or without bhavana has better activity profile. Analysis of the results obtained by this study clearly indicates that Hinguleshwara rasa does have anti pyretic activity. Comparison between Hinguleshwara rasa with bhavana

and Hinguleshwara rasa without bhavana shows that Hinguleshwara rasa with bhavana has got better anti pyretic activity profile. In fact it has been produced moderate and statistically significant reduction in the rectal temperature after yeast suspension injection while Hinguleshwara rasa without bhavana produced only a weak non significant effect. Longer period and sustained anti pyretic activity was noted in Hinguleshwara rasa with bhavana group.

Ama is the root cause for Jwara. Swedavarodha and santapa are the results of the pathogenesis of Jwara which is caused due to ama. Irregular habits of ahara and vihara first effect the channels of its own and that of sweda and suppresses the activity of agni, thus dispelling heat from the site of digestion.^[5] All the drugs of Hinguleshwara rasa have jwaraghna property. The deepana property of Pippali^[6] and Hingula^[7] will help to resolve the mandagni of Jwara. The vyavayi property of Vatsanabha^[8] will help in faster action and provide deeper access into the shakahas. It is also a Pitta shodhaka dravya and thus eliminates the Pitta dosha from the body, which is primary dosha involved in Jwara. The bhavana with Nimbu swarasa, further potentiates the formulation with gunas of Nimbu such as

deepana, pachana, rochana.^[9] Paracetamol provides only temporary symptomatic relief where as Hinguleshwara rasa resolves the basic pathology of the Jwara through ama pachana and thus produces sustained result.

CONCLUSION

Bhavana is a kind of samskara performed to modify the properties of the drug. Hinguleshwara rasa is a formulation mentioned under Jwaradhikara has got jwaraghna property, is potentiated by giving bhavana with Nimbu swarasa. As per experimental study, Bhavitha Hinguleshwara rasa has got long and sustained antipyretic activity profile compared to Hinguleshwara rasa without bhavana.

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