Research Article

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ANTI-INFLAMMATORY EFFECTS OF SIMHASYADI KASHAYA AND GHANAVATI

Renju S. *

Assistant Professor, Department of Rasa Shastra and Bhaishajya Kalpana, S.C.P.M Ayurveda Medical College and Hospital, Gonda, Uttar Pradesh, India

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***Corresponding author**
E-mail: renjurajayur@gmail.com

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ABSTRACT

Simhasyadi kashaya mentioned in Chakradatta contains Guduchi, Vasa and Brihati, which are readily available in our surrounding area. It is indicated for Shopha, Swasa, Kasa, Jwara and Chardi. In contrast, Simhasyadi Ghanavati is taken on the hypothesis that Ghanavati is more effective than kwatha. Apart from these, vatis are more durable, and medicinal value can be maintained for a more extended period, easy to administer and easy to store. In the present study, Simhasyadi Kashaya and ghanavati were prepared by standardised methods and tested in albino rats for anti-inflammatory action. The rats of either sex weighing 150 to 250 gm are used in this experiment. The control rats receive 1 ml of distilled water; the standard group is given ibuprofen suspension, test group A given oral administration of Simhasyadi kwatha and test group B given Simhasyadi ghanavati orally. After 1 hour, the rats are injected with 0.05 ml of 1% carrageenan solution subcutaneously into the plantar side of the left hind paw. The paw is marked with ink at the level of the lateral malleolus and immersed in mercury up to this mark. The paw volume is measured plethysmographically immediately after injection and again after 30 min, 60 min, 120 min, 180 min and after 12 hours and eventually 24 hours after challenge. The statistical tests proved that the trial drugs, Simhasyadi kashaya and Ghanavati, had a significant anti-inflammatory effect compared to the control and standard groups. It maintained a constant lower than the control level because of its residual anti-inflammatory action.

Keywords: Simhasyadi Kashaya, Simhasyadi Ghanavati, Sopha (Inflammation), Ibuprofen

INTRODUCTION

Ayurveda is based on two ideologies, maintaining the health of healthy persons, and curing the disease of the diseased one. Acharya Charaka has quoted that all dravyas present around us are of medicinal value; their proper utilization depends upon the yukti of a physician. The best physician knows the administration of medicinal plants, external and internal, combination and single use.

In the present era of science and technology, a solid research backup is essential for developing new drugs and the herbal industry. Pharmacognostical, analytical and biological assays help build a rational relationship between the active principles of drugs and their therapeutic effects. The scientific foundation which forms the backbone of the herbal industry will make the ancient science of Ayurveda acceptable worldwide.

Simhasyadi kashaya mentioned in Chakradatta contains Guduchi, Vasa and Brihati, which are readily available in our surrounding area. It is indicated for Sopha, Swasa, Kasa, Jwara and Chardi. So, the present study has been undertaken to evaluate a cheaper and cost-effective medicine for sopha.

Review of literature

Simhasyadi kashaya was first explained by Chakradatta in Shopha prakarana [1]. Later it was included in Bhaishajya Ratnavali, Vangasena and Brihath Nighantu Rathnakara. It contains Guduchi, Brihati and Vasa. Yoga is indicated for Shopha, Swasa, Kasa, Jwara and Chardi. In this study, the Simhasyadi kashaya was modified into Simhasyadi ghanavati, and an experimental study was carried out on albino rats to find out its shothaghna action.

Guduchi
Botanical name: *Tinospora cordifolia* (Willd.) Miers.
Family name: Menispermaceae

Vasa
Botanical Name: *Adhatoda vasica* (L.)
Family: Acanthaceae

Brihati
Botanical name: *Solanum indicum* Linn.
Family name: Solanaceae

Shopha is defined as a swelling which is prithu (widespread), grathita (presence of granthi), sama/vishama (regular or irregular) and is due to the accumulation of the doshas between the twak and mamsa in a particular site of the body [2].

Charaka quotes that kwatha is one of the medicinal preparations where coarsely powdered ingredients are boiled in water for a definite time until the liquid is reduced to the required quantity of the entire matter and squeezed through the thin cotton cloth. The residue is discarded, and the liquid is used as kwatha [3].

Acharya Vagbhata in sutra sthana, Ghana means “Srava rahitham”, indicating the substance without liquid. Ghana means compact, solid, hard, dense, coarse, viscid, gross etc. [4\]

Acharya Sarangadhara has defined Rasakriya that kwatha, swarasa etc.; if again subjected to heat, it reduces to solid form. Acharya Yadavji Trikamji mentioned that Rasakriya is the

process of lowering swarasa, kwatha, etc., liquid preparation to get a solid mass [5].

Objectives of the study

The main objectives of the current study are Preparation of Simhasyadi kwatha by following the classical method [6], preparation of Simhasyadi ghanavati by adopting the rasakriya approach explained in Dalhana commentary [7] and compare the efficacy of anti-inflammatory action of Simhasyadi kwatha and ghanavati experimentally.

Animal Ethics Clearance Number: KVG/13-14/B-0519

MATERIALS AND METHODS

Preparation of Simhasyadi Kashaya

The formulation (Simhasyadi kwatha) combines three herbal ingredients viz Vasa, Guduchi and Bhandaki.

Table 1: Simhasyadi Kashaya Dravya Vivarana

Drug name	Botanical name	Family name	Parts used
Vasa	*Adhatoda vasica* (L.)	Acanthaceae	Stem and Leaves
Guduchi	*Tinospora cordifolia* (Willd.) Miers.	Menispermaceae	Stem and Leaves
Bhandaki	*Solanum indicum* Linn	Solanaceae	Whole plant
Water			

Figure 1: Guduchi

Figure 2: Vasa

Figure 3: Brihati

Method of preparation of Simhasyadi Kashaya

Guduchi, Vasa and Brihati were taken in fresh form, converted into small pieces, and crushed. All the three drugs were mixed thoroughly to prepare a homogenous blend, which was shifted to a stainless-steel container, added with four parts of water (800ml) and subjected to mild heat. When the volume was reduced to one-fourth (200ml), the contents were filtered through a clean cloth into a stainless-steel vessel to obtain kwatha.

Method of preparation of Simhasyadi Ghanavati

The drugs were separately reduced into smaller pieces with the help of a cutting machine and crushed. These drugs were taken and soaked in water (64 L) for 10 hours and, after completion of 10 hours, boiled in low flame till the volume of water reduced to its 1/8th. i.e., 8 L remained. Then the container was taken out from the fire, filtered to another container through a fine cloth, and then allowed to cool down. The filtered liquid was known as kwatha.

Again, the above-filtered decoction (8 L) was further subjected to reboiling with continuous stirring over a mild flame until the content became semisolid. The semisolid content is kept in a drier for drying. The temperature for drying was 50-60 ^{0}C. But it absorbed moisture from the atmosphere and liquefied repeatedly, so it was impossible to make pills of desired size and shape. Since vati was to be prepared according to the protocol, the fine powder of the same yoga was added to the semisolid mass, and then vatis were prepared. The proportion of Ghana and Churna is below 5 gm of fine powder added to 10 gm of Ghana and rolled into pills.

Figure 4: Simhasyadi kwatha preparation

Figure 5: Simhasyadi kwatha after reduction

Figure 6: Procedure of Ghana

Figure 7: Ghanapaka stage

Figure 8: Ghanavati before the addition of powder

Figure 9: Ghanavati, after the addition of powder

Selection of Experimental Model

Twenty-four healthy albino rats of either sex (selected randomly) weighing 200 – 250 grams were procured in the animal house.

Rats Maintenance

- All animals were maintained at the animal house under the identical condition of the place, light, temperature, food, and other condition.
- All the cages were washed with detergent followed by disinfectant phenol solution to maintain hygiene.
- After cleaning cages, the bedding material was prepared using paddy husk, which was changed once in three days.
- All four cages used for the experiment were cleaned before the commencement of the experiment.

Animal Selection Criteria

The criteria for the selection of the rats for the present study are:

Inclusion criteria
- 200-250 gm albino rats
- Male and Female rats
- Active and healthy rats

Exclusion criteria
- Below 200 gm and above 250 gm
- Diseased and pregnant rats
- Rats already used for other experiments

Paw Oedema Method

Many methods are used for the screening of anti-inflammatory drugs. One of the most used techniques is based upon the ability of such agents to inhibit oedema produced in the rat's hind paw after injection of irritant substances like brewer's yeast, formaldehyde, egg albumin, kaolin, carrageenan. The essentials required for the study are plethysmograph, carrageenan, albino rats, syringe, needle, standard, control and test drugs, infant feeding tube, mercury, and saline.

Test drugs: -The prepared kashaya filter through a clean piece of cloth was collected in a conical flask, and 75 mg of Ghana was diluted with 8ml of distilled water and made solution.

Preparation Of Carrageenan Solution

In a conical flask, 1 gm of the collected sample of carrageenan was taken. It was dissolved in 100 ml of distilled water by constant stirring with a glass rod. This suspension is used to induce inflammation in all the groups. The dose of carrageenan suspension is 0.05 ml / 100 gm of body weight. [8]

The albino rats of 4 groups will be administered with respective drugs
Group 1 - Standard: -Ibuprofen-oral administration-7.5 ml/kg body wt.
Group 2 - Control: -Distilled water-oral administration-1 ml/200gms body wt.
Group 3 - Test drug Simhasyadi kashaya- 4.3 ml/Kg body weight
Group 4 - Test drug Simhasyadi ghanavati- 45 mg/Kg body weight

Principle
This method is based upon the ability of anti-inflammatory agents to inhibit oedema produced in the rat's hind paw after injection of a phlogistic agent. The volume of the injected paw is measured before and after the application of irritants. The paw volume of treated animals is compared with control. A plethysmograph is used to measure the paw volume.

Rats of each group were kept in separate cages. Each rat in all the cages was marked with different colours like 1) red head, 2) red body, 3) red tail, 4) blue head, 5) blue body, 6) blue tail for their identification.

Procedure
Rats were grouped into 4, and each group consisted of 6 rats. These rats were kept fasting for 18 hours before the commencement of the experiment. Rats were provided with water. The next day paw volume of all rats was recorded with a plethysmograph. This provided the initial reading. After recording the initial reading, all rats induced the inflammation by injecting 10% of carrageenan solution subcutaneously on the paw. The injection site is massaged to spread the suspension beneath the skin. The dose of carrageenan solution administered was 0.05 ml / 100 gm of body weight. After inducing the inflammation, again paw volume of each rat was noted to confirm the inflammation. After recording the inflammation, the complementary medicines were administered to all groups after two hours. After administering corresponding drugs to each group, oedema of each rat was noted and recorded for consecutive 24 hours.

Table 2: The Treatment protocols

Group	Drug	Dose for each Rat / 200 gm body wt.
Control	Distilled water	1ml
Standard	Ibuprofen suspension	0.1 ml
Test group A	Simhasyadi kashaya	1ml
Test group B	Simhasyadi Ghana	1ml

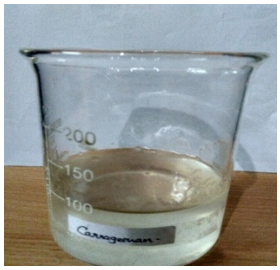


Figure 10: 10% Carrageenan solution prepared

Figure 11: Ibuprofen suspension

Figure 12: Simhasyadi Kashaya

Figure 13: Simhasyadi Ghana solution

Figure 14: Plethysmograph

Figure 15: Medicine administration

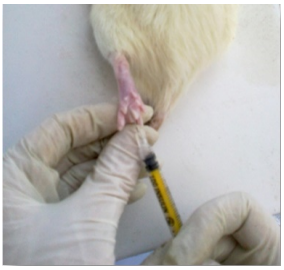


Figure 16: Inducing oedema

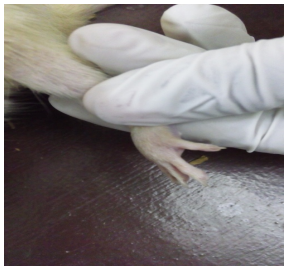


Figure 17: Paw Inflammation

Figure 18: Measuring Inflammation by using Plethysmograph

RESULTS

Statistical Data of Experimental Groups

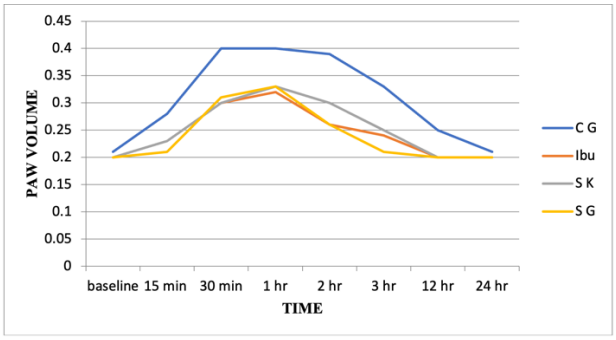
The statistical test carried out was ONE WAY ANOVA followed by Bonferroni POST HOC TEST.

Table 3: Statistical data of experimental groups

Group	Baseline	30 min	1 hour	2 hours	4 hours	12 hours	24 hours
C G	0.21±0.04	0.4±0.0^{*bcd}	0.4±0.0^{*b}	0.39±0.02^{*bcd}	0.33±0.05^{bcd}	0.25±0.06	0.21±0.04
Ibu	0.2±0.0	0.3±0.0^{*a}	0.32±0.02^{*a}	0.26±0.05^{*a}	0.24±0.03^{*a}	0.2±0.02	0.2±0.0
S K	0.2±0.0	0.3±0.0^{*a}	0.33±0.05	0.30±0.04^{*a}	0.25±0.04^{*a}	0.2±0.0	0.2±0.0
S G	0.2±0.0	0.31±0.04^{*a}	0.33±0.05	0.26±0.05^{*a}	0.21±0.02^{*a}	0.2±0.0	0.2±0.0

*= mean difference is significant at 0.05 level: *(P<0.05)*

a=control, b=Ibu (Ibuprofen), c=S K (*Simhasyadi Kashaya*), d= S G (*Simhasyadi Ghanavati*), CG – control group, Ibu - Standard drug (Ibuprofen), S K - *Simhasyadi Kashaya*, S G - *Simhasyadi Ghanavati*



Graph 1: Representing the difference in Hg (Mercury) level between groups

Interpretation

After the administration of medicine,

- The Control group showed inflammation in 30 minutes.
- After 1 hour, all the groups got inflammation (High peak).
- In the 2nd hour, kashaya and standard group showed a significant decrease in the control group.
- In the 4th hour, Kashaya, Ghana and the standard group showed significantly less inflammation than the control group.
- By the 12th hour, Ghana and the standard group showed almost equal values to the baseline reading. The Control group also showed a significant reduction.
- Kashaya group showed a significant fast reduction in inflammation in the beginning, but as the time progressed, the effect was getting slower compared to the Ghana group.
- At the twenty-fourth hour, all the four groups got similar readings as a baseline, P<0.05.
- The statistical tests proved that trial drugs Simhasyadi kashaya and Simhasyadi ghanavati have a significant anti-inflammatory effect (P<0.05), which is almost like the standard group.
- Ibuprofen has a short duration of action, as it has shown a maximum decrease in inflammation after 4 hours of the drug administration. It always maintained a reading lower than control because of its residual anti-inflammatory action.

- Based on the above observations and analysis, it can be said that the test drugs have equal action to that of the standard medication Ibuprofen in controlling the inflammation.

Statistical Analysis

One-way ANOVA and Post hoc tests were carried out to analyse the data obtained during the study between the groups. A 'P-value <0.05 is considered statistically significant, 'P-value <0.01 is considered moderately significant, and 'P-value <0.001 is considered highly significant.

DISCUSSION

Based on the statistical tests, it was proved beyond doubt that the trial drugs, Simhasyadi kashaya and Simhasyadi ghanavati, have a significant anti-inflammatory effect compared to control and standard groups. Ibuprofen had a short duration of action, as demonstrated by the maximum decrease in inflammation after 4 hours of drug administration. Probably because of its residual anti-inflammatory activity, it maintained a constant lower–than-control level. The shothaghna effect of Simhasyadi kashaya, when compared to the Standard group, it was quick in action but not constant or prolonged. This indicates that kwatha gets digested and absorbed into the body faster (Laghupaki). It may also get eliminated from the body faster and hence the span of action is more petite. Simhasyadi ghanavati showed better activity than the standard drug in reducing the paw volume, and the effect was late in onset but constant and long-lasting. It shows that it takes more time for its digestion and absorption because of its guru guna, but action is persistent and stable because of its sthiratva guna.

Here, this study was experimental, and rats were subjected to analysis; there were limitations in assessing the subjective parameters like pain. The Simhasyadi kashaya, as well as Simhasyadi ghanavati, were proved to be effective in reducing inflammation, so the drug also could have an action on pain which could not be assessed in this study. The drug action in Ayurveda is explained based on rasa, guna, virya, vipaka and prabhava. Properties of Simhasyadi Kashaya and Simhasyadi ghanavati are inferred from experiment that Kashaya, thikta rasa, laghu, ruksha guna, usna virya and katu vipaka.

The inflammation is characterised by a rise in temperature, dilating blood vessels, redness, and pain. Simhasyadi kashaya is a combination which acts on inflammation. Here, Guduchi acts directly on the temperature rise, and Vasa has a better action on dilatation of blood vessels and redness. At the same time, Brihati works on pain and swelling.

The drug Simhasyadi kashaya and ghanavati by its thikta, kashaya rasa, laghu, and ruksha guna acts as kaphahara and by its usna virya acts as vatahara. The thikta rasa also mitigates the associated pitta dosha [9]. Ruksha guna helps in the shoshana of dravatva [10,] and ushna virya, along with soshana of dravatva, normalizes vata gati. These all properties combine to aid in the inhibition of shotha.

CONCLUSION

By observing the pharmaceutical part, the preparation of Simhasyadi kashaya was comparatively easy. Preparation of Simhasyadi Ghana involves more time and cost of fuel. But it was observed that the Ghana satwa could be preserved for a more extended period (8 months) without adding any preservatives. This has a positive score from the pharmaceutical point of view. An experimental study reveals that the anti-inflammatory effect of Simhasyadi kashaya started faster than the standard drug, whereas ghanavati reduced the inflammation completely before that of the standard drug. The statistical analysis of the experimental study shows a highly significant action of ghanavati compared to kashaya in reducing inflammation. This shows a change in the form of medicine from kwatha to ghanavati adds the advantages of prolonged and sustained action.

REFERENCES

1. Sri Indradeva Tripathi - Chakra Datta of Sri Chakrapani data, Chaukhamba Sanskrit Sansthan, Varanasi; 1991, p. 352
2. Vaidya Yadavji Trikamji Acharya- Sushruta, Sushruta Samhita commentary of Dalhana (Sutra sthana 17/3); Chaukhamba Sanskrit Sansthan; Varanasi; 2009, p. 824
3. Vaidya Jadavaji Trikamji Acharya -Chakrapani Datta, Charaka Samhita of Agnivesha elaborated by Charaka and Dridhabala, with the Ayurveda- Dipika Commentary (Sutra sthana); Chaukhamba Surbharati Prakashan, Varanasi; 2009; p. 31
4. Harisadasiva Sastri Paradakara Bhisgacharya -Ashtanga Hridaya with commentary of Arunadatta (Sutra sthana 6/97), Chaukhamba Sanskrit Sansthan, Varanasi; 2010; p.756
5. Parashurama shastry vidyasagar- Sharangadhara. Sharangadhara Samhita with the commentaries of Adhamalla's Deepika and Kashiram's Gudartha Deepika; Varanasi: Chaukhamba Surbharati Prakashan; 1983; p.243
6. Parashurama shastry vidyasagar - Sharangadhara. Sharangadhara Samhita with the commentaries of Adhamalla's Deepika and Kashiram's Gudauta Deepika; Varanasi: Chaukhamba Surbharati Prakashan; 1983. p. 206.
7. Vaidya Yadavji trikamji Acharya- Sushruta Samhita of Sushruta Acharya with Nibandha Samgraha Commentary of Sri Dalhana Acharya; Chaukhamba Surbharati Prakashan; 2012; Sutra sthana 37, p. 162.
8. Lawranle D. R. and Bacharch A. L.-Paget G E and Barnes JM. Evaluation of drug activities, pharmacometrics eds. Vol. 1. Academic Press New York, 1964.p.321
9. Harisadasiva Sastri Paradakara Bhisgacharya- Ashtanga Hridayam with commentary of Arunadatta (Sutra sthana); Chaukhamba Sanskrit Sansthan; Varanasi; 2010; p.32
10. Harisadasiva Sastri Paradakara Bhisgacharya- Ashtanga Hridaya with commentary of Arunadatta (Sutra sthana); Chaukhamba Sanskrit Sansthan; Varanasi; 2010; p.32

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