10.5005/jp-journals-10056-0025

ORIGINAL ARTICLE

# A Preliminary Pharmaceutical and Physicochemical Study of *Kushmandakhanda Leha*

[1]Sharada N Chikurte, [2]Kinnari Mehta


## ABSTRACT

**Inroduction:** *Kushmanda (Benincasa hispida*) is a well-known plant in relation of its multipurpose use of different parts of the plant in Ayurvedic literature. The drug *Kushmandakhanda leha* is used by Acharya Vagbhatta and Acharya Govinddas for the treatment of *Amlapitta*. Many formulations of *Kushmanda* have been described by Acharyas.

**Aim:** To prepare *Kushmandakhanda leha* and to generate physicochemical profile of *Kushmandakhanda leha*.

**Materials and methods:** *Kushmandakhanda leha* is prepared from the reference of Rasa Ratna Samuchchaya. *Kushmanda swarasa* and *Avaleha* (from *swarasa*) were prepared. Organoleptic and physicochemical profile was generated.

**Results:** pH value is 6.5, specific gravity is 1.4992, ash value is 1.9%, water soluble solids is 89.81%, water insoluble solids is 18.11%, acidity is 0.31%, reducing sugar is 11.47%, and fat content is 6.51%.

**Conclusion:** The present study provides the detail of *Kushmandakhanda leha* preparation, its physicochemical characters which may help in laying down a standard protocol for further research works.


**Keywords:** *Amlapitta*, *Avaleha*, *Benincasa hispida*, Formulations, *Kushmandakhanda leha*, Physicochemical analysis.

**How to cite this article:** Chikurte SN, Mehta K. A Preliminary Pharmaceutical and Physicochemical Study of *Kushmandakhanda Leha*. Int J Educ Res Health Sci 2017;3(1):5-7.

**Source of support:** Nil

**Conflict of interest:** None

## INTRODUCTION

The drug *Kushmandakhanda leha* is one of the classical Ayurvedic medicines where *Kushmanda* [*Benincasa hispida* (BH) (Thunb.) Cong.] is used as a main ingredient. Acharya Charaka and Sushruta have described *Kushmanda* under Shakavarga.[1,2] Also, properties of *Kushmanda* have been described by Acharya Bhavmishra.[3] Ripe and unripe fruit has different properties and it acts differently on Dosha. It is summarized in Table 1. Bal Phala (unripe fruit) is used for Pitta shaman (neutralizing function of ≈ acid). *Kushmanda* is used in many forms. Different formulations of *Kushmanda* like *Kushmanda Avaleha*[4] is used in Raktapitta, Kshaya, Jvara, Shosha, Trishna, Bhrama, Shvasa, Kasa, Kshata, Urahasandhankrita, etc. *Kushmanda* rasayana[5] is used in Jvara, Shvasa, Kasa, Kshata, Urahasandhankrita, etc. *Kushmandakhanda*[6] and *Kushmandakhanda leha*[7] are used in *Amlapitta*. Here, for study *Kushmandakhanda leha* is prepared for *Amlapitta*.

*Amlapitta* is a very common disease, which is a burning problem of the society. Though the drugs of modern system pacify the symptoms to some extent, they will manifest a set of complications, whereas an Ayurvedic treatment can reach to root cause and pacify the problem (Balance of three elements, i.e., Vata, Pitta, Kapha) thoroughly.

[1]Professor and Head, [2]Assistant Professor

[1,2]Department of Rasashastra and Bhaishjya Kalpana, College of Ayurveda & Research Centre, Pune, Maharashtra, India

**Corresponding Author:** Sharada N Chikurte, Professor and Head, Department of Rasashastra and Bhaishjya Kalpana College of Ayurveda & Research Centre, Pune, Maharashtra India, e-mail: sharadabedade6656@gmail.com

## MATERIALS AND METHODS

Test drug *Kushmandakhanda leha* is a pure herbal formulation and consists of six drugs (Table 2). Reference was taken from Rasa Ratna Samuchchaya 18/211 from *Amlapittarogadhikar*. All drugs are very common in nature and easily available in the market. Drugs were procured from local market and *Kushmandakhanda leha* was prepared in departmental laboratory at Government Ayurvedic College, Nanded, Maharashtra, India.

### Pharmaceutical Procedure

It involves manufacturing of *Swarasa* and *Avaleha*.

**Table 1:** *Rasa*, *Guna*, *Virya*, *Vipaka*, *Doshghnata*, and *Karma* of *Kushmanda*

| *Property* | *Bhavprakash nighantu* |
|---|---|
| *Rasa* | *Vridhha – swadu* |
| *Guna* | *Bala* (unripe) – *Shita* |
| | *Vridhha* (ripe) – *Natihima, laghu* |
| *Virya* | *Bala* (unripe) – *Shita* |
| *Vipaka* | — |
| *Doshghnata* | *Bala* (unripe) – *Pitta nashak* |
| | *Madhyam – Kaphakaraka* |
| | *Vridhha* (ripe) – *Sarvadoshahara* |
| *Karma* | *Vridhha* (ripe) – *Deepan, Bastishudhhikara, Chetoroga, Hridya* |

**Table 2:** Formulation composition of *Kushmandakhanda leha*

| *Ingredients* | *Botanical name* | *Part used* | *Quantity* | | *Amount taken* |
|---|---|---|---|---|---|
| | | | *Classical* | *Conversion* | |
| *Kushmanda* juice | *Benniscasa hispida* Thunb | Fr. | 100 pala | 200 parts | 7 L |
| *Dhatri churna* | *Embilia officinalis* Gaertn | Fr. | 8 pala | 16 parts | 560 gm |
| *Guduchi churna* | *Tinospora cordifolia* Willd | Whole part | ½ pala | 1 part | 35 gm |
| Cow's milk | — | — | 100 pala | 200 parts | 7 L |
| Sugar candy | — | — | 8 pala | 16 parts | 560 gm |
| Cow *ghrita* | Clarified butter | — | — | — | 350 gm |

## Process of *Swarasa* Preparation

Fresh and green 10 kg of fruit *Kushmanda*, (total 3) were taken and cleaned with water. The outer hard pericarp was removed and inner white pulp was cut in small pieces and seeds were removed. Small pieces were crushed in mixer. Pulp was squeezed with clean cotton cloth and juice was obtained in clean stainless steel vessel. Total 7 L of juice was obtained from 10 kg of *Kushmanda*. Juice was light green in color.

## Process of *Avaleha* Preparation

Around 7 L of *Kushmanda swarasa* was shifted into a stainless steel vessel and 7 L of milk was added into it. It was continuously stirred and care was taken so that milk could not get spoiled. After attaining proper temperature, 560 gm sugar was added, then 350 gm of ghee was added. Heat was given till *Avaleha Siddhi Lakshanas* appear. After observing the classical characteristics of *Avaleha,* heating was stopped and *Praksepa Dravyas* (560 gm of *Aamalki* and 35 gm of *Guduchi*) were added at 70°C. The temperature was maintained in between 95 and 110°C during the procedure of *Avaleha Paka* and it took 9 hours to complete the process.

Around 3.5 kg of *Kushmandakhanda leha* was obtained after completing the procedure (Table 3).

## Analytical Study

*Kushmandakhanda leha* was subjected to organoleptic and physicochemical studies to develop analytical profile. The following parameters were carried out in this phase:

- Organoleptic characteristics: Color, odor, touch, taste, and form (Table 4)

**Table 3:** Practical details of *Kushmandakhanda leha*

| *Parameters* | *Observations* |
|---|---|
| *Kushmanda swarasa* | 7 L |
| Temperature (when milk added in Juice) | 60°C |
| Total duration for *paka* | 9 hours |
| Temperature maintained | 95–110°C |
| Temperature (for adding *Prakshepa dravya*) | 70°C |
| Yield | 3.5 kg |

**Table 4:** Organoleptic characteristics of *Kushmandakhanda leha*

| *Parameters* | *Observations* |
|---|---|
| *Rupa* (Form) | Semi solid fruit jam like structure |
| *Rasa* (Taste) | Sweetish with slight sour taste |
| *Varna* (Color) | Blackish brown |
| *Sparsh* (Touch) | Soft |
| *Gandha* (Odor) | Sweetish |

**Table 5:** Physicochemical analysis of *Kushmandakhanda leha*

| *Parameters* | *Observations* |
|---|---|
| pH | 6.5 |
| Specific gravity | 1.4992 |
| Ash value | 1.9% |
| Soluble solid | 81.89% |
| Insoluble solid | 18.11% |
| Acidity | 0.31% |
| Reducing sugar | 11.47% |
| Fat | 6.51% |

- Physicochemical analysis: pH value,[8] specific gravity, ash value,[9] water soluble solids, water insoluble solids, acidity, reducing sugar, fat content. Details are given in Table 5.

## OBSERVATION AND DISCUSSION

In Ayurveda, basically, there are two types of formulations, i.e., primary formulations and secondary formulations. *Avaleha* Kalpana is considered a secondary formulation. It is a preparation, which is prepared by reboiling of the Kwatha (decoction), etc., until it becomes semisolid. It includes the ingredients like *Churnas* (powders), Kalka (soft paste), sugar, jaggery, honey, ghee, taila (oil), honey, etc., as per the need of condition of diseases and patients. Honey should be added after self-cooling of the preparation. The *Avaleha* may be of two types based on the use of liquids. It includes both fatty and nonfatty substances. The fats like ghee, sesame oil, castor oil, etc., have been used depending on the Dosha involved.[10]

*Kushmanda* is widely used for the treatment of *Amlapitta*, here, unripe fruit was used for the study as it is Pitta Shamaka. Also supported by recent studies,

extracts of BH prevent development of experimental ulcers: Study showed extracts of BH may be a natural drug with antiulcer activity. And, study results were comparable with the omeprazole treated group. Study suggests that BH possesses significant antiulcer and antioxidant property.[11]

Constant observation and continuous stirring are essential in obtaining a good quality of *Swarasa* and *Avaleha*. For the preparation of *Kushmanda swarasa*, outer layer of *Kushmanda* was removed, which weighed about 1.7 kg. Seeds were about 200 gm in weight. The inner part of *Kushmanda* was very soft and easily churned in mixer. Juice was sticky in nature. For the preparation of *Avaleha*, milk was added in *Swarasa* after getting it hot and came at temperature of 60°C. By this procedure, milk doesn't get spoiled. Here, ghee is not mentioned in the reference, but to avoid sticking and smoothing of *Avaleha*, ghee was added. It also helps in disease Amalapitta. Ghirta should be added at initial and hot stage which leads to melting of Ghirta and uniform mixing. Description of *Kushmanda* and its properties has been described by our Samhitas. Unripe *Kushmanda* is pitta nashak, half ripe is kaphakarak, whereas ripen is laghu, ushna, kshar, deepan, and bastishodhak.[12]

## CONCLUSION

*Kushmanda* [*Benincasa hispida* (Thunb) Cong] is a well-known plant having different property as it grows. Many formulations are being prepared and used in different diseases. *Kushmandakhanda leha* is used in *Amlapitta* and mentioned in Rasa Ratna Samuchchaya. Milk should be used in warm condition in *swarasa* to overcome of spoiling. In the study, ghee is added for nonsticking and smoothing of *Avaleha*. Analytical profile has been generated. This study may be used as a reference standard in the further quality control researches.

## REFERENCES

1. Datta, C. Charak Samhita of Charaka with Ayurveddipika Commentary, Sutrasthana 27/113, New Delhi: Rashtriya Sanskrit Sansthana; 2006. p. 159
2. Shastri, A. Sushrut Samhita of Maharshi Sushruta with Ayurveda Tatva Sandipika Hindi Commentary, Sutrasthana, 46/211, Varanasi: Chaukhamba Sanskrit Sansthan; 2007. p. 202.
3. Pandey, R. Bhavprakash Nighantu of Bhavmishra, Shloka no 55, Varanasi: Chaukhamba Sanskrit Sansthan; p. 267
4. Shrivastava, S. Sharangdhar Samhita of Acharya Sharangdhara, Madhyamkhanda 8/22-28, 2nd edn., Varanasi: Chaukhamba Orientalia; p. 211.
5. Kunte AM et al. Astanga Hridaya of Vagbhatta with commentaries of Arundatta and Hemadri, Chikitsasthana 3/114-117, 9th edn., Varanasi:Chaukhamba Orientalia; 2005; p. 596.
6. Mishra S, Bhaishjya Ratnavali of Govinddas, Amlapittarogadhikar, 56/131-133, Chaukhambha Surbharti Prakashan; p. 912.
7. Shastri A, Rasa Ratna Samuchhaya of Acharya Vagbhata, Uttarardha 18/210-211. Varanasi: Chaukhamba Amarbharti Prakashana; p. 367.
8. Anonymous. The Ayurvedic Pharmacopoeia of India, Reprinted 1st edn., Govt. of India: Ministry of Health and Family Welfare; Part 1, Vol. I, 2001: Appendix 3, (3.3, 3.7), p. 230, 236.
9. Anonymous. The Ayurvedic Pharmacopoeia of India, Reprinted 1st edn., Govt. of India: Ministry of Health and Family Welfare; Part 1, Vol. I, 2001: Appendix 2, (2.2.3, 2.2.7, 2.2.15), p. 213, 147, 220.
10. Baragi PC et al. Neutraceuticals in Ayurveda with special reference to Avaleha Kalpana., Ancient Science of Life 2008;28(2): p. 29-32.
11. Benincasa hispida – "Brihatphala": A Review. [Internet] [cited on 2016 December 21]. Available from: http://www.articlesbase.com/alternative-medicine-articles/benincasa-hispida-brihatphala-a-review-4478776.html#.
12. Shastri A, Sushrut Samhita of Maharshi Sushruta with Ayurveda Tatva Sandipika Hindi Commentary Commentary, Sutrasthana, 46/211-214. Varanasi: Chaukhamba Sanskrit Sansthan; 2007. p. 202.