

# Preparation and Physico-Chemical Analysis of *Madanphala Valkal Lepa Churna*

Vikash Sharma, Savita Shivappa Angadi\*

Department of Shalaky Tantra, Shri BMK Ayurveda Mahavidyalaya Postgraduate Studies and Research Centre, (A Constituent Unit of KLE Academy of Higher Education and Research Centre, Deemed to be University), Belagavi, Karnataka, INDIA.

## ABSTRACT

**Background:** *Lepa Kalpana* is an important treatment modality in *Ayurveda*. It is a semi-solid medicament or paste used for topical application. *Lepas* have been used for various ailments of skin, hair, and overall beautification since ancient times. **Objectives:** The preparation of *Madanphala Valkal Lepa Churna*, as described in *Vrinda Madhava*, is intended for treatment of *Darunaka*, which is mentioned in the context of *Kshudra Roga*. This formulation is analysed for its organoleptic and physicochemical properties. **Materials and Methods:** This formulation follows the traditional method of preparing *lepa*. The dried herbal powder was obtained from a GMP-certified pharmacy, sieved, and analysed for its organoleptic and physicochemical properties. These properties were found to be stable and met the necessary criteria for medicinal use. **Results:** In order to establish its applicability as an anti-dandruff *lepa* and drug is also subjected for finding organoleptic and physicochemical properties of *Madanphala Valkal* (pericarp) *Lepa Churna*. **Conclusion:** *Madanphala Valkal* (Pericarp) *Lepa Churna* is prepared after following classical SOP for *lepa* with its analysis.

**Keywords:** Anti-Dandruff, *Darunaka*, *Lepa*, *Madanphala Valkal Churna*.

## Correspondence:

**Dr. Savita Shivappa Angadi**

Professor and HOD, Department of Shalaky Tantra, Shri BMK Ayurveda Mahavidyalaya Postgraduate Studies and Research Centre, (A Constituent unit of KLE Academy of Higher Education and Research Centre, Deemed to be University), Belagavi, Karnataka, INDIA.  
Email: savitaangadi484@gmail.com

**Received:** 24-07-2025;

**Revised:** 12-09-2025;

**Accepted:** 03-11-2025.

## INTRODUCTION

In Contemporary science, various anti-pityriasis formulations, such as 2% ketoconazole, salicylic acid, sulphur suspension creams, gels and emulsions are used. However, these treatments are associated with several side effects, including hair loss, paraesthesia, rashes, and gynecomastia.<sup>[1]</sup> In contrast, Ayurvedic medicines generally have minimal side effects or no side effects. Topical applications play a crucial role in *Ayurvedic* therapeutics, as highlighted in classical texts. When *Ardra* or *Suskha Dravya* are thoroughly ground with water to form a semi-solid medicament or paste for topical use, it is referred to as *lepa*.<sup>[2]</sup> *Lepa* is a *Bahirparimarjana chikitsa*, which helps alleviate localized imbalances of *Dosha*, and *Dhushya*. From a pharmaceutical perspective, *lepa kalpana* is considered a type of *Kalka Kalpana*.<sup>[3]</sup> Several types of *lepas* are mentioned in *Ayurveda* for treating *Darunaka*,<sup>[4]</sup> among which the *Madanphala valkal lepa* is described by *Acharya Vrinda Madhava* in the context of *Kshudra Roga*.<sup>[5]</sup> *Madanphala* fruit is either globose or broadly ovoid. Its pulp possesses anthelmintic properties and has been

used as a folklore remedy for abortifacient effects.<sup>[6]</sup> *Madanphala valkal lepa* follows traditional methods of *lepa* preparation, and its unique physical and chemical properties make it an effective anti-dandruff treatment.

## MATERIALS AND METHODS

### Sample collection

The *Madanphala Valkal Lepa* is made using a single ingredient, *Madanphala Valkal*. The raw material was obtained from KLE Ayurveda Pharmacy, a GMP-certified unit located in Khasbag, Belagavi, Karnataka (Table 1).

### Authentification of raw Drug

*Madanphala valkal* was verified at the ASU Drug Testing Laboratory, a part of the Central Research Facility (CRF) at Shri B.M.K Ayurveda Mahavidyalaya, Belagavi, Karnataka.

### Preparation of Drug

The process starts with the collection of *Madanphala*, which is then dried under sunlight. The *Valkal* is extracted and subsequently dried in a herbal medicine dryer for 1 hr to decrease its moisture content. Finally, the dried material is processed in a pulveriser, where it is ground into a fine powder with an 80 mesh size (Table 2).



DOI: 10.5530/pres.20262218

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**Table 1: Madanphala valkal churna contents.**

Sanskrit name	Latin name	Family	Part	Rasa	Guna	Veerya	Vipaka	Karma
<i>Madanphala</i>	Randia Dumetorm Lam	Rubiaceae	<i>Phala</i> <i>Valkal</i> (pericarp)	<i>Madhur,</i> <i>Tikta</i>	<i>Lagh,</i> <i>Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Lekhniye,</i> <i>Kusthagna,</i> <i>Sothahara</i>

## Pharmaceutical Study

A range of physico-chemical properties, such as colour, odour, taste, foreign matter, ash value, acid insoluble ash, water-soluble extractive, and alcohol-soluble extractive were analyzed. The results are presented in Tables 3 and 4.

## Description Microscopic

The transverse section of the fruit reveals an epicarp consisting of a single-layered epidermis, which is sometimes indistinct. The mesocarp is made up of thin-walled parenchymatous cells, some of which contain a reddish-brown substance. Several vascular bundles are embedded within this layer. The endocarp is stony and composed of light yellow polygonal, sclerenchymatous cells of varying shapes and sizes.<sup>[7]</sup>

## Chemical constituents

### Triterpene saponins

Two new triterpene saponins were isolated from the fruits of the plants. These were characterized as: 3-O-[B-D-glucosyl (1-4)-B-D-glucosyl (1-3)-B-D-glucuronosyl] oleanolic acid.

3-O-[B-D-glucosyl (1-6)-B-D-glucosyl (1-6)-B-D-glucosyl (1-3)-B-D-glucosyl (1-3) -B-D-glucuronosyl] oleanolic acid. These compound are complex sugars (glycosides) attached to an oleanolic acid, a common triterpene compound, which may play a role in the plant's biological activity.<sup>[8]</sup>

Fruits and seeds contain citric and tartaric acids, along with compounds such as randianin (a saponin), randia acid, ursosaponin, and duncoronins A, B, C, D, and F. Additionally, they include randoside A and various fatty acids, including arachidic, lignoceric, linoleic, oleic, palmitic, and stearic acids.<sup>[6]</sup> According to API, dried fruit is recommended for treating chlorosis, the common cold rhinitis, and persistent skin disease. The therapeutic activity of the fruit is primarily attributed to its saponin content, which constitutes about 2-3% in fresh fruits and increase to approximately 10% in dried whole fruits. These saponins are predominantly concentrated in the pulp. A mixture of two saponins, identified as randialic (neutralsaponin), and randialic acid (acidic saponin), has been isolated from the pulp. Upon complete hydrolysis, both saponins yield oleanolic acid as their sapogenin. Ursosaponin, extracted from the ethanolic extract of dried whole fruit, produces ursolic acid and glucose. Additionally, randianin, isolated from the fruit, has been identified as a haemolytic triterpenoid saponin.<sup>[9]</sup>

**Table 2: Preparation of drug.**

Steps	Description
Collection of Raw ingredients	<i>Ripe Madanphala</i> was collected from a natural source and dried under sunlight.
Extraction of <i>valkal</i> (pericarp)	Manually, <i>Valkal</i> (pericarp) separation was done from seed of <i>Madanphala</i> .
Herbal drier machine	Dried in a herbal medicine drier for 1 hr in order to reduce its moisture content ensuring better preservation.
Grinding into coarse powder	Dried material was ground into a coarse powder of 80 mesh size.

## Storage and packaging

The polyethylene Pouches used for storing *Churna* should be transparent and completely free from moisture. Dried in a herbal medicine drier for 1 hr in order to reduce its moisture content ensuring better preservation.

According to the Drug and Cosmetics Act, shelf life of *Churna* is two years.<sup>[10]</sup> Each pouch should contain 20 g of *Churna* and be securely sealed.

It should be stored in a cool, dry place, away from direct sunlight, as excessive heat and moisture can cause oxidation and shorten the shelf life of the product.

## RESULTS

*Madanphala valkal churna* was evaluated, and the analysis showed that the *Churna* is brown in colour, with the characteristic taste and odour of *Madanphala valkal* mentioned in Table 3. The Physiochemical standards of *Madanphala valkal* are provided in the Table 4. The total ash value, which indicates the amount of minerals and earthy materials present in the raw material, was found to be 4.915% w/w. The acid-insoluble ash content in the plant material was 4.021% w/w. Extractive values give insight into the quantity of chemical constituents present in the drug. The water-soluble extractive content was measured at 18.370% w/w, indicating the amount of soluble material in water. The alcohol-soluble extractive value, reflecting the presence of polar constituents, was recorded at 7.882% w/w.

**Table 3: Description Macroscopic.**

Tests	Results
Part	Fruit Pericarp
Colour	Brown
Taste	Characteristic
Odour	Characteristic

**Table 4: Physico-chemical Standards.**

Tests	Results
Foreign Matter	Nil
Ash Value	4.915%
Acid Insoluble Ash	4.021%
Water Soluble Extractive	18.370%
Alcohol Soluble Extractive	7.882%

## DISCUSSION

*Madanphala* fruit has Oleanolic acid which possesses hepatoprotective activity, antiinflammatory potential, antioxidant activity, antibacterial and antimicrobial properties,<sup>[11]</sup> which may enhance its effectiveness in treating dandruff. Palmitic acid and stearic acid are saturated fatty acid which may work as emollient. *Madanphala* also have analgesics, free radical scavenging activity, anti-allergic, and antifungal properties.<sup>[12]</sup> Antifungal property of *Madanphala* may aid in treating dandruff, as dandruff is often caused by a fungal infection (*Malessezia furfur*).<sup>[13]</sup> It is characterized by both *Madhur*, and *Tikta* rasa and is valued for its carminative, purgative, aphrodisiac, emetic, and antipyretic properties. It is traditionally used to treat abscesses, ulcers, inflammation, wounds, tumors, and various skin diseases.<sup>[6]</sup> *Madanphala* has *Ushna Virya* and *Katu Vipaka* by virtue of it, *Madanphala* possesses *Vata* and *Kaphahara* properties,<sup>[7]</sup> which assist in reversing the *samaprapti* of *Darunaka*, as *Darunaka* also originates from the vitiation of *Vata* and *Kapha*.

### Points to note during preparation

1. During raw material collection, it is essential to carefully remove any foreign matter before preparing the coarse powder.
2. Maintaining proper hygiene is crucial throughout the process.
3. The raw material should be thoroughly dried, as moisture can lead to fungal growth and oxidation, ultimately reducing the shelf life of *churna*.
4. A mask should be worn while separating the *valkal* from *Madanphala*, as it is having unpleasant odour.

## CONCLUSION

*Madanphala valkal churna lepa* is a good quality monoherbal formulation. The preparation of *Madanphala valkal churna lepa* was carried out following the step-by-step method described in classical texts. Its organoleptic and physiochemical properties were stable and met the criteria for medicinal use. Its chemical constituent like Oleanolic acid which possesses hepatoprotective activity, antiinflammatory potential, antioxidant activity, antibacterial properties, and antimicrobial which may enhance its effectiveness in treating dandruff. Moreover, *Madanphala* has antifungal properties which may help in treating the dandruff, as dandruff also occurs due to fungal infection (*Malessezia furfur*). Microbial limit test can be further scope of study.

## ACKNOWLEDGEMENT

The botanical verification of *Madanphala valkal* was conducted by Dr Divya Khare, an authentication expert at the Central Research Facility Shri B.M.K Ayurveda Mahavidyalaya, Belagavi, Karnataka.

## AUTHOR CONTRIBUTION

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work. All the authors are eligible to be an author as per the international committee of medical journal editors (ICMJE) requirements/guidelines.

## CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

## ABBREVIATIONS

**API:** Ayurvedic Pharmacopoeia of India.

## SUMMARY

*Madanphala valkal lepa churna* has undergone physicochemical analysis and has been found suitable for medicinal use, specifically in the treatment of dandruff.

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**Cite this article:** Sharma V, Angadi SS. Preparation and Physico-Chemical Analysis of *Madanphala Valkal Lepa Churna*. *Pharmacog Res*. 2026;18(1):149-52.