# Formulation of Cracked Heel Repair Madanalepa Cream from Madanaphala (*Randia spinosa*) Extract

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**Abstract: Cracked heels, or heel fissures, also referred as *padadari* in *ayurveda* are common foot issues that can lead to discomfort and pain. Inadequate moisture is typically the root cause of heel fissures. These fissures can develop into painful wounds and may even result in bleeding. In treating cracked heels, herbal agents are favored over chemical ones due to their lower toxicity, greater bio-compatibility, reduced adverse effects, cost-effectiveness, and wide availability. Numerous remedies are mentioned in ayurveda. External application of *madanaphala (Randia spinosa)* is effective in this. In this study we tried to formulate a ready to use cream from *madanaphala (Randia spinosa)* extract.**

**Keywords: Cracked heel repair, Heel fissures, *Madanaphala* extract, *Padadari, Randia spinosa.***

## I.INTRODUCTION

A common aesthetic concern that affects both men and women is the presence of cracked feet. Cracked feet are characterized by dry, rough skin, hardness on the heel's outer edge, and the presence of cracks or fissures. As per *Ayurveda*, these symptoms can be correlated with Padadari, described under *Kshudra roga* (minor diseases by *Sushruta*, *Madhava Nidana*, *Bhavaprakasha,* and *Yogaratnakara*)(1). The primary clinical characteristics of *Padadari*, or cracked foot, include the presence of cracks on the feet (*Padayo dari*), pain (*Saruja*), and roughness and dryness (*Rukṣata*)(2).

The onset of cracked heels is marked by the formation of a callus, characterized by dry and thickened skin around the periphery of the heel. This callus can exhibit discoloration, typically in shades of yellow or dark brown, and initially presents small fissures. The increased pressure on the subcutaneous fat pad beneath the heel causes lateral expansion of the callus, resulting in fissuring. Without intervention, these fissures may progress in depth, leading to discomfort during ambulation and, in severe cases, potential bleeding(3).

In the context of Ayurvedic treatment for *Padadari*, the recommended approach involves specific procedures. This includes venous puncture (*Siravedha*) in the feet and the application of fomentations and unguents to the affected region. Moreover, Ayurvedic practice suggests the use of an ointment mixture comprising ingredients such as wax (*Madhucchishta*), lard (*Vasa*), marrow (*Majja*), resin obtained from Shorea robusta (*Sarja Rasa*), clarified butter, an alkaline formulation derived from ash of Hordeum vulgare (*Yavakshara*), and red ochre (*Gairika*) for plastering the affected part(4,5).

In the book *Basavarajeeyam*, the formulation *Madanadi Lepa* is advised for the treatment of *Padadari* (cracked foot). It is composed of the following ingredients: *Madanaphala (Randia spinosa)*, *Saindhava lavana* (rock salt), *Guggulu (Commiphora mukul)*, *Gairika* (Red ochre), *Ghrita* (clarified butter), *Madhu* (honey), and *Ushira*

*(Vetiveria zizanioides)*. *Madanaphala* has anti-inflammatory (*Shophahara*), analgesic (*Rujahara*), wound healing (*Vranaropaka*) properties(6). The application of *madamaphala* paste with ghee is also beneficial for cracked feet. But making the paste every time can be quite a tedious task hence in this study, we tried to formulate a cream from an extract of *madanaphala*.

## II.MATERIALS AND METHODS

Requirements:

*Randia spinosa* aqueous extract, Aloe vera, Turmeric, Kokum oil, Castor oil, Coconut oil, Beeswax, Borax, Stearic acid etc.

Extraction of aqueous extract of *Randia spinosa:*

Fruits of *Randia spinosa* were collected, dried, and after removing seeds converted into coarse powder. The extract is prepared using distilled water as a solvent with the Soxhlet extraction method.

Preparation of *Madanalepa* crack heel repair cream:

The composition of a formulation is shown in the table below.

Table 1- Composition of formulation (quantities for 5gm)

| Sr No | Ingredients | Composition |
|---|---|---|
| 1 | *Randia spinosa* Extract | 1000 mg |
| 2 | Aloe vera | 150 mg |
| 3 | Turmeric | 150 mg |
| 4 | Kokum Oil | 500 mg |
| 5 | Castor Oil | 400 mg |
| 6 | Coconut Oil | 400 mg |
| 7 | Bees Wax | 500 mg |
| 8 | Borax | 25 mg |
| 9 | Stearic Acid | QS |

Cream formulations are classified as emulsions. The method entails the separate preparation of constituents from the oil and aqueous phases. These elements are subjected to heat to induce liquefaction and dissolution, after which they are amalgamated with uninterrupted stirring until the cream is synthesized. Subsequently, the mixture is allowed to undergo the cooling process.

Beeswax and borax melted in a beaker. The temperature of the oil phase (Kokum oil, Castor oil, coconut oil) was maintained between 65-70 °C.

In another beaker, *Randia spinosa* extract, aloe vera, turmeric, and stearic acid were taken. A small quantity of water was added to dissolve the ingredients.

The oil phase was slowly added to the Aqueous phase with continuous stirring.

The emulsion was cooled to make a semisolid cream base. pH of cream kept between 4.5-7.

Standardization:

Spreadability: Sample spreadability was assessed as follows: 0.5 g of crack cream formulation was placed in a 1 cm diameter circle on a glass slide. A second glass plate was then added, with a 500 g weight on top, for 5 minutes. Spreadability measures the area covered by the cream after uniform distribution on the slide, and the increase in diameter was recorded. This process was repeated three times, and an average was calculated.

Washability: A small amount of cream was applied and washed under running water

Viscosity: Viscosity studies were performed using a Brookfield Synchro-Lectric Viscometer with a helipath stand. A 10 g sample was equilibrated for 5 minutes before measuring readings at speeds of 10, 20, 30, 50, 60, and 100 rpm. The corresponding viscometer readings were noted and the spindle speed successively lowered. These measurements were carried out three times at room temperature. Viscosity in centipoise (cps) was determined by multiplying the readings with factors from the Brookfield viscometer catalog, and the average of three triplicates was computed.

pH of the cream: The pH of the 10% w/v cream suspension was measured at 25 °C with a pH meter. The pH meter was calibrated using pH 4.0 and 7.0 standard buffers prior to the measurement, and the average of three measurements was calculated.

Test for thermal stability: The cream was deposited into a glass container, occupying 2/3 of its volume, and hermetically sealed. Subsequently, the container was subjected to incubation at a controlled temperature of

4°C for 48 hours. The test was deemed successful when, upon extraction from the incubation environment, there was an absence of phase separation.

Phase Separation: A 10 mg sample of the cream was put on a watch glass. A 100 ml beaker was filled with water and placed inside a desiccator to reach saturation. The watch glass with the cream was introduced into the desiccator and left for 24 hours.

## III.RESULTS

Evaluation of Cream

Table 2: Results of Stability tests

| Sr No. | Parameters | Results |
|---|---|---|
| 1 | Spreadability | Formulation greater spreadability as per standerd |
| 2 | Washability | Easily washable with water |
| 3 | Viscosity | showed pseudoplastic flow |
| 4 | pH of the cream | 7.18±0.185 to7.32±0.244 |
| 5 | Test for thermal stability | Stable, no oil separation was observed |
| 6 | Phase separation | no phase separation was observed |

## IV.DISCUSSION

Ayurveda has great potential for the treatment of different diseases. It also has answers to many common cosmetic problems like a cracked foot. Different External applications (*lepa)* are mentioned in the classics. The application of *Madanaphala (Randia spinosa*) paste is a simple and effective remedy but making the paste every time can be quite a tedious task. This formulation is not available in the market. Cream was prepared using general guidelines for the preparation of cream using an extract of *Madanaphala (Randia spinosa*). It was subjected to various assessment parameters and the findings obtained were within the limits.

*Madanaphala* is having anti-inflammatory (*Shophahara*), analgenic (*Rujahara*), wound healing (*Vranaropaka*) anti-bacterial and antifungal properties(7,8). Turmeric possesses anti-inflammatory and antiseptic characteristics. A blend of castor oil and turmeric powder is employed for the healing of fissures(8,9). Aloe vera's moisturizing effect, fuelled by its vitamins, minerals, and powerful antioxidants, is a key treatment for dry skin. Topical aloe vera gel application boosts collagen synthesis, aiding in cracked skin healing(10). Kokum oil is also traditionally used for cracked heels. It is an exceptional antiaging agent with rich source of vitamin E and antioxidants(11). Castor oil and coconut oil also shows antiaging, skin tonic, antioxidant activities. Bees wax is clinically effective in anal fissures and cracked heels(12). All ingredients from the formulation having antioxidant, wound healing and haemostatic properties. The formulation needs to confirm its efficacy through preclinical and clinical trials.

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## REFERENCES

[1] CCRAS, NIIMH. Internet. 2010. e-Samhita-sushruta-National Institute of Indian Medical Heritage. Available from: https://niimh.nic.in/ebooks/esushruta/?mod=read

[2] C E R, Vivek P, Kumar N. M. An Ayurvedic approach on Pādadāri (Cracked foot). International Research Journal of Ayurveda & Yoga. 2023;06(06).

[3] Wadekar puja, Potnis vaishali. A Review on Heel Fissures and its Management. International Journal of Research in Engineering, Science and Management. 2021;4(2).

[4] Gupta S, Acharya R. Management of Padadari (cracked feet) with Rakta Snuhi (Euphorbia caducifolia Haines.) based formulation: An open-labeled clinical study. AYU (An international quarterly journal of research in Ayurveda). 2018;39(4).

[5] Prakashrao DrPS, Raju DrMDP, Yakkundi DrRC, Pachchinavar DrKH, Mohan DrGV. Efficacy Of Ghrita Yavakshara Lepa& Sarjadi LepaFollowedby SiravyadhaIn The Management Of Padadari –A ClinicoComparative Study. International Research Journal of Ayurveda & Yoga. 2020;03(08).

[6] K R V, Sridurga C. EFFECT OF MADANADI LEPA ON VIPADIKA-A CASE STUDY.

Available from: https://doi.org/10.46607/iamj3910122022

[7] Garg AK, Chouhan P. Madanaphala (randia dumetorum): a pharmacological and pharmacognostical review. International Journal of Recent Scientific …. 2019.

[8] CCRAS, NIIMH. Internet. 2012 [cited 2023 May 1]. e- Nighantu. Available from: https://niimh.nic.in/ebooks/e-Nighantu/?mod=read

[9] Chandramouleeswaran. FOOT CARE THROUGH AYURVEDA. Int J Res Ayurveda Pharm [Internet]. 2011;2(6):1635–6. Available from: www.ijrap.net

[10] Surjushe A, Vasani R, Saple D. Aloe vera: A short review. Vol. 53, Indian Journal of Dermatology. 2008.

[11] Mohammed F, Joshi SV, Tantrady SB. Clinical efficacy of Vrukshamla Beeja Taila (Kokum Butter) in the Management of Padadari (Cracked Heels). Journal of Ayurveda Medical Sciences. 2017;2(2).

[12] Fratini F, Cilia G, Turchi B, Felicioli A. Beeswax: A minireview of its antimicrobial activity and its application in medicine. Vol. 9, Asian Pacific Journal of Tropical Medicine. 2016.