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Formulation And Evaluation Of Topical Antimicrobial Herbal Ointment

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Abstract:

Throughout history, medicinal compounds have been derived from plants, playing a crucial role in the treatment of various ailments in both humans and animals. In addition to other dosage form herbal drugs can be formulated into ointments. An ointment is a viscous, semisolid preparation designed for topical application on various body surfaces. The present study objective is development and evaluation of wound healing activity of a developed polyherbal ointment formulation, incorporating extracts of turmeric and aloe vera, along with other excipients. The prepared formulation evaluated for parameters like physical properties, pH, viscosity, spreadability, antimicrobial activity. The prepared formulation showed good spreadability, no evidence of phase separation and good consistency during study period.

Keywords: Herbal formulation, Anti-inflammatory, Aloe vera, Turmeric

Introduction

The herbal ointments refer a viscous semisolid preparation containing any plant's seeds, berries, roots, leaves, bark or flowers for the topical use on a variety of body surfaces. The most active compound of Turmeric is curcumin which has many scientifically proven health benefits, such as the potential to improve heart health and prevent against Alzheimer's and cancer. It's a potent anti-inflammatory and antioxidant. It may also help to improve the symptoms of depression and arthritis. When used on your skin, *Aloe vera* has shown to be safe. For sunburns, mild cases of frostbite, cold sores, and psoriasis, aloe may relieve some of your pain and promote healing. *Aloe vera* contains 75 potentially active constituents. It also contains vitamin B₁₂, folic acid, and choline.^[1]

An antimicrobial substance or compound that is applied to living tissue/skin to reduce the possibility of infection. Antibacterial activity is the ability of a substance to inhibit or kill bacterial cells. In an earlier study, medicinal plants have been reported to be very beneficial in wound care, promoting the rate of wound healing with minimal pain, discomfort, and scarring to the patient.^[4]

Along with other dosage forms, herbal drugs are also formulated in the form of ointment. An ointment is a viscous semisolid preparation used topically on a variety of body surfaces. These include the skin and the mucus membranes of an eye, vagina, anus, and nose. Ointments are used topically for several purposes, e.g. as protectants, antiseptics, emollients, antipruritic, keratolytic and astringents.^[8]

Application

- 1.Wound Healing & Skin Repair:** Helps in minor cuts, scrapes, burns.
- 2.Anti inflammatory & Pain Relief:** Reduces muscle pain and arthritis symptoms
- 3.Antimicrobial & Antifungal Protection:** Prevents infections in wounds and cuts
- 4.Moisturization & Skin Nourishment:** Hydrates dry, cracked or chapped skin
- 5.Acne & Skin Conditions:** Helps reduce acne, eczema, psoriasis

MATERIALS AND METHODS

Materials:

Turmeric, Aloe vera, Honey, Neem oil, Beeswax, Ceto stearyl alcohol, White soft paraffin, Tea tree oil, Methyl paraben, Rose oil, Triethanolamine, etc.



Method of Preparation:

1.Extraction of Turmeric: In 250 ml volumetric flask mix 1gm (5-7%) of turmeric powder with 10ml of distilled water that has been treated 5-10 min at 80-100°C in water bath. After filtering the turmeric extract is produced.



2. Extraction of aloe vera: Distilled water has been used to collect and wash mature, healthy and fresh aloe vera leaf. Then the outermost part of leaf was cut longitudinally with sterile knife after it had been properly dried in oven at high temperature. Then the aloe vera gel that is colorless parenchymatous tissue was removed using the sterile knife then to remove the fibers and impurities it is filtered through muslin cloth. Then the filtered product which is clear aloe vera gel was used in the preparation.



Procedure: Initially ointment base was prepared by weighing accurately. The fusion method is used for making ointment. Grated beeswax which was placed in evaporating dish in water bath. After melting of beeswax remaining ingredients were added and stirred gently to aid melting and mixing homogenously followed by cooling of ointment base. Herbal ointment was prepared by mixing accurately weighed neem oil, turmeric and aloe vera extract to the ointment base by levigation method to prepare smooth paste with 2 or 3 times its weight of base, gradually incorporating more bases until to form homogenous ointment. This homogenous ointment finally transferred in a suitable container. Store in an air-tight container and dark, cool place.



Sr. No.	Ingredients	Quantity
1	Turmeric	5 ml
2	Aloe vera gel	10 ml
3	Bees wax	10 gm
4	Ceto stearyl alcohol	8 gm
5	White Soft Paraffin	15 gm
6	Tea tree oil	1 ml
7	Neem oil	2 ml
8	Honey	2 ml
9	Methyl paraben	0.2 gm
10	Triethanolamine	1 ml
11	Rose oil	0.5 ml

Evaluation Parameters

1. Physical evaluation

This includes a visual inspection to assess the formulation's appearance, color, and odor. A meticulous scrutiny of these characteristics is essential to ensure not only the aesthetic appeal but also the overall quality of the formulation.

2. Determination of pH

The pH measurement was conducted utilizing a pH meter, which underwent calibration before each utilization with standard buffer solutions at pH 4, 7, and 9. The electrode was introduced into the sample 10 minutes prior to obtaining the reading at room temperature.

3. Spreadability

Spread ability is assessed by measuring the time, in seconds, it takes for two slides to slide off from the gel when positioned between them under a specific load. An excess of the sample was applied between two glass slides, and a predetermined weight was placed on these slides to compress them uniformly. A weight of 70 g was added, and the duration needed to separate the two slides was recorded. Spread ability was then calculated using the formula

$$S = m \times l/t,$$

where S represents spread ability, m is the weight attached to the upper slide, l denotes the length moved on the glass slide, and t represents the time taken.^[2]

4. Consistency: Smooth and no grittiness.

5. Homogeneity

All developed ointments were packed in containers and then tested for homogeneity by visual inspection.^[5]

6. Antimicrobial activity

The antimicrobial activities of both extracts were determined individually and as a combination in varying concentrations using the agar plate. The Minimum Inhibitory Concentrations (MIC) was determined by ditch method.^[6]

7. Phase separation

Ointment prepared in a sealed container was kept in a hot air oven at temperature of 100°C. Phase separation was then monitored for a period of 24 hours 30 days.^[9]

8. Irritancy test

The formulation was non-irritable & non allergic on the skin.

9. Washability

The formulation was easily removed from the skin by using water. ^[1]

10. Viscosity

Viscosity of cream was done by using Brooke field viscometer at a temperature of 25 °C using spindle No. 63 at 2.5RPM. According to the results all the three formulations showed adequate viscosity.^[10]



Antimicrobial Activity

Result and Discussion

Sr. No.	Evaluation Parameter	Observation
1	Color	Pale yellow
2	Odor	Pleasant
3	Consistency	Smooth
4	pH	6.5
5	Irritation	No
6	Washability	Washable
7	Homogeneity	Good
8	Phase separation	No
9	Spread ability	Easily Spreadable
10	Antimicrobial activity	Yes
11	Viscosity	24040cP

Conclusion:

In this study a formulation of herbal ointment was tested & evaluated in terms of their Organoleptic properties (appearance, color, odor) & Physiological parameters (PH, spread ability, washability, irritancy test). The results indicate the formulation met the requirements of the standards, which means they are chemically sound. This could make them potential topical antimicrobial agents effective in the treatment of skin infections.

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