



Formulation And Evaluation Of Antifungal Cream From Herbal Clove Oil

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ABSTRACT

The present study focuses on the formulation and evaluation of an antifungal topical cream incorporating clove oil, a natural extract known for its potent antimicrobial properties, particularly against fungal pathogens. Clove oil, rich in eugenol, was utilized as the primary active ingredient in various cream formulations using different concentrations. The creams were prepared using standard emulsification techniques and evaluated for physicochemical properties including pH, viscosity, spreadability, and stability. Antifungal efficacy was assessed through in vitro methods against common fungal strains such as *Candida albicans* and *Aspergillus niger* using the agar well diffusion method. Results indicated that the clove oil-based cream demonstrated significant antifungal activity, with higher concentrations showing improved zones of inhibition. The formulation also exhibited acceptable stability and dermatological properties, suggesting its potential as an effective, natural alternative to synthetic antifungal agents. This study highlights the therapeutic promise of herbal clove oil in developing safe and effective topical antifungal treatments.

Keyword: Antifungal, Clove oil, Fungal skin infection

1. INTRODUCTION

The concept of beauty and cosmetics is as ancient as mankind and civilization. Indian herb and its significance popular worldwide. An herbal cosmetic have growing demand in the World market and is an invaluable gift of nature. Herbal formulations always have attracted Considerable attention because of their good activity and comparatively lesser or nil side effects with synthetic drugs. Herbal cosmetics are defined as the beauty products which Possess desirable physiological activity such as healings smoothing appearance, enhancing And conditioning properties because of herbal ingredient. Now-a-

days the usefulness of herbs in the cosmeceutical production has been extensively increased in personal care system and There is a great demand for the herbal cosmetics, Cosmetics are the substances intended to be Applied to the human body for cleansing, beautifying, promoting attractiveness, and altering. The appearance without affecting the body's structure or functions. But the usage of synthetic Products becomes very harmful from long time for the youth as well as our environment. Various synthetic compounds, chemicals, dye and their derivative proved to cause various Skin diseases having numerous side effects. Thus we are using herbal cosmetics as much as Possible. The basic idea of skin care cosmetic lies deep in the Rig-Veda, Yajurveda, Ayurveda, Unani and Homeopathic system of medicine.

These are the products in which Herbs are used in crude or extract form. These herbs should have varieties of properties like Antioxidant, anti-inflammatory, antiseptic, emollient, an activity and antibacterial etc. seborrheic, antihemolytic types of skin ailments formulations like skin protective, sunscreen, antiacne, Antiwrinkle and antiaging are designed using varieties of materials, either natural or synthetic. Cream is a polyherbal formulation that consists of Clove oil. That herbs have been selected on. The basis of a traditional system and scientific justification with modern uses. Cream that can give effective protection to skin and free from any toxicity or toxic residue or any Irritation when regularly used and should also be cosmetically acceptable. Herbal medicine is one of the oldest and most universal system of health care system. The Advancement in the field of herbal drug delivery started recently with the aim to manage Human diseases efficiently. World Health Organization (WHO) estimates that 80% of the World populations presently use herbal medicine for primary health care Every nation is Seeking health care beyond the traditional boundaries of modern medicine turning to self Medication in the form of herbal remedies.

3. DRUG PROFILE:

Herbal Ingredients used:

3.1 Clove Oil

Introduction: Cloves are fragrant plants that belong to the Myrtaceae family. It is a member of the Eugenia genus. The largest genus in the Myrtaceae family is called Eugenium. Cloves are a species of the Eugenia genus that have exceptional economic importance. Cloves are known by the scientific name *Eugenia caryophyllus*. Traditional medicine, which relied on using herbal Medicines, continues to be crucial to the health care system. Due to the belief that natural medications from medicinal Plants have fewer adverse effects and greater efficacy than Their synthetic counter parts, these products have gained Increasing recognition in recent decades Currently, Traditional medicines represent the primary source of primary Health care for about 80% of the world's population. Numerous herbal plants have bactericidal, veridical and Fungicidal effects, they are employed in embalming and food Preservation, they also have anti-inflammatory, antibacterial, Sedative, analgesic and local anesthetic effects.



Fig No.1: Clove Oil

Common Name: Clove

Botanical Name: *Eugenia caryophyllus*

Local names: Lavanga, Devapuspa, Varala,

Harvesting:

Cloves are commercially harvested Primarily in India, Pakistan, Indonesia, Madagascar, Zanzibar, Sri Lanka and Tanzania. But, Indonesia and Madagascar are the main clove Buds oil producer.

4. MATERIAL AND EQUIPMENT

4.1 Material

Table No.1: Material used in Formulation

SR NO	INGREDIENT	ACTIVITY
1.	Liquid paraffin	Moisturizer
2.	Bees wax	Thickening Agent
3.	Methyl paraben	Preservative
4.	Rose water	Moisturizer
5.	Clove oil	Antifungal
6.	Borax	Stabilizer
7.	Distilled water	Solvent Base

4.2 Equipment

The following equipment was utilized during the formulation of herbal cream.

- Digital Weighing Balance-** Used for the precise measurement of ingredients such as bees wax, borax, and other herbal additives to ensure formulation accuracy.
- Beakers and Measuring Cylinders** - Employed to measure and hold liquid components such as rose water, liquid paraffin, and clove oil, water during the preparation process.
- Water Bath (Heating Apparatus)** - Utilized to gently melt the bees wax and warm extracts or oils, preserving the bioactive properties of sensitive ingredients such as borax and liquid paraffin.
- Stirring Rods and Spatulas** - Necessary for thorough mixing of the oil phase in aqueous phase by rapid mixing cool.

5. METHOD AND EVALUTION

5.1 Method:

Table No.2 Formulation table of antifungal cream

INGREDIENT	QUANTITY	ACTIVITY
Liquid paraffin	4.5gm	Moisturizer
Bees wax	1.5gm	Thickening Agent
Methyl paraben	0.1gm	Preservative
Rose water	6ml	Moisturizer
Clove oil	3ml	Antifungal
Borax	0.1g	Stabilizer
Distilled water	q.s	Solvent Base

5.1 : Collection of sample : Clove crude drug are purchased from the market.

6.2: Preparation of oil phase: All the ingredients like white beeswax, were Melted in a stainless steel container. To this Mixture liquid paraffin was added and allowed to Melt. The temperature was then kept between 65 to 70°C



Fig No.2: Oily Phase

5.3 : Preparation of Aqueous phase: Water was heated to 65 to 70°C. To this Aqueous medium pre weighed all the reagent like borax were added; Then the Temperature of the aqueous phase was maintained At 65 to 70°C



Fig No.3: Liquid Phase

5.4 : Process of cream formulation: Total Oil phase was then slowly pour into The aqueous phase at 65- 70°C and mixed for 10 to 15 Minutes. When the temperture of both the Medium were at the same temperature, the aqueous Phase was slowly added to the oil phase with Moderate agitation and was kept stirred until the Temperature dropped to 40°C. clove Oil was added to it. The o/w emulsion was then Cool down to room temperature to changed a thick Cream base. And immediately transfers in to a container, and Closed tightly.



Fig No .4 : Formulation of Antifungal Cream

5.2 EVALUATION:

1. Physical examination (Organolectic Properties): The prepared herbal antifungal creams were inspected visually for their colour, Appearance, odor, and consistency. The pH was Measured in each herbal antifungal cream, using a pH meter, which was procalibrated with standard buffer solutions at pil 4, 7.9. The pH meters electrode was inserted in to the cream 10 min before the reading at room temperature. The standard pH of a topical preparation should be within the pH range matching to the pH of the skin, namely, 4.5-6.5.



Fig.No 5. pH Test

2. Viscosity: The viscosity of formulated creams was Measured by Brook field ViscometerNDJ-SS using Spindle S 94 at varying speed and shear rates. The Measurements were done over the range of speed Setting from 0.15.0.25, 0.35, 0.45 and 0.55 rpm in 60s between two successive speeds as Equilibration with shear rate ranging from 0.25 5-1 To 1.05-1. Viscosity determinations were Performed at our room temperature.

3. Spredability: Spredability: property of a formulation was Calculated by an apparatus designed by Muttimer et Al.: it made of a wooden block, which was Connected by a pulley at a one end. A rectangular Shaped ground glass was set on this block. An Excess amount of cream (about 3-4 gm)

under Study was placed on this ground plate. The herbal Antifungal cream was then kept in between this Plate and a glass plate having the same dimension Of fixed ground plate and attached with the book. A Fixed 1 Kg load was placed on the upper of the Plates for about 4-5 minutes to expel all the Entrapped air and to provide a uniform film of the Cream between the plates. Excess of the cream was Scrapped off from the boundaries. The top plate Was then subjected to drag of 80 Gms. With the Help out of string attached to the hook and the time (in seconds) required by top plate to cover a Distance of 10 cm be noted. A less indicates better Spreadability. Spreadability measured In unit gm.cm/sec Spreadability of the cream may be determined by The following equation, $S = ML / T$ Where, L = length moved by glass slide T = Time in seconds M = Weight in pan & S = Spreadability



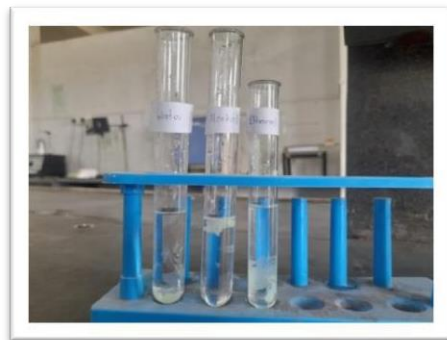
Fig No.6: Spreadability

4. Skin irritancy test: Skin irritancy is determined with that Herbal antifungal cream formulations do not affect The human skin cells or tissues. Irritancy may result In swelling, redness and inflammation on the Surface of skin when some particular creams are Applied without testing. Hence skin irritancy test Was carried out by marking an area on the left hand Dorsal surface. The cream was applied with a Spatula to that marked specified area and time was Noted. Irritancy, erythema, edema was checked for Regular intervals upto 24 hours. There was no Prominent irritation because of the applied herbal Antifungal cream hence it was safe to use.

5. Solubility Test: 1. Solubility in Water: Add a small amount of cream to a test tube. Add water and shake/stir thoroughly. Observation: Cream is insoluble in water and may float or form a separate layer due to the fat content.

2. Solubility in Ethanol: In a clean test tube, mix cream with ethanol. Stir or shake gently. Observation: Partial solubility; ethanol can dissolve some fat components, but not completely.

3. Solubility in Chloroform/Ether (Organic Solvent): Add cream to a test tube with chloroform or ether. Shake and observe.

**Fig No.7: Solubility****6. RESULT AND DISCUSSION**

Sr.No	Evalution parameters	F1	F2
1	Colour	White	White
2	Appearance	Smooth	Smooth
3	Odour	Pungent	Pleasant peppermint
4	Consistency	No phase separation	No phase separation
5	Viscosity	66440cps.	65740cps
6	Spreadability (gm.cm/sec)	14.23	18.00
7	PH	7.5	7.4
8	Extrudability	96.15 %	89.50 %
9	Skin irritancy test	No Irritancy, erythema ,edema.	No Irritancy, erythema ,edema.

6.1 Discussion :

The formulation of an antifungal cream using clove oil aimed to harness the natural antifungal properties of *Syzygium aromaticum*, primarily due to its high eugenol content. During the formulation process, various concentrations of clove oil were incorporated into an oil-in-water (O/W) cream base to identify the optimum balance between efficacy, stability, and user acceptability. The physical evaluation of the cream showed satisfactory characteristics, including smooth texture, good spreadability, and a pH compatible with skin (between 5.5 and 6.5). These properties are essential for consumer acceptance and effective topical application. No phase separation or color changes were observed over the storage period, indicating good stability.

7. Conclusion:

The use of herbal bioactive ingredients in Cream (cosmetic) influence biological functions of Skins and provide nutrients necessary for the Healthy skin aginst antifungal infection. The Prepared formulation

(F2) showed good spread Ability, no evidence of phase separation and good Consistenscy during the staly period. Stability Parameters like visual appearance, nature but it had A drawback by first formulation (F1) the smell wan Unpleasant as garlic oil was used which gives a Very strong unpleasant smell So we prepared Another formulation (F2) to mask this unpleasant Smell in the second formulation peppermint oil Was used to enhance the preparation and mask the Odour of clove which was also acting as a tertiary Antifungal agent here. The formulation and evaluation of an antifungal cream containing clove oil show promising results in combating fungal infections. Clove oil, with its potent antimicrobial properties, has been effectively incorporated into the cream formulation, demonstrating significant antifungal activity. The cream was found to be both stable and effective, with clove oil acting as a natural and safe alternative to synthetic antifungal agents. Its ability to inhibit fungal growth, coupled with minimal irritation to the skin, suggests that clove oil-based antifungal creams could be a valuable option in the treatment of fungal infections. However, further clinical studies are recommended to confirm its efficacy and safety in broader patient population.

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