

FORMULATION AND EVALUATION OF NATURAL ANTI-ACNE CREAM CONTAINING LEMON GRASS EXTRACT.

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Abstract

Majority of cosmetic products are applied over skin for various purpose like beautification, protection etc. Skin care preparations aren't new; it's the age old necessary of mankind. Therefore structure and performance of skin is vital consideration for designing cosmetic. Now-a-Days , Herbal Cosmetic is growing rapidly as most ladies prefer natural products instead of chemicals products for his or her attention. Herbal Cosmetic contains natural nutrients to boost and supply consumer satisfaction because of relatively fewer side effects compared to synthetic cosmetic. Acne vulgaris could be a disturbing issue especially for teenagers and adolescence. in keeping with global statistic, approximately 85% of population will suffer this skin issue at age around 12- 25 years, nearly 8% adults at age 23- 34 years old and only 3% of adults having acne at age 35-44 years old. Although, some skin issue are often categorized as self-limiting, but it can also give negative psychosocial consequences to individual by having low self-esteem, social withdrawal because of embarrassment and at the worst scenario, it can result in suicidal ideation.

Keyword: Anti-acne, Anti-microbial, α -citral (geranial) and β -citral (neral).

1.INTRODUCTION

Propioni bacterium acnes and Staphylococcus aureus were chargeable for acne since the presence of this bacterium within the sample isolated from acne patient. At the identical time, the increasing number of resistance of acne inducing bacteria toward the antibiotic may be a worrisome problem. the choice

treatment of acne are investigated and adopted. Among the alternate system of medication, the usage of topical therapeutic agents is more convenient for application. Most of the people now more attracted toward the utilization of herbal formulations. per WHO, there are four billion people use herbal medicine as a primary health care and convinced to be safe. Cymbopogon Flexuous also called Lemon Grass in India may be a tropical Plant growing to three to five feet tall. There are kinds of Lemon grass available in India which is green, reported. This fruits were also reported similarly to exhibit antibacterial ,antipyretic ,antidipressant , analgesic, antimicrobial activity. However, there's no anti-acne cream formulation by using Lemon grass extract though it had been reported as potential antimicrobial activities . Hence, within the present study we have an interest to formulate anti-acne cream from Lemon Grass extract and study its antimicrobial potency.

2. ACTIVE INGREDIENT IN LEMONGRASS-

One of the main ingredients of the numerous different species of lemongrass (genus Cymbopogon) is citral (3,7-dimethyl-2,6-octadien-1-al). Lemongrass oil has been found to contain up to 75-85% citral.

2.1. Antibacterial Activity-

The chromatographic fraction of the oil in agar plate was active on Bacillus globigii, escherichia, Staphylococcus aureus and Salmonella paratyphi and Shigella flexneri. These actions are presented in two of the three main mechanisms of the oil known through chromatographic and mass spectrometric methods. While the α -citral (geranial) and β -citral (neral) components separately

elicit an antibacterial action on gram-negative and gram-positive organisms, the third component, myrcene, failed to display any apparent antibacterial activity on its own. The extract was also active when the oil extract was oxidized via the active oxygen method.


2.2 Antifungal Activity-

Lemon grass oil is active against such dermatophytes like Trichophyton mentagrophytes, T. rubrum, Epidermophyton floccosum and Microsporum gypseum, and is among the foremost active agents against human dermatophytes. Other studies reported that lemon grass oil is active against keratinophilic fungi, 32 ringworm fungi and food storage fungi. Lemongrass oil is additionally effective as a herbicide and as an insecticide thanks to these present antimicrobial effects.

| | |
|------------------------|---|
| Complications | Anxiety, reduced self-esteem, depression, thoughts of suicide |
| Usual onset | Puberty |
| Risk factors | Genetics |
| Differential diagnosis | Folliculitis, rosacea, hidradenitis suppurativa, miliaria |
| Treatment | Lifestyle changes, medications, medical procedures |

Table. 01 Acne or risk factor

3. ACNE-

| | |
|---|--|
| Acne | |
| Other names | Acne vulgaris |
|  | |
| Fig.01 Acne | |
| Acne vulgaris in an 18-year-old male during puberty. | |
| Symptoms | Blackheads, whiteheads, pimples, oily skin, scarring |

Acne, also stated to as spots, may be a long-lasting skin condition that occurs when dead skin cells and oil from the skin clog up hair follicles. It mostly affects skin with a comparatively high numeral of oil glands, with the face, upper part of the chest, and back. The resulting appearance can result in anxiety, reduced self-esteem, and, in extreme cases, depression, or thoughts of suicide. Genetics is that the primary explanation for acne in 80% of cases. diet and cigarette smoking and neither cleanliness nor exposure to sunlight seems to play a part. In mutually sexes, hormones known as androgens appear to be a part of the underlying mechanism, by causing increased production of sebum. Another divisor is that the excessive growth of the bacterium Cutibacteriu acnes, which is present on the skin

3.1. Classification-

The severity of acne (Gr. 'Ακμή, "point " + L. vulgaris, "common, ") are often categorized as mild, moderate, or severe to work out an proper treatment regimen. around is no universally accepted scale for grading acne severity.] The occurrence of blocked skin follicles (known as comedones) limited to the face with occasional inflammatory lesions defines mild acne. Moderate severity acne is alleged to occur when the next number of inflammatory papules and pustules occur on the face matched to mild cases of acne and look as if on the trunk of the body. Severe acne is claimed to occur when nodules (the painful 'bumps' lying under the skin) are

the characteristic facial lesions, and involvement of the trunk is extensive. Large nodules were previously called cysts. The duration nodulocystic has been utilized inside the medical works to clarify severe cases of inflammatory acne. True cysts are rared in those with acne , and also the term severe nodular acne is now the favored terminology. Acne inversa (L. Invertō , "upside-down ") and acne (rosa, "rose-colored " + -āceus, "forming , ") don , 't seem to be forms of acne and are alternated names that respectively hash out the skin conditions hidradenitis suppurativa (HS) and rosacea. While HS shares certain corresponding types with acne, like an inclination to block skin follicles by cell debris, the condition otherwise lacks the symbol features of acne and is therefore considered an explicit disease of the skin. Classic types of acne contain increased secretion of oily sebum by the skin, microcomedones, comedones, papules, nodules (large papules), pustules, and at times ends up in scarring. The appearances of acne vary with complexion. It should cause psychological and social problems

3.2. Causes-

- Genes
- Hormones
- Infections
- Diet
- Stress
- Environmental factors
- Medications

3.3. Pathophysiology –

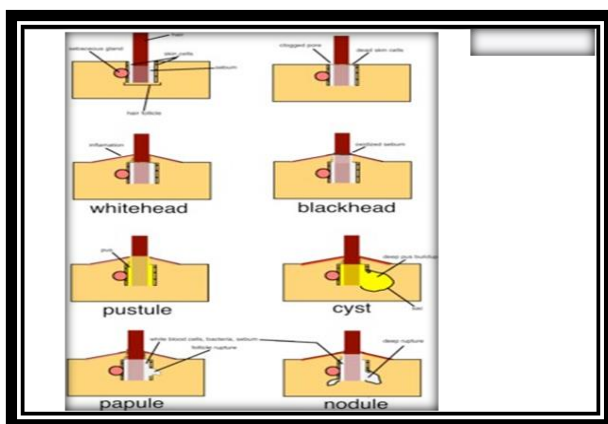


Fig.02 Simplistic representation of the formation of acne comedones



Fig.03 Hair follicle anatomy demonstrating a healthy hair follicle (pictured left), a whitehead or closed comedo (middle picture), and a blackhead or open comedo.

Acne vulgaris may be a prolonged skin problem of the pilosebaceous unit and grows because of obstructions within the skin's hair follicles. These blockages occur as a results of the subsequent four abnormal processes: increased oily sebum production (influenced by androgens), excessive .deposition of the protein keratin leading to comedo formation, colonization of the follicle by Cutibacterium acnes (C. acnes) bacteria, and therefore the local release of pro-inflammatory chemicals within the skin. The primary pathologic change is that the formation of a plug (a microcomedone), which is driven mostly by extreme growth, reproduction, and accumulation of skin cells inside the follicle. In well skin, the skin cells that have died come up to the superficial and exit the pore of the follicle. Though, enlarged production of oily sebum in those with acne causes the dead skin cells to stay together. the buildup of dead somatic cell debris and oily sebum blocks the pore of the hair follicle, thus forming the microcomedone. The C. acnes biofilm inside the follicle get worse this process. If the microcomedone is superficial surrounded by the follicle, the skin pigment melanin is exposed to air, prominent to its oxidation and dark appearance (known as a blackhead or open comedo). In contrast, if the microcomedone occurs deep within the follicle, this causes the formation of a whitehead (known as a closed comedo).

3.4. Mechanisms and Causes of Acne-

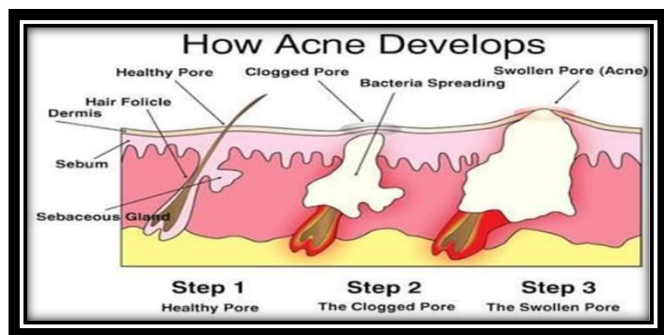


Fig .04 Acne Development

Three pathogenic factors are closely involved within the mechanism of acne with a sequence beginning with seborrhea, then sebum retention, and at last inflammation. The oil gland may be a target of androgens. Acne could also be associated with an excessive sensitivity of sebaceous end-organs to androgens. However, in women, an ovarian or adrenal hyperandrogenism could also be implicated. Many factors, particularly the chemical composition of sebum in acne and also the androgens are accountable for this hyperkeratinisation. The irritation is said to the seditious role of the numerous enzymes of Propionibacterium acnes then to the chemotacticism of neutrophils. Other pathogenic factors may have a job in acne, particularly smoking and stress. The knowledge of those pathogenic factors and their evaluation in each patient are a main point for therapeutic strategy, because every available treatment features a special impact on such or such factor.

4. AIM AND OBJECTIVE:

Aim :-

Formulation and Evaluation of Natural Anti-acne Cream Containing Lemon Grass Extract

Objective :-

- The objective of this work to develop a formulation for acne from natural and easily available resource i.e. Lemon grass extract.
- We will develop and optimize formulation containing the Lemon grass extract.

- The formulation will be characterised for antimicrobial, antibacterial ,antifungal ,anti-inflammatory etc.
- The formulation will be screened for antimicrobial action on staphylococcus aureus

5. MATERIALS AND METHODS -

- Collection and Authentication
- Lemon grass (*Cymbopogon flexuosus* and *Cymbopogon citratis*) were purchased from local market in India.

5.1. Materials:-

Table. 02 Role of Material

| Table. 02 Role of Material | | |
|----------------------------|---------------------|--------------------|
| Sr. No | Material | Role of Material |
| 1. | Lemon Grass Extract | Active Ingredients |
| 2. | Stearic acid | Emulsifier |
| 3. | Cetyl alcohol | Stabilizer |
| 4. | Liquid paraffin | Emollient |
| 5. | Glycerin | Humectants |
| 6. | Methyl paraben | Preservative |
| 7. | Triethanolamine | Emulsifier |
| 8. | Distilled Water | Solvent |

5.2 Extraction:

The collected leaves were washed thoroughly in distilled water to remove the contaminants. The leaves were chopped into small pieces and dried under shade for 1 week; the dried materials were coarsely powdered using mechanical blender. The powdered fruits of *Cymbopogon flexuosus* with total weight of 200 g were extracted by maceration method using 30% ethanol, 70% ethanol and 96% ethanol with ratio of 1:10 for 3x24 hours at room temprature and stirred with a shaker at 150 rpm, then filtered and concentrated by rotary evaporator . The ethanolic extract of *Cymbopogon*

flexuous was filtered and concentrated to dryness under reduced pressure and controlled temperature using rotary evaporator. The extract was stored in air-tight containers in a refrigerator at 4°C until further use.



Fig .05 Lemon Grass Powder

6. ACTIVE PROFILE

6.1 Lemon Grass



Fig .06 Lemon grass Herb and plant

Synonyms - East Indian Lemon Grass Indian Melissa

Botanical Name - *Cymbopogon flexuosus* and *Cymbopogon citratis*

Family – Graminae

6.2 Biological Source -

The lemon grass oil is a volatile oil obtained by steam distillation from the leaves and aerial part of plants *Cymbopogon flexuosus* and *Cymbopogon citratis* belonging to family Graminae It includes not less than 75% of aldehydes considered as citral.

6.3 Geographical Source:

Lemongrass is indigenous to India and is found in Tinneveli, Travancore, and Cochin. Two principal types of Lemongrass are recognized because the red-stemmed variety, the true *C. flexuosus*, which can well be a source of archipelago Lemongrass oil and so the white-stemmed variation which is designated as *C. flexuosus* var. *albescens*. The oil from the latter is low in aldehyde content and is slightly soluble in 70% alcohol.

6.4 Cultivation:

Lemongrass grows best in well-drained sandy loam or in light sandy soil. Dark, heavy, rich soil, gives a much better yield of grass, but the oil obtained from it's lower citral content. Warmth and sunshine favour oil development. The grass grown-up on worse slants, less visible to heavy rains, is rich in oil content. The grass is sophisticated in forestry clearances or on hill slopes at an height of near 700 m. the underside is ploughed in March–April and seeds are sown every which way. The grasses come up with the primary shower of the monsoon. Weeding is dispensed systematically within the plantation. Protection against grazing is critical. The grass is prepared for cutting at the tip of May or early in June and can be harvested every 35–40 days till November or December. The citral content of the oil is high (83%) when it's obtained from grass harvested during September–December. When cutting, the stubbles are burnt earlier the sporadic April monsoon shower. Fresh shoots come up from the roots with the beginning of normal monsoon, then the grass is prepared for harvesting by the tip of May. Plantations are renewed every six to eight years

6.5 Characteristics:

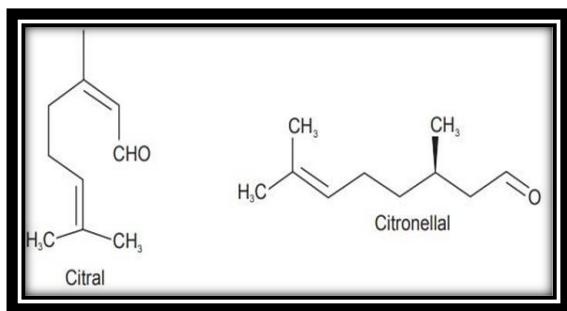
A light-coloured oil, rich in citral content, is obtained by steam distillation. The yield varies form 0.25 to 0.5% per acre.

6.6 Chemical Constituents:

Lemongrass oil is the principal source of citral (68–85%) from which ionone is derived. The oil also contains methyl heptanone, decyl aldehyde, geraniol, linalool, limonene, dipentene, citronellal and β -terpineol, and borneol.

7.2 Formulation Table -

Table. 03 Formulation Table



6.7 Uses:

The oil is used in perfumery, soaps, and cosmetics and as antimicrobial agent, antibacterial agent. Linalones obtained from citral are required for synthetic violet perfumes.

7. EXPERIMENTAL WORK:

7.1 Formulation of Anti-Acne Cream:

1. The composition of anti-acne cream was shown in Table 1. The oil phase consists of octadecanoic acid and other oil soluble component like cetyl alcohol and liquid paraffin were dissolved within the oil phase.
2. The oil phase was placed inside the beaker within the water bath.
3. The temperature of water bath was set to 75°C during the heating time.
4. The water soluble components and preservatives (glycerine, methyl paraben and thiethanolamine) were dissolved within the aqueous phase and heated within the same water bath at temperature 75°C.
5. After heating, the aqueous phase was added in portions to the oil phase with continuous stirring until the cooling of emulsifier occurred.
6. Different proportion of of Cymbopogon flexuosus fruits extract (5% and 10%) was mixed with the bottom together with fragrance.

| Table. 03 Formulation Table | | |
|-----------------------------|--------------------|---------------------|
| Components | Amount(50% w/w) F1 | Amount (100%w/w) F2 |
| Active Ingredients | | |
| Lemon Grass Extract | 5 % | 10 % |
| Oil Phase | | |
| Stearic acid | 10 % | 20 % |
| Cetyl alcohol | 4 % | 8 % |
| Liquid paraffin | 4 % | 8 % |
| Aqueous Phase | | |
| Glycerin | 5 % | 10 % |
| Methyl paraben | 0.05 % | 0.05% |
| Triethanolamine | 0.05 % | 0.05 % |
| Distilled Water | Up to 100ml | q. s |



Fig .07 Lemon Grass Anti-acne Cream

7.3 Characteristics-

Lemon Grass Anti-acne Cream

Colour - White

Apperance - Smooth, Easy to spread

Consistency - Semi-solid

7.4 Uses of ingredient:

Lemon Grass Extract –

- I. **Citral a, major component present in lemon grass is effective in treating fungal and bacterial skin infection.**
 - It having great skin healing properties.
 - It show anti acne activity.
- II. **Steric acid –**
 - It is use as self Emulsifier.
 - It gives whitening effect to the cream.
- III. **Cetyl alcohol-**
 - It use as stabilizer.
 - It is also use as emulsifier.
 - It use as thickener and emollient.
- IV. **Liquid Paraffin-**
 - It is use as Emollient.
- V. **Glycerin-**
 - It is use as Humectant.
 - It provide moisture and prevent water loss from the skin.
- VI. **Methyl paraben-**
 - It is use as preservative in oil phase.
 - It helps to kill the microbial growth in cream.
- VII. **Triethanolamine-**
 - It use as emulsifier.
 - It use as surfactant.
- VIII. **Distilled Water-**
 - It is use as solvent.

8. EVALUATION PARAMETERS:

The following parameters were checked to gauge the anti-acne cream:

Determination of the type of Emulsion-

A red dye was mixed with the cream. A few drop of the cream was placed on microscopic slide and observed under a microscope. If the disperse globules appear red the continual phase colorless, the cream is oil in water

(o/w) type. The reverse condition is occurs water in oil (w/o) type cream.

A. **pH of the Cream -**

The pH meter was calibrated using standard solution. About 0.5 g of the cream was weighed and dissolved in 50 ml of water and its pH was measured.

B. **Homogeneity-**

The preparation was tested for homogeneity by visual appearance and touch.

C. **Appearance-**

The appearance of the cream was judged by its color, pearlescence and roughness and graded.

D. **After feel Emolliency-**

slipperiness and amount of residue left after the appliance of fixed amount of cream were checked acne Cream .

E. **Type of smear-**

After application of cream, the sort of film or smear formed on skin were checked.

F. **Removal-**

The ease of removal of the cream applied were examined by washing the applied hand over water.

G. **Stability study-**

The stability study was administered by storing the anti-acne cream at three different temperatures which are 8°C, 27°C and 40°C for 2 months.

9. RESULTS :

The dye test was confirmed that both F1 and F2 formulations were o/w kind of emulsion cream. The pH of the formulated cream was found to be in range 4.6 to 4.8 which is nice and recommended pH for the skin. The formulated anti-acne cream was evaluated for several physicochemical tests and also the results were shown . the sort of smear formed on the skin wasn't greasy after the appliance of both creams. The creams were easy to get rid of after application by washing with water. The formulations were able to produce uniform distribution of extracts within the cream. This be present definite by visual inspection and by touch. there make sure no alterations in term of color of the cream even it had been kept for a protracted period of your time

| Table.04 Evaluation Parameter | | | |
|-------------------------------|-------------|------------|------------|
| Sr. no. | Parameters | Results | |
| | | F1 | F2 |
| 1. | Color | White | White |
| 2. | Odor | Pleasant | Pleasant |
| 3. | Consistency | Semi-solid | Semi-solid |
| 4. | pH | 4.9 | 5 |

10. CONCLUSION :

In conclusion , the extracts of a, Lemon grass contained valuable substances for cosmetics and antimicrobial application. The lemon grass extract demonstrated antimicrobial activity. However , investigation in the form of clinical studied would be necessary . Besides, it has also been reported antifungal and antimicrobial activity. The observed potential antibacterial activity of the formulations may be due to the presence of active constituents in the ethanolic extract of *Cymbopogon flexuosus*. The antibacterial activity was well maintained when it was converted into cream formulation. This was good sign for further studies to make this product into commercial standards. We recommended that the formulated cream can be successfully used for skin infections which including acne vulgaris, after the confirmation of clinical and toxicological studies in future.

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