



Formulation And Evaluation Of Natural Anti-Acne Gel Containing Lemongrass Oil

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Abstract:- The aim of this research is to formulate and evaluate a herbal gel that contains extract from the leaves of *Cymbopogon Citratus*. There is increased scientific evidence that plants possess a vast and complex arsenal of active ingredients which have the ability to calm or smooth the skin as well as restore activity, heal and protect the skin. Majority of cosmetic products are applied over skin for various purposes like beautification, protection etc. Herbal Cosmetics contain natural nutrients to boost and supply consumer satisfaction because of relatively fewer side effects compared to synthetic cosmetics.

Keywords:- Anti-acne, Anti-microbial, Gel, Lemongrass oil, Carbapol 934.

INTRODUCTION:- Lemongrass (*Cymbopogon citratus*) is a tall, perennial grass that is planted in almost all tropical and subtropical countries. The volatile oil obtained from the fresh leaves of the plant is one of the most important essential oils in the food, cosmetics, and pharmaceutical industries. The importance of lemongrass oil (LGO) in the pharmaceutical industry is a result of its various pharmacologic and clinical effects. *Propionibacterium acnes* and *Staphylococcus aureus* were chargeable for acne since the presence of this bacterium within the sample isolated from an 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 is investigated and adopted. Among the alternate systems of medication, the usage of topical therapeutic agents is more convenient for application. Most of the people are now more attracted toward the utilization of herbal formulations. per WHO, there are four billion people who use herbal medicine as a primary health care and are convinced to be safe. *Cymbopogon Flexuosus* also called Lemon Grass in India.

ACNE:-

Acne (also known as *Acne Vulgaris*) is a skin condition that occurs when the hair follicles become clogged with oil and dead skin cells. It is a chronic, inflammatory skin condition that affects teenagers and can persist to adulthood. The distinct lesions can be classified as inflammatory (papules, pustules, nodules, and cysts) or non-inflammatory (open/black and closed/white comedones), which can result in

scar formation and skin pigmentation and require long-term, consistent care. Lesions are usually found on the chest, upper back, neck, and face.

TYPES OF ACNE :-

Acne can take several forms:-

They include:

- 1) **Blackheads:** Open bumps on the skin that fill with excess oil and dead skin. They look as if dirt has deposited in the bump, but the dark spots are actually caused by an irregular light reflection off the clogged follicle.
- 2) **Whiteheads:** Bumps that remains closed by oil and dead skin.
- 3) **Papules:** Small red or pink bumps that become inflamed.
- 4) **Pustules:** Pimples containing pus. They look like whiteheads surrounded by red rings. They can cause scarring if picked or scratched.
- 5) **Fungal acne (pityrosporum folliculitis):** This type occurs when an excess Yeast develops in the hair follicles. They can become itchy and inflamed.
- 6) **Nodules:** Solid pimples that are deep in the skin. They are large and painful.
- 7) **Cysts:** Pus-filled pimples. These can cause scars.

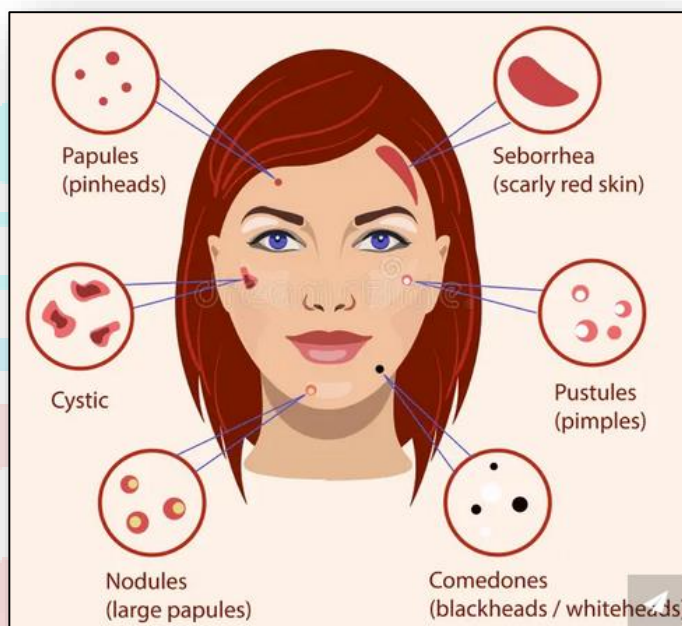


Fig.(1)Type of Acne

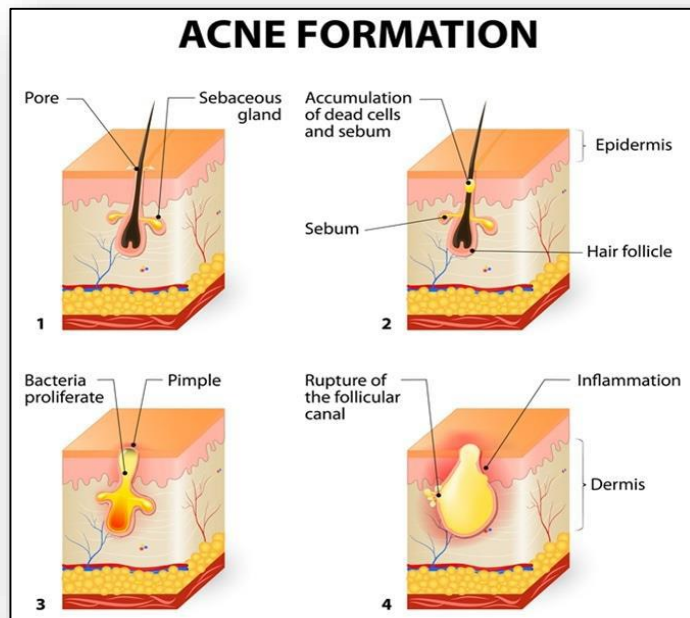


Fig.(2) Acne Formation

What causes acne?

Acne occurs when the pores of your skin become blocked with oil, dead skin, or bacteria. Each pore of your skin opens to a follicle. The follicle is made up of a hair and a sebaceous (oil) gland. The oil gland releases sebum (oil), which travels up the hair, out of the pore, and onto your skin. Sebum helps keep your skin lubricated and soft. One or more mishaps in this lubrication process can contribute to acne.

Acne might occur, for example, when:

- your follicles produce too much oil
- dead skin cells accumulate in your pores
- bacteria build up in your pores

Any of these concerns can lead to pimples, which develop when bacteria grow in a clogged pore and the oil can't escape.

Symptoms

Acne commonly appears on the face and shoulders. It may also occur on the trunk, arms, legs, and buttocks. Skin changes include:

- Crusting of skin bumps
- Cysts
- Papules (small red bumps)
- Pustules (small red bumps containing white or yellow pus)
- Redness around the skin eruptions
- Scarring of the skin
- Whiteheads
- Blackheads

What are the risk factors for developing acne?

- hormonal changes due to pregnancy or puberty
- polycystic ovarian syndrome (PCOS) and other endocrine conditions
- cigarette smoking
- poor sleep
- stress
- cleansers, creams, moisturizers, and other beauty products with high oil content
- certain medications, including lithium, some types of hormonal birth control, anticonvulsants, and steroids
- a family history of acne

Preventing acne

It's not always possible to completely prevent acne, but you can take certain steps at home to help lower your chances of getting pimples or acne breakouts.

- Wash your face daily with an oil-free cleanser.
- Try an OTC acne cleanser to help remove excess oil.
- Use water-based makeup or products labeled “non-comedogenic” — this means they're less likely to clog your pores.
- Avoid skin care and makeup products that contain oil.
- Always remove makeup and cleanse your skin thoroughly before bed.
- Shower or wash your face after exercising.
- Tie back long hair to keep it out of your face.
- Avoid tight-fitting hats, headbands, and clothing that covers breakout-prone areas.
- Eat a balanced diet, and stay hydrated.
- Take steps to reduce stress.

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.

inflammatory etc.

LEMON GRASS :-

- **Synonyms** – East Indian Lemon Grass Indian Melissa
- **Botanical Name** – Cymbopogon flexuosus and Cymbopogon citratus
- **Family** – Gramineae
- **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 citratus belonging to family Gramineae It includes not less than 75% of aldehydes considered as citral.
- **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.
- **Uses** - The oil is used in perfumery, soaps, and cosmetics and as antimicrobial agent, antibacterial agent antioxidant.

Lemongrass oil, which is frequently used for its antibacterial and astringent properties, can help tone and revitalize the skin.



Fig.(3) Lemon grass Herb and plant



Fig.(4) Lemon Grass Powder
Economic uses of lemon grass

- Flavoring
- In addition to adding flavour to food, such as in chicken recipes, spices are also utilised in sherbet and beverages like tea.
- Soil Erosion Control
- used as mulch for different plants and trees
- a useful crop for preventing soil erosion.
- Oil
- Distillation produces commercial lemongrass oil or Indian verbena oil, both of which have a strong lemon flavour and aroma.
- Used to separate citral for the production of vitamin C. Citral is used to flavour food and as a beginning ingredient in the production of ionone.
- Fuel: The distillation process uses the plant waste left behind after oil extraction as fuel.
- Medicinal
- To treat headaches, crushed leaves are applied to the face and forehead.
- Root decoction has diuretic properties.

Lemongrass oil

- Origin of lemongrass oil a perennial plant with long, slender leaves that is native to India and is quickly growing and aromatic. It develops a network of large and small roots that quickly erode the soil. It is referred to as "chumana pulu" in India, where it is also known as "Indian verbena" or "Indian lemon balm oil" and is used in Ayurvedic medicine to treat plague and reduce fever. It is a valuable component in citrus soaps and perfumes and serves as an insect deterrent.
- Properties of lemon grass oil Lemongrass oil has a watery viscosity, a dark yellow to amber colour, and a lemony, pleasant scent Chemical composition Contains lemongrass oil, myrcene, citronellal, geranyl acetate, nerol, geraniol, neral and traces of limonene and citral.
- Extraction
- From fresh or partially dried leaves, lemongrass oil is extracted via steam distillation.
- Uses of lemon grass
- Lemongrass oil revitalises the body and cures jetlag symptoms, clears headaches, and aids in the treatment of nervous weariness and stress-related illnesses. It is an excellent overall tonic for the body, and it promotes glandular secretions while also stimulating the parasympathetic nervous system, which is beneficial for recuperating from illness.

EXTRACTION OF ESSENTIAL OIL FROM LEMONGRASS :-

Solvent Extraction Method:

- Weigh 150 grams of dried lemongrass sample and put in clean flat bottomed flask pour 500ml of n- hexane solvent.
- Allow to stand the contents for 36 hours this is done to extract the oil components in lemongrass.
- Pour the extract in other 1 liter beaker.
- Add 200 ml ethanol to extract essential oil, because oil is soluble in ethanol.
- Mix the mixture, transfer to 500 ml separatory funnel.
- Allow the separated content to reach equilibrium.
- Divided into two layers (depending on their Density is different).
- Collect the lower ethanol extract and upper hexane into two separate 250ml beakers and place them in a 78 °C water bath.
- This is done to remove the ethanol from leaving only natural essential oils.
- Production of oil is determined by weighing the extract on electric scale weigh the balance
- The difference between the final weight and the initial weight of the beaker containing the extract and the weight of the empty beaker gives the essential oil.



Fig.(5) Lemongrass oil

FORMULATION TABLE :-

Ingredients	F1	F2	F3
Lemongrass Oil	1.5ml	1 ml	2 ml
Almond Oil	0.3ml	0.2ml	0.5 ml
Carbapol 934	1 gm	1 gm	1 gm
Methylparaben	0.2gm	0.2 gm	0.2 gm
Glycerin	7.5 ml	7.5 ml	7.5 ml
Propylene glycol	2.5 ml	2.5ml	2.5 ml
Triethanolamine	0.2 ml	0.2 ml	0.2 ml
Distilled water	q. s	q. s	q. s

PROCEDURE :-

- Carbopol 934 gels were prepared by adding carbopol 934 in water and kept it for 24 hours, carbapol was homogenized using magnetic stirrer
- Weighed amount of methylparaben was added to water prior to the addition of carbapol 934 in another beaker, the required quantity of propylene glycol was added
- Further lemongrass oil, almond oil, this mixture was added to the beaker containing carbopol with stirring.
- The glycerin was also added to the polymer dispersion and stirred continuously till it forms a homogeneous product.
- In order to neutralize the gel at pH 6.7, triethanolamine was later added.
- The volume was made up with distilled water and stirring was done vigorously.
- The same method was adopted to formulate three different formulations by taking 1.5 ml , 1 ml and 2 ml of lemongrass oil and labeled as F1, F2 and F3. All the prepared gels were then subjected to evaluation tests. The composition of different gel formulations is listed in formulation table.

**Fig (6) Lemon Grass Anti-acne Cream**

Characteristics-**Lemon Grass Anti-acne Cream****Colour** - White**Appearance** – Smooth, Easy to spread**Consistency** - Semi-solid**Uses of ingredient:****Lemon Grass Extract –****Properties :-****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 shows anti acne activity.
- Fabulous Fragrance.
- Treats oily skin.
- Acne fighting quality.
- It is a good antioxidant.
- It helps in reducing the inflammation.

Almond Oil :-**Properties :-**

- Good for Skin and hair.
- Leaded with Anti-oxidants.
- Rich in vitamin E.
- Good source of protein.

Carbapol 934**Properties :-**

- Ability to Thicken.
- Stabilize.
- Enhance clarity.
- Improve product performance.

Methyl paraben-**Properties:-**

- It is use as preservative in oil phase.
- It helps to kill the microbial growth in cream.

Glycerin-**Properties :-**

- It is use as Humectant.
- It provides moisture and prevent water loss from the skin.

Propylene glycol-**Properties:-**

- Humectant
- Solvent
- Emollient
- modify the gel's viscosity
- Stabilizer

Triethanolamine-**Properties:-**

- It use as emulsifier.
- It use as surfactant.

Physical Evaluation :-**Formulated herbal gel was evaluated by using following physical parameters**

1.Colour :-

The color of gel was observed by visual examination i. e pale yellow

2. Odour :-

The odour of cream was found to be characteristics

3.Consistency:-

The formulation was examined by rubbing gel on hand manually. The gel has a smooth consistency.

4.Determination of pH :-

The pH of gel was determined by using pH paper

The pH of gel was found e within the range of (6-7) i.e Neutral to the range of skin pH

5.Determination of homogeneity:-

The homogeneity of formulated gels was evaluated visually. The formulations were evaluated for appearance and existence of aggregates.

6.Determination of Spreadability:-

The Spreadability of gel was evaluated visually it was spreadable when applied on the surface of skin.

RESULTS :

The pH of the formulated cream was found to be in range 6 to 7 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.

Parameter	Effect
Colour	Pale yellow
Odour	Aromatic
Consistency	Good
pH	5.7
Homogeneity	Good
Spreadability	Good

Conclusion :-

The review provides us with a general understanding of lemongrass, including its sources, oil isolation techniques, pharmacological activity, Extraction methods and range of applications and also various health benefits of it. This plant is harmless and has several applications in the food, pharmaceutical, cosmetics and agricultural sectors. Cymbopogon citrates, has the potential of showing an anti -acne effect.

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