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FORMULATION AND EVALUATION OF ANTI ACNE HERBAL GEL

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ABSTRACT
Use of herbal medicine has increased many folds on account of side effects observed with conventional drugs. The over production of the sebaceous gland is a condition in which acne is arise. The various physical parameters like pH, colour, odour, grittiness, viscosity, homogeneity, spreadability, skin irritancy etc are evaluated for the formulated gel. In present study various attempts were made to develop and evaluate the herbal anti-acne gel which contain Bael extract, Neem extract and Glycerine to facilitate the topical usage. The plants have been reported in literature having good antiaging, anti-microbial, antioxidant, antiseptic, and anti-inflammatory activity. Carbopol 940 use as gelling agent. Thus, the topical anti-acne gels were safe to apply on the skin without irritation.
KEYWORDS: *Anti-Acne Gel Cleanser, Bael Leaves, Neem Leaves, Rose Water, Carbapol 940 , Glycerine.*

INTRODUCTION

Acne is a skin condition and it is due to the excess amount of production in the sebaceous glands. The most common acne is called acne vulgaris and it is called "common acne". The redness occur from the skin is respect to the infection. Oils from glands combine with dead skin cells to block hair follicles.oil is build up under the blocked pores. Bacteria of the can then grow very quickly. This infection makes the skin becomes swollen and red, which becomes visible. The most common part of the body where the acene happen are face, chest, back and upper arm. The acne was happened due to the production of sebum's, follicular hyper keratinization, bacterial colonization, and inflammation. P. acne act as metabolizing sebaceous triglycerides into fatty acids, which neutrophils were attracted. In addition, S. epidermidis within sebaceous unit responsible in superficial infection. The inflammatory factors are released by those bacteria which are converted from bacteria to comedons. Acne is occurs at that time when a person is turning from a child into an adult and it is normally during puberty.

Fig No. 1 (Types Of Acne)

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Types of Pimples

- **Whiteheads -** They are very small and remain under the surface of skin.
- **Blackheads -** They are not form due to the dirt. It occurs on the surface of the skin and looks black. Blackheads are not black because of dirt they are black in colour. Generally, air oxidizes the protein called keratin.
- **Papules -** They are occur on the surface of the skin and look like small tender pink bumps which are visible.
- **Pustules -** Pustules (pimples or zits) are red at the bottom level consisting of pus at its top and can be looked on the surface of the skin.
- **Nodules -** They are painful, large, solid pimples existing deeply in the skin and can be seen on the skin surface.
- **Cysts -** They are too much painful and visible on the skin.

A gel have solid consistency. It has properties ranging from soft and weak to hard and tough. When gels are in steady state it exhibits no flow properties. They are defined as sub - standard dilute crossed linked system. Gels arebehave like solid due to the 3-dimensional cross-linked network within the liquid. Gels are mostly liquid by their weight. Gel gives structure and contributes to the adhesive stick track and it is cross linking within the fluid.

Advantages of Gel Cleansers

- Deep cleansing.
- Acne fighting.
- Soothing and moisturizing.
- Restoring vitality & balance to the skin.
- Elimination oils & excess dirt.
- Unclogs pores.

REVIEW OF LITERATURE

- Dr. S. Rao (2018) - This herbal gel demonstrated anti-bacterial and anti- inflammatory activities which is based on neem and calendula. The herbal gel is used to treat various types of acne and alter the appearance of the skin. It is included in the international journal of pharmaceutical science and research.
- Dr. P. Singh (2018) - The main purpose of this paper was to formulate the anti-acne herbal gel. It was based on ginger and turmeric having anti- oxidant effects. It provides nourished smooth and soft skin. The additional constituent used in the gel is aloe vera gel.
- Prof. Y. Kumar (2019) - The main objective of the research study is to formulate the herbal gel using natural ingredients such as tea tree oil, neem extract, coconut oil and beeswax. In today's life both men and women play an important role in altering the appearance of skin. It possesses the potent anti-acne property.
- Prof. A. Sharma (2019) - The formulation is based on herbal gel using neem and turmeric. It controls the production of the sebaceous glands which gives rise to the acne. 20% coconut oil and 10% bees wax is also used in the formulation for making an effective herbal gel. It exhibits potent anti-acne and anti- bacterial properties.
- Prof. R. Chaudhary (2019) - A new herbal gel consists of eucalyptus and peppermint which reduces the inflammation. Herbal gel Formulation designated to the deep clean of the skin and make it healthy and glowing.
- Dr. S.K. Singh (2020) - The main objective of the research study was to prepare the herbal gel. It contains the active ingredients such as tea tree oil, aloe vera gel, glycerin, Carbapol etc. It reduces the acne lesions by 70% and also exhibits various properties.
- Dr. M. Jain (2020) - The research study aims to produce an herbal gel including ingredients aloe vera gel, green tea extract and vitamin E that showed the anti-acne and anti-oxidant potential. It gives a smooth and moisturized skin. It is also used for deep cleansing.
- Dr. J. Sharma (2020) - The cinnamon and honey based herbal gel provided the anti-acne and also various effects. It minimizes acne with their effective formulation. Nowadays most of the men and women use the herbal gel as a cleanser.
- Dr. V. Kumar (2020) - The herbal gel is used for removing the excess oil and dirt from the skin and also unclogs the pores. Formulation was prepared with ginger and aloe vera extract. The herbal gel accelerated wound healing and skin generation with anti-acne treatment.

AIM: Formulation and evaluation of anti-acne herbal gel.

OBJECTIVES

1. To select and use effective herbal ingredients with anti-acne activity.
2. To formulate a stable and uniform herbal gel dosage form.
3. To evaluate the physicochemical properties (pH, viscosity, spreadability).
4. To assess antimicrobial activity against acne-causing bacteria.
5. To evaluate skin irritation and safety of the formulated gel.
6. To study the stability of the herbal gel under different storage conditions.

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- **PLAN OF WORK**

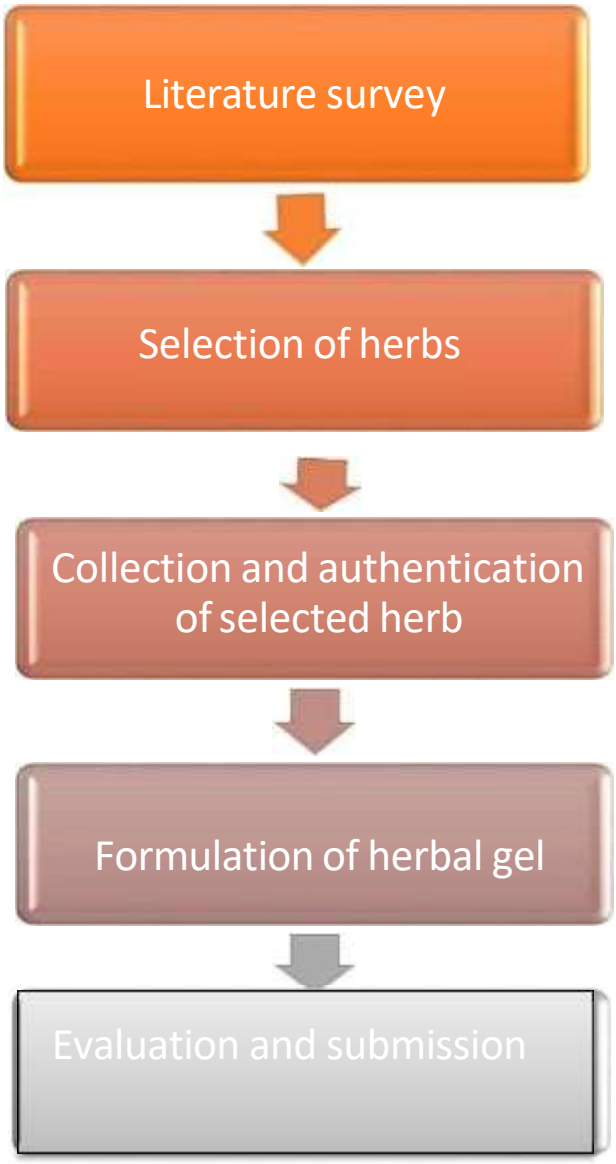

Fig No. 2 Plan Of Work

Drug Profile of Herbal Anti-Acne Gel

❖ **Herbal Medicines**

1. **Aegle Marmelos (Bael leaves)**

Fig No. 3(Bael Leaves)

Synonym: Indian Bael, Bengal Quince.

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Biological source: Bael consist of unripe or half ripe fruits and leaves of the plant known as Aegle marmelos.
Family: Rutaceae
Use: It is used to treat various kind of skin disease because it has good anti- bacterial, anti- oxidant, anti-inflammatory, anti-fungal and anti-acne property.
Bael leaves contain many active constituents that may help with acne, including: Terpenoids: These compounds have antifungal and antibacterial properties. **Saponins:** These compounds have anti-inflammatory and antinociceptive properties. **Glycosides:** These compounds have anti-inflammatory and antinociceptive properties. **Alkaloids:** The Pant Aparna variety of bael leaves has the highest amount of alkaloids.
Flavonoids: The Pant Aparna variety of bael leaves has a high amount of flavonoids.
Phenols: The Pant Aparna variety of bael leaves has a high amount of phenols.

2. Azadirachta Indica (Neem Leaves)

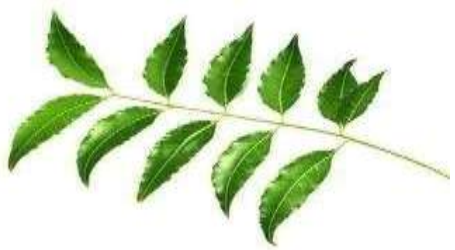
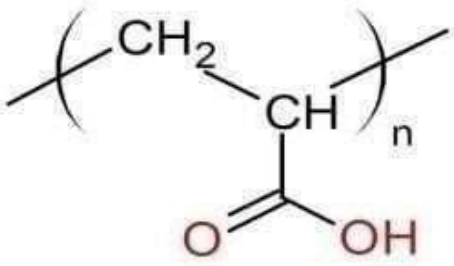


Fig No. 4(Neem Leaves)

Synonym: Melia azadirachta, Neem
Biological sources: The biological source of neem is azadirachta indica.
Family: Meliaceae.
Uses: Beneficial in treating Acne and other Skin disorders. It has anti- bacterial, anti- inflammatory and anti acene property.
Neem leaves contain many active constituents that may help with acne, including: Azadirachtin: The most important active constituent in neem.
Quercetin and ß-sitosterol: Polyphenolic flavonoids with antibacterial and antifungal properties.
Nimbolide: Has a great zone of inhibition against some bacteria species, including those that cause acne.
Rutin: A flavonoid that, when combined with quercetin, has a superior antibacterial action.

- **Excipient Profile**

1. Carbopol Structure



Structure No. 1 (Carbopol)

IUPAC name: Poly (acrylic acid) or poly(1-carboxyethylene).
Other names: carbomer or carboxy-polymethleme
Chemical formula: (C3H4O2)n
Molar mass:
Carbapol 934 -102.13 g/mol
Carbapol 940 -102.1317 g
Carbapol 941 -713.1 g/mol
Uses: To activate the gelling effect, Carbopol is dispersed and hydrated, then the solution is neutralized with chemicals that increase the pH.

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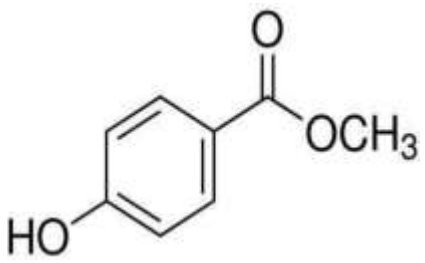
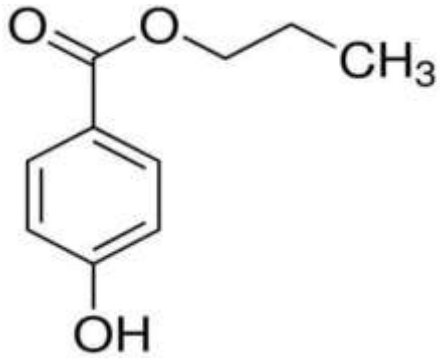
2. Methyl paraben Structure



Structure No. 2 (Methyl paraben)

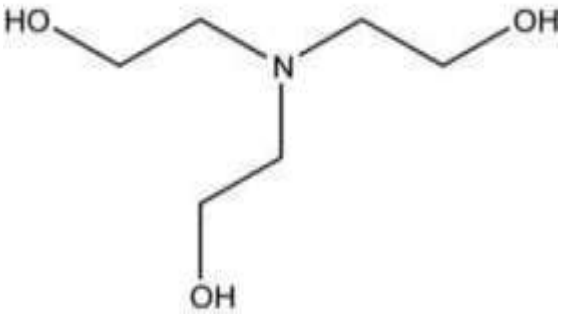
IUPAC name: Methyl 4-hydroxybenzoate.
Other names: Methyl p-hydroxybenzoate, 4-hydroxybenzoic acid methyl ester, Methyl Hydroxy Benzoate, and Methyl Ester.
Chemical Formula: C8H8O3
Molar mass: 152.15 g/mol
Uses: Methyl paraben is a type of paraben, a group of chemicals that prevent the growth of bacteria, fungi, and yeast. It's also found naturally in some fruits, particularly blueberries.

3. Propyl paraben Structure



Structure No.3 (Propyl paraben)
IUPAC name: 4-hydroxybenzoic acid n-propyl ester.
Other names: Propyl 4-hydroxybenzoate, Propyl p-hydroxybenzoate, Propyl parahydroxybenzoate, and Nipasol E216.
Chemical formula: C10H12O3 **Molar mass:** 180.2 g/mol
Density: 1.06 g/cm³
Melting Point: 95–98°C:
Use: Propyl paraben is an antimicrobial agent with antifungal and antibacterial properties. It's often used in combination with other parabens or antimicrobial agents.

4. Triethanolamine Structure



Structure No.4 Triethanolamine IUPAC Name: 2,2',2"-nitrilotris[ethanol].

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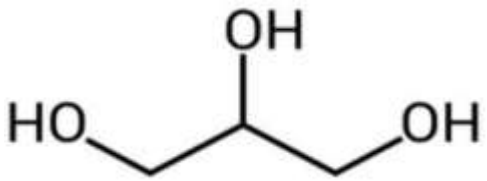
Other Names: Tri(hydroxyethyl) amine , Tris(2-hydroxyethyl)amine
Chemical Formula: C6H15NO3 **Molar Mass:** 149.188 g/mol
Density: 1.13 g/cm³
Melting Point: 20.5–21.6°C

Use: It helps to stabilize the consistency, improves the texture, and makes the products easier to spread. The triethanolamine neutralizes fatty acids, adjusts and buffers the pH, and solubilizes oils and other ingredients that are not completely soluble in water.

5. Glycerine Structure



Structure No. 5 Glycerine

IUPAC Name: propane-1,2,3-triol
Other Name: Glycerol
Chemical Formula:C3H8O3 \ mol **Molar Mass :**92.11 g/mol \
Density:1.261 g/cm^3
Melting Point: 17.8–18.2°C (64.0–64.8°F

Uses: Glycerin is a humectant, which means it draws water from the skin's deeper layers and the air to keep the skin hydrated. This can help relieve dry skin and make the skin look refreshed. Glycerin can soften rough or dry skin.

❖ MATERIALS AND M,ETHODS MATERIAL

Table 1: The materials used and from they are collected for formulation.

MATERIALS	COLLECTED FROM
Carbapol 940	From Laboratory
Distilled Water	From Laboratory
Bael Leaves	From Plant
Neem Leaves	From Plant
Glycerin	From Local Market
Rose Water	From Local Market
Methyl Paraben	From Laboratory
Propyl Paraben	From Laboratory
Triethanolamine	From Laboratory

Table No. 1{ MATERIALS AND METHODS }

Preparation of Herbal Extract
The herbs collected from the plants are washed under running water and are dried in indirect sunlight. Then converted into coarse powders and sieved through sieve no. 60 mesh. Then the extracts were prepared by decoction method and the prepared extracts were stored in well closed containers.

Decoction Process
Decoction is a method of extraction that involves boiling plant material in water to extract chemical substances. It's different from maceration, which involves separating a solid material from a solution after a set period of time. This process involves firstly drying the plant material then mash it or cutting the material which allow for maximum dissolution. Then finally boil it in water to extract the chemical constituents.

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Fig No. 5(Bael Extract)

AUTHENTICATION OF HERB

The naturally collected and dried herbs were authenticated from Dharmaraj Shaikshanik Pratishthan's College Of Pharmacy, Walki Ahilynagar. All the herbs were evaluated as per Ayurvedic Pharmacopeia of India.

Preparation of Gel Base

Carbopol 940 is weight accurately then dissolved in water. After that it kept overnight for soaking. Once the Carbopol is swollen stirring should be done to mix the Carbopol 940 to form the Gel

- **FORMULATION TABLE**

Sr.No	Chemical	Quantity
1.	Carbapol 940	1 g
2.	Glycerin	5 ml
3.	Distilled Water	q.s to 100g
4.	Rose Water	2 ml
5.	Methyl Paraben	0.2g
6.	Propyl Paraben	0.02g
7.	Triethanolamine	q.s
8.	Bael Extract	3g
9.	Neem Extract	2g

Table No. 2 (FORMULATION TABLE)

CONCLUSION

1. Herbal anti-acne gels offer a safer alternative to synthetic acne treatments.
2. Natural ingredients provide antimicrobial and anti-inflammatory effects.
3. Herbal formulations reduce the risk of skin irritation and side effects.
4. Gel dosage form improves patient compliance and ease of application.
5. Proper formulation ensures uniformity and consistency of the gel.
6. Evaluation parameters confirm suitable pH and skin compatibility.
7. Antioxidant properties help in healing and preventing acne lesions.
8. Stability studies ensure product quality during storage.
9. Herbal gels are cost-effective and easily available

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