



POLY- HERBAL NANOGEL AND SOAP FOR TREATMENT OF ACNE

¹Landge Dhananjay, ²Barge Shambhavi, ³Bargande Kaveri, ⁴Bhong Shubham, ⁵Belge Prasad.

¹HSBPVT's GOI Faculty Of Pharmacy , Kashti-414701Maharashtra. ²HSBPVT's GOI Faculty Of Pharmacy , Kashti-414701Maharashtra.

³HSBPVT's GOI FOP , Kashti-Maharashtra. ⁴HSBPVT's GOI Faculty Of Pharmacy , Kashti-414701Maharashtra.

⁵HSBPVT's GOI Faculty Of Pharmacy , Kashti-Maharashtra. India.

Abstract: Herbs are more effective because they are safer and have fewer side effects than synthetic drugs. The current study involves the development and evaluation of medicinal antiacne herbs containing the hydroalcoholic extract of neem leaves (*Azadirachta indica*). And extract of aloe vera gel from aloe vera leaves. Information shows that this herb has good antibacterial, antioxidant and anti-inflammatory properties. The aim of our research is to create herbal nanogels and soaps with antibacterial properties. Herbal soaps were prepared and evaluated in terms of pH, moisture content, foaming index, foam retention time and saponification analysis. Herbal gels were prepared and evaluated in terms of pH, spreadability, extrudability, viscosity and homogeneity. Prepare herbal gel containing neem leaf hydroalcoholic extract and aloe vera extract is a good try.

Keywords: Acne, anti-inflammatory, herbals, aloe vera, neem

I. INTRODUCTION :

Acne is a skin problem that can affect a person's appearance. Clinical findings appear in adolescence and early adulthood [1]. Acne is more common in older girls. Children aged 14-17 and 16-19 [2]. The pathogenesis of acne is associated with microcomedone formation from sebum-allergic hair follicles and inflammation caused by the growth of microcomedones in hair follicles (3). Therefore, although the initial causes may be different, the consequences of TB vulgaris will be similar. Therefore, there are some treatments for acne and pimples. In this review, medical products included in cosmetics are discussed. The pathogenesis of tuberculosis vulgaris lesions has been evaluated, especially since topical agents have more potential as drug candidates and mixed candidates have been used [4]. Sebaceous glands in acne formation: Acne occurs in young and old

people [5] and is closely related to sebaceous gland activity, especially in androgen-stimulated young people [6]. Therefore, disruption of the skin barrier and colonization with normal flora occur (7)

1.1 ACNE :

Common skin conditions such as comedones, papules, pustules, nodules, and/or inflamed infectious growths like cysts are indicative of acne vulgaris. It is a multifactorial disorder caused by several factors, including increased sebum production, bacterial colonization of the pilosebaceous unit, and inflammation. Various topical agents are available for the treatment of acne vulgaris, including antibiotics, retinoids, benzoyl peroxide, and azelaic acid. However, the use of polyherbal formulations has gained popularity in recent years due to their potential benefits against acne.

Acne is a chronic inflammatory skin condition that affects the hair follicles and sebaceous glands. Factors that contribute to the development of acne include genetics, hormonal changes (such as during puberty or pregnancy), stress, diet, and certain medications.

Also note that the presence of the bacterium *Propionibacterium acnes* can contribute to the development of acne. The pathogenesis of acne involves several interconnected factors, including increased sebum production, hyper keratinization (an abnormal buildup of skin cells), inflammation, and bacterial colonization. The role of various inflammatory mediators, such as cytokines, in the development of acne lesions. The condition can be treated by both topical and systemic therapies.

Topical treatments may include benzoyl peroxide, retinoids, and antibiotics, while systemic therapies may include oral antibiotics, hormonal therapies (such as oral contraceptives), and isotretinoin (a potent retinoid).

1.2 TYPES :

1. Inflammatory
2. Non-inflammatory

The most common types of acne include non-inflammatory acne (such as whiteheads and blackheads) and inflammatory acne (such as papules, pustules, and nodules). Non-inflammatory type has higher chances of leaving a scar on skin surface, whereas inflammatory acne is generally more severe than non-inflammatory acne. Some examples of inflammatory type acne include Papules, Pustules, Nodules, Cysts. The non-inflammatory type of acne consists of blackheads and whiteheads. (8)

Microbial or bacterial colonization of the pilosebaceous unit is the largest factor. The pilosebaceous unit is the area of the skin that contains hair follicles and sebaceous glands. The bacterium *Propionibacterium acnes* (*P. acnes*) is one of the most common microbial strains associated with acne vulgaris.

1.3 MICROBES INCLUDED :

However, recent research has identified several other microbial strains that may also contribute to the development of acne, including:

1. **Staphylococcus epidermidis (*S. epidermidis*):** This bacterium is a normal resident of the skin but may contribute to the development of acne by producing enzymes that break down sebum and promote inflammation.

2. **Staphylococcus aureus (S. aureus):** This bacterium is another normal resident of the skin but can cause infection in individuals with weakened immune systems. In acne vulgaris, *S. aureus* may contribute to inflammation and exacerbate the disease.

3. **Malassezia species:** These fungi are also normal residents of the skin but may contribute to the development of acne by inducing inflammation and stimulating sebum production.

Targeting these microbial strains may be an effective approach for treating acne vulgaris. For example, topical and oral antibiotics may be used to target *P. acnes* and other bacteria, while antifungal agents may be used to target *Malassezia* species. (9)

1.4 Herbs to treat acne:

Natural medicine is widely used for health [10]. Therefore, the current use and potential of the plant are summarized below:

Aloe vera extract is used as an ingredient in the Ayurvedic formula. It can reduce bubble damage [11]. This is based on the treatment of the South African dermatological medicine Aloe vera Asiatica [12]. However, *A. Vera* is not significant in inhibiting *P. acnes*-induced pro inflammatory cytokines. Neem (*Azadirachta indica*), are used in Ayurvedic formulations to treat acne. This herb reduces ROS production [13]. Therefore, its anti-inflammatory properties should be stronger than those of *A. vera*, indicating its potential for treating non-inflammatory diseases.

Rosemary, commonly known as sage, contains essential oils commonly used to treat acne.

1.5 Acne vulgaris is caused by :

1. Follicular hyperkeratosis
2. Perifollicular inflammation and
3. Excessive sebum production and secretion [14,15]

II. PLANT PROFILE :

2.1 Aloe Vera: Aloe vera contains many ingredients that can be used to treat acne.

These include Salicylic acid: Aloe vera contains salicylic acid, which is known for its astringent properties. Salicylic acid can help prevent pores and the formation of new acne. Polysaccharides: Aloe vera polysaccharides can improve skin moisture, relieve irritation and improve skin damage. Phytosterols: These compounds have anti-inflammatory and antioxidant properties that help warm and protect the skin. Amino acids: Aloe vera contains many amino acids that are important for healthy skin and help repair the skin [16,17].

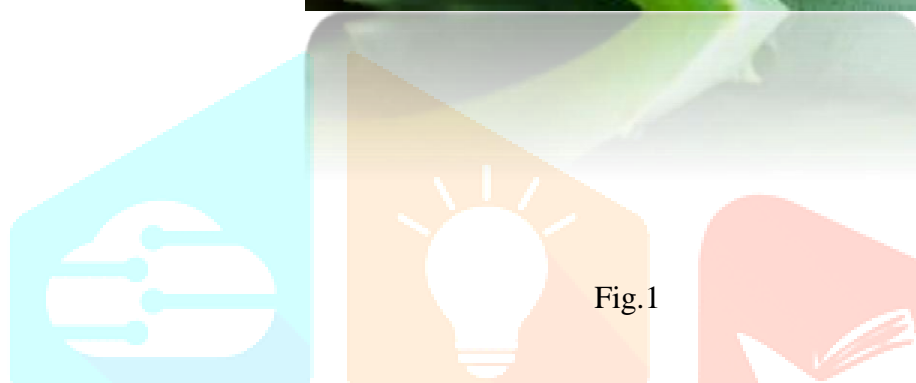


Fig.1

2.2 Neem: Neem leaves contain compounds such as neem, nimbidin and nimbin that have anti-inflammatory, antibacterial and antifungal properties. Neem oil is rich in fatty acids and triglycerides. It has antibacterial and anti-inflammatory properties. Neem oil may help prevent and treat acne by inhibiting the growth of acne bacteria and reducing skin inflammation [18,19]



Fig.2

III. NANOPARTICLES:

Nanoparticles: Nanoparticles are particles ranging in size from 1 to 100 nanometers. In nanotechnology, a particle is defined as a small object that acts as an integrated unit in terms of conduction and properties. Particles are further classified according to their diameter. Nanoparticles can be used to target plants to the same body, thus improving

selectivity, drug delivery, efficacy and protection. [20]

Nanoparticles can be used to increase the solubility of plants and help fix the drug at specific sites, resulting in better results. Nanoparticles can deliver large amounts of drugs to bacteria due to their size and high loading capacity. [21]

3.1 Role of nanoparticles:

Increases the total surface area of the drug by allowing it to be transported in a smaller size Dissolves faster in the bloodstream Drug delivery machine targets the drug in a specific way Everywhere Epithelial and endothelial barriers serve as drug transport sites. A combination of two different methods or medications. [22]

3.2 Animal Study :

In animal models for acne research, researchers often use rodents such as mice or rats. They cause diseases such as acne by using chemicals that cause acne-causing conditions such as sebum production, inflammation, or bacterial colonization. Although the animal model provides insight, it is important to remember that results may not directly translate into human responses and ethical considerations are important across species.

3.3 Evaluation :

Evaluation Of Gel:

- 1) Ph
- 2) Spread ability
 $E_i = d^{2\pi}$, where $E_i = \text{Spreadability of sample 4}$
- 3) Extrudability
- 4) Viscosity 5) Homogeneity

Evaluation Of Soap:

- 1) Ph
- 2) Colour & Clarity
- 3) Foam forming ability
- 4) Retention Time of soap
- 5) Saponification Value
- 6) Total fatty matter

IV. DISCUSSION:

In this paper, we have collected and described effective herbs in the treatment of acne vulgaris. This herb can have anti-acne effects due to four mechanisms: antibacterial, anti-inflammatory.

Beauty is natural, cosmetics are as old as humanity and civilization [21]. Therefore, acne can reduce a person's confidence in physical appearance or depression, which can affect all aspects of life. Given the increasing resistance to existing antimicrobial agents, side effects, and sometimes the high cost of treatment, it is difficult to find effective treatments for acne that are tolerated by patients [22,23]. Natural remedies have been used for thousands of years. It is estimated that there are 2,50,000-5,00,000 species of plants on Earth [24] that offer great promise to identify phytotherapeutic agents and transform them into drugs for the treatment of acne vulgaris, which affects approximately 80% of the population aged 12 years to 25 years [23].

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