



## A systematic review on formulation and evaluation of herbal gel for the management of acne vulgaris

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### Abstract

Herbal medicine has become an item of global importance both medicinal and economical. Although usage of these herbal medicines has increased, their quality, safety and efficacy are serious concerns in industrialized and developing countries. Herbal remedies are getting increase in patient compliance as they are devoid of typical side effects of allopathic medicines. One of the methods for its survival is preparation of extract and their formulations for better absorption and penetration of the active moiety into the systemic circulation. Herbal gel is a solid, jelly-like substance that can have properties ranging from soft and weak to hard and tough preparations. It is used topically for a variety of purposes, such as protectants, antiseptics, and antibacterials.

**Keywords:** Herbal gel, leaf extract, acne vulgaris, antimicrobial activity

### Introduction

In certain European and Asian countries, research is being done on the millennia-old practice of herbal treatment. Considerable work has been done that is beyond and beyond the capabilities of the typical human. The technologically enhanced lifestyle of the twenty-first century has given human sorrow many names. The nicest part about utilizing herbal medicine is that it has no unsuccessful cures and no adverse effects, making it suitable for users of all ages. Formulations containing two or more herbs are referred to be poly herbal <sup>[1]</sup>.

Several studies have been done using extracts of neem leaves (*Azadirachta indica* Family: Meliaceae) and turmeric rhizomes (*Curcuma longa* Family: Zingiberaceae), combined with a variety of other herbal remedies such as *Rubia cordifolia* (Family: Rubiaceae) and *Berberis aristata* (Family: Berberideceae) <sup>[2, 3]</sup>. Herbal medications are available in several dosage forms as well as gel, a solid, jelly-like substance with qualities ranging from soft and weak to hard and tough. Gel is applied topically and utilized as an antiseptic, protectant, or antibacterial <sup>[4]</sup>. Using gels topically at disease sites has several benefits, including a quicker release of the medicine at the site of action, regardless of its water solubility. Of the medication in contrast to ointments and creams <sup>[5]</sup>. Thus, our primary objective is to develop a herbal gel that is devoid of different chemicals and doesn't pose a significant risk when applied to different body parts.

### Skin anatomy and physiology

Anatomically, the skin is a multilateral organ with numerous layers. The anatomical barrier that separates the body from its surroundings, the skin part was about 16–18% of an average body weight. The layer below the epidermis is known as the dermis, while the layer above it is known as the epidermis. Subcutaneous fatty tissues are located beneath the dermis <sup>[6]</sup>.

### Acne

Long-term skin disorder known as acne develops when dead skin cells clog hair sacs. Acne vulgaris is the common name for acne. The majority of those impacted by this are between the ages of 11 and 25. The development of both inflammatory and non-inflammatory lesions in the hair follicles and/or sebaceous glands, together known as the pilosebaceous unit, is what defines it. Puberty is often accompanied by mild acne, but severe cases can leave scars even after treatment and result in an unpleasant appearance. In real life, acne can be categorized into three severity levels based on the severity of the symptoms: mild, moderate, and severe.

**Non-inflammatory lesions:** They fall into two categories: closed comedons (white heads) and open comedons (blackheads).

**Inflammatory lesions:** Lesions that are inflammatory in nature can appear as nodules, cysts, papules, or pustules. The development of seborrhea, comedones, inflammatory lesions, bacteria in the follicular canal, and sebum production are the typical characteristics of acne vulgaris <sup>[7-8]</sup>

### Types of ACNE <sup>[9-10]</sup>

#### Rosacea, rosacea, acne

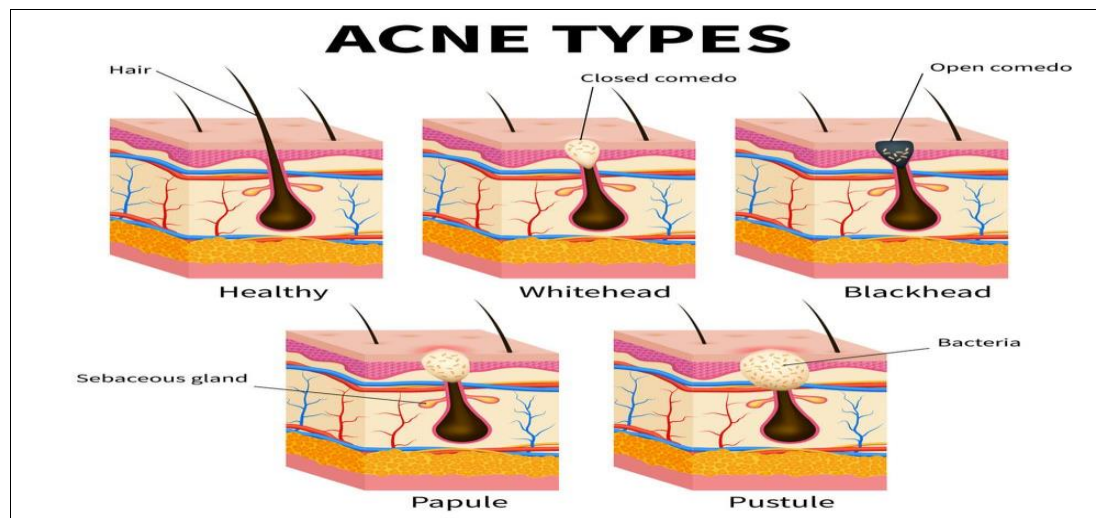
It's a skin condition that affects adults, mostly women, and causes the facial blood vessels to enlarge, giving the appearance of being flushed. Rosacea is a common adult acne-like skin condition that is chronic, incurable, easily controlled, and medically treatable. Rosacea typically affects the middle third of the face, primarily the nose, causing intermittent flare-ups and relief. The skin may be clear for weeks, months, or years at a time before the symptoms reappear repeatedly. Rosacea tends to appear in phases and results in facial skin inflammation, primarily around the nose, forehead, cheeks, and chin. Rosacea manifests as redness of the face, small red pimples, and fine

red lines on the skin of the face. a large red nose with a bulbous shape. eye conditions such as conjunctivitis and swollen, red eyelids.

### Acne vulgaris

The most common form of acne; usually affects people from puberty to young adult hood. Hickey, pimple, zit A small inflamed elevation of the skin; a pustule or papules which are common symptoms in acne. Difference between a pimple and acne: Unlike common acne, rosacea is not primarily a disease of teenagers but occurs most often in

adults (ages 30-50), especially in those with fair skin. Different than acne, there are usually no blackheads or whiteheads in rosacea. Certain people get one or two spots off and on while others get frequent eruption of spots with lots of pus-filled pimples indicates acne which is a chronic or prolonged condition that affects many teens and adults. Almost everyone in the world experiences pimples at some point. As soon as the body enters the puberty stage, around the age of 12, hormones begin to be released and begin to function in a person's body regardless of gender. At this point, food or pollution can upset the balance of hormones.



### Acne Treatment<sup>[11-12]</sup>

The course of treatment for acne is determined by its severity and state, which can range from mild, non-inflammatory come-dons to inflamed papules or pustules. This typically indicates that *Propionibacterium acnes* is present. There are options for both systemic and topical therapy to treat acne. Modern acne therapy aims to disrupt the pathogenic pathway at one or more points, in contrast to the traditional treatments in the inflammatory phase, which involve topical and systemic antibiotics that function as both antimicrobial and anti-inflammatory agents. Long-term overuse of antibiotics has increased the resistance of acne-causing bacteria, such as *Propionibacterium acnes* and *Staphylococcus epidermis*, to several antibiotics used in acne treatment.

### Gel<sup>[13]</sup>

A gel is a system of at least two constituents that is solid or semisolid and is made up of a condensed mass that is surrounded and penetrated by a liquid. Gels and jellies have more of a solid than a liquid quality despite being made up of small amounts of solid particles scattered throughout a sizable volume of liquid. The presence of cutaneous structure imparting solid-like properties is what distinguishes gel from jelly.

The World Health Organization (WHO) has defined herbal medicines as completed, labelled medicinal products that include plant material or a combination of plant materials, as well as aerial or subterranean plant parts that contain active ingredients. The use of herbal formulations as antimicrobial, anti-diabetic, anti-aging, anti-arthritis, anti-depressant, anti-anxiety, anti-inflammatory, and anti-HIV treatment agents has become widely accepted therapy for Alzheimer's disease, asthma, migraines, cirrhosis, and memory-boosting exercises.

### Herbal gel methodology

**Gathering of Unprocessed Drugs:** The local market was where the raw drugs were gathered. Subsequently, they were appropriately identified and preserved for additional handling.

**Extraction of crude drugs:** It involved properly washing and grinding the gathered crude drugs into a coarse powder. Using distilled water as a solvent, the Soxhlet extractor was used to extract the powdered crude drugs. Six hours were spent on the extraction process at 100°C room temperature.

**Extract preparation:** To obtain an extract free of solvent, the extract obtained through the above extraction procedure was evaporated using a hot plate. Subsequently, the extract was appropriately preserved in a desiccator in order to make herbal gel.

**Creating the herbal gel:** Herbal ingredients were dissolved in water to create the gel. Xanthan gum, propylene glycol, ethanol, methyl paraben, propyl paraben, EDTA, solution, and supplemental methyl paraben were added to the gel's preparation. A 5% herbal gel was prepared using the same process<sup>[14, 15]</sup>.

### Characteristics of the herbal gel

#### 1. Physical Appearance

The colour, odour, homogeneity, and consistency of the herbal gel formulation were examined visually. After the gels were placed in the container, all developed gels were examined visually to ensure homogeneity. Their appearance and the existence of any aggregates were examined<sup>[16]</sup>.

## 2. pH measurement

A digital pH metre was used to measure the pH of different formulations. After dissolving one gramme of gel in 100 milliliters of distilled water, it was kept for two hours. Three separate measurements of the pH of each formulation were made [17].

## 3. Calculating Viscosity

With spindle number 62.5 the Brookfield viscometer (Brookfield viscometer RVT) was used to measure the viscosity of the prepared gels [18].

## 4. Spreadability

The term "spreadability" refers to how easily the gel covers a surface when applied to skin or an affected area [19].

Spreadability was determined by applying the subsequent formula.

$$S = (M \times L) / T$$

Where,

S = Spreadability

M = Weight in the pan (tied to the upper slide)

L = Length of the glass slide

T = Time (in sec) taken to separate the slides.

## 5. Bloom Strength

Using a cylindrical probe with a 0.5 diameter as a fixture, Texture Analyze, which is outfitted with a 5 kg load cell, was utilized to ascertain the gel's bloom strength. The cylindrical probe was positioned beneath the sample container in the center of the platform. The test was started after the probe's height was calibrated. For the study, a trigger force of 10 g was employed. [20]

## Conclusion

The majority of herbal products in the Indian medical system are made with raw plants or plant parts and their extracts. Herbal plant leaf extracts have nematocidal, insecticidal, fungicidal, and antimicrobial qualities. It is believed that herbal cosmetics are safer over an extended length of time. However, quality control testing must be done for these preparations because the safety and efficacy of herbal cosmetic products are extremely important. Applying gels topically to the pathological site has several benefits, including a quicker release of the medication to the site of action.

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