

**A REVIEW: HERBAL PLANTS USED IN ACNE TREATMENT**

Shirish B. Nagansurkar, Sanjay K Bais, Rutuja Choragi

Fabtech College of Pharmacy, Sangola

Corresponding author Mail ID: rutujachoragi@gmail.com

**ABSTRACT:**

*This study's objectives are to create and assess topically applied, anti- acne gel made from garlic juice. Techniques: This study used extraction, gel formulations with varying concentrations of carboxymethyl cellulose (CMC), and gel assessment tests to measure the gel's ability to inhibit Propionibacterium acnes and to cause skin irritation, viscosity, pH, and organoleptic activity. Long-term inflammation of the pilosebaceous unit caused by acne vulgaris can result in inflammatory lesions, seborrhoea, comedowns, and other conditions. It has been established Propionibacterium acnes and Staphylococcus epidermidis are common pathogens that cause acne. inflammation. The bacteria Staphylococcus aureus contributes to acne inflammation. Because natural remedies are thought to have Less side effects than synthetic, they are more widely accepted. Demand for herbal formulas is increasing on the international scene. The goal of the current study is to create and assess a herbal anti-acne gel that contains an ethanolic extract of Garlic (Allium sativum) and Neem (Azadirachta Indica). Three formulations (F1, F2, and F3) utilising a neem extract, a garlic extract, and a combination of these two were created in order to optimise the herbal anti-acne gel.*

**Keywords:** *Staphylococcus aureus, Gel, Azadirachta indica, Allium sativum, herbal medicine*

**INTRODUCTION**

Acne is a hereditary or acquired affection of the pilosebaceous units. It is derived from the Greek word "akme" meaning peak or peak. Acne vulgaris is the proper term to refer to acne. The most prevalent condition in children, typically between the ages of 18 and 25, is acne. The skin condition known as acne vulgaris, a pilosebaceous gland disorder, is characterised by the development Acne, inflammatory disease, seborrhea and infection. Propionibacteriumacnes, Staphylococcus epidermidis and Staphylococcus aureus Excessive growth of the hair follicle and sebum production. It is a nearly allen compassing illness that affects 95% of boys and 83% of girls across all racial groups. It has been stated that P. acnes is an obligatory anaerobic microbe. Because it can activate complements, it is linked to the onset of inflammatory acne.<sup>1,2</sup> Garlic is used by Indonesians as an antimicrobial, carminative, expectorant, sedative, and to treat many diseases such as high blood pressure, asthma, cough, cold, headache, jaundice, hemorrhoids, constipations, ulcers, bruises, abscesses, insect bites and insomnia. Sulphur containing compounds in garlic include allicin, alliin, ajoene, diallyl sulphide, rehmanna glutinosa, and Sallylcysteine.. Non sulphur containing include vitamin B, proteins, minerals, saponins, and flavonoids<sup>7</sup>. Citrobacter freundii, Bacillus subtilis, Pseudomonas fluorescent, Escherichia coli, Staphylococcus aureus, and Proteus vulgaris are among the microorganisms that garlic has antimicrobial activity against <sup>8</sup>. Garlic contains a phytoalexin known as allixin.<sup>9</sup>. It is problematic to apply garlic juice

directly to acne. Therefore, topical dosage forms like gel must be developed. Gel is easily absorbed and gives the skin a chillier feeling.<sup>3,4</sup>

## Different varieties of acne

### 1.Acne lesions:

It varies in severity from acne (blackheads and whiteheads) to nodules and cysts. are defined as a physical alteration It occurs on the skin due to bacterial processes in the sebaceous vesicles. A comedone (plural comedones) is a plugged sebaceous follicle that can contain bacteria, tiny hairs, dead cells from within the follicle, and sebum. Both open blackhead) and closed (whitehead) comedones should not be picked, squeezed, or pressed because doing so can injure surrounding tissue and spread bacteria such as streptococci and staphylococci. Picking and squeezing the affected area increases the possibility of scarring it.<sup>14</sup>

### 2.Papule:

When your pores' outer walls degrade due to extreme inflammation, papules form. The hard, clogged pores that feel nice up close and personal are the outcome. Usually, the skin around the pores turns red<sup>17,18</sup>. pustule: The disintegration of the walls surrounding your pores can also result in pustules. Pustules contain pus, as opposed to papules. These skin-protruding lumps are typically red in colour. Usually has a yellow or white head on top of the head.<sup>15</sup>

### 3.Nodule:

Nodular acne is a major type of acne that results in acne nodules, which are big, painful, and inflammatory breakouts<sup>18</sup>. A nodule is a solid lesion with an irregular shape, similar to a papule. A nodule, as opposed to a papule, is characterised by inflammation, can penetrate deeper skin layers, and may result in tissue destruction that leaves scars. cyst: Combinations of bacteria, sebum, and dead skin cells can clog pores and cause cysts. Clogs are located beneath the skin's surface and deeper within the skin than nodules. When these big red bumps come into contact with the affected area, it hurts. The most common type of acne, cysts, are typically caused by a serious infection.<sup>16</sup>

## Causative agents:

### 1.Propionibacterium acnes and Staphylococcus aureus

Unclear exactly how they contribute to the acne process, though. Thus, many *P. acnes* subs trains are found in normal skin, while others are associated with persistent acne. It is therefore unclear if these strains are pathogenically developed or if they are contributing to this illness. One increasing factor is *P. acnes*' It's resistance to common medications. The aforementioned current strains have ability to alter, maintain, It is used to prevent abnormal oil production, inflammation, and pore exfoliation associated with acne. The development of Acne vulgaris is associated with infection with the parasitic<sup>19</sup>

### 2. Dietary Input

Diet and acne are the two factors, but it's unclear how these two factors relate to one another, and there's no solid evidence to support a particular dietary combination. On the other hand, a high glycemic diet is linked to a worsening of acne vulgaris. There are also studies showing a relationship about the use of chocolate, milk or salt with acne vulgaris. Chocolates can be made with varying amounts of sugars and with or without milk, so it's unclear what role they play<sup>22</sup>. Genetic input: There may be a genetic component to an individual's susceptibility to acne vulgaris. Many studies predicting the prevalence of acne in first degree relatives support this recommendation.<sup>20</sup>

### 3.Changes in hormones

Acne vulgaris appears to be influenced by hormonal changes in the human body, such as those associated with puberty and menstruation cycles. Follicular glands produce more sebum when certain sex hormones are elevated,

particularly those that are altered during puberty and pregnancy. The effects of using anabolic steroids are usually the same. Hormones that affect the growth of acne vulgaris include testosterone, dehydroepiandrosterone terrors and dihydrotestosterone, and insulin-like growth. Adult females who develop acne vulgaris may have underlying medical conditions such as hirsutism, polycystic ovarian syndrome, or Cushing syndrome<sup>21</sup>

#### 4. Psychological input

Several studies and scientists have demonstrated that acne.<sup>22</sup>

#### Herbal Medicines that Have Anti-Acne Properties

Due to their benefits, which include longer history of use, reduced side effects, improved patient tolerance, and relative affordability, herbal medicines are becoming more and more well-liked (8). Additionally, they have offered solid proof for the management of numerous illnesses that are challenging to treat. These herbs can be used to treat illnesses on their own or in conjunction with manufactured medications. More importantly, they may be taken with synthetic drugs in addition to being consumed as a preventive or therapeutic measure to lessen their side effects.<sup>7</sup> Without fail, herbal remedies are used either in conjunction with other therapies or on their own to treat acne vulgaris.

**Table No.1: Herbal plants on anti-acne activity**

Sr.No.	Plant Name	Biological source	Family	Parts used in acne treatment
1.	Neem	Azadiarchata indica	Meliaceae	Leaves
2.	Garlic	Allium sativum linn	Liliceae	Bulb
3.	Zinger	Zingibere officinalis	Zingebereceae	Rhizome
4.	Clove	Caryophyllus eugenol	Myrtaceae	Flower
5.	Honey	Apis melifera	Apidae	Honey comb
6.	Sativus canabis	Canabis	Canabinaceae	Leaves
7.	Ashwagandha	Withania somnifera	Solanaceae	Root
8.	Tulsi	Ocimum sanctum	Labitaie	Leaves
9.	Aloe vera	Aloe Barbendiasis	Liliceae	Dried incision
10.	Curcumin	Curcuma longa	Zingiberaceae	Rhizome
11.	Peppermint oil	Mentha piperita	Labitaie	Leaves
12.	Lemon peel	Citrus limonis burm	Rutaceae	Outer part
13.	Sandalwood oil	Santalum album	Santaleceae	Wood
14.	Rose	Rosa species	Rosaceae	Petals
15.	Tea tree oil	Melaleuca alternifolia	Myrteceae	Leaves

16.	Pine	Pinus species	Panaceae	Leaves (needle like)
17.	Gentianalutea	Gentianalutea linn	Gentiaceae	Rhizome
18.	Arjun	Terminalia arjuna	Combretaceae	Bark
19.	Amaranth	Amranthus hypochondriacus linn	Amranthaceae	Leaves
20.	Indian sarsaparilla	Smilex ornata hooker	Liliceae	Roots
21.	Black cumin	Nigella sativa	Ranunaulaceae	Seeds
22.	Guggul	Mukul myrrh tree	Burseraceae	Bark

### 1) Neem:

**Synonym:** Nira, Nimb, Nimba, Limba

#### **Origin:**

Neem has fresh or dried leaves and oilseeds of the Azadirachta a family: Meliaceae.

Neem is a versatile medicinal herb with unique benefits array of with a range of therapeutic uses. Azadirachtin is the most valuable and primary active Phyto constituent found in Azadirachta indica. Other phytoconstituents include Nimbolinin Nimbidol, nimbin, nimbidin, gedunin, salannin, sodium nimb in at and quercetin. Azadrachta indica leaves and bark are primarily used in the treatment of acne vulgaris. Neem has reportedly been used traditionally for many years to treat blood purifying and skin purifying conditions. Because of its antibacterial and antiinflammatory has been used medicinally for a long time to treat skin conditions. Owing to its antimicrobial characteristics, it effectively combats the majority of epidermal disorders, including eczema, psoriasis, and acne.<sup>5</sup>

### 2) Garlic

#### **Synonym:**

Lahsun

#### **Biological source:**

It has the bulbous part of the plant called allium sativum Linn belongs to family Liliceae.

Chemical constituents:

Allicin, Allium, Volatile oil, S-allyl Mercapto cysteine.

#### **Uses:**

- 1) Carminative.
- 2) Expectorant
- 3) Stimulant
- 4) Disinfectant.
- 5) Antibacterial
- 6) Anthelmintic
- 7) It also helps to reduce acne as well as red marks they leave behind.<sup>6</sup>



**Fig.1: Garlic**

### 3) Zinger:

**Synonym:**

Zingerene, Aadrak, Zingebere

**Biological source:**

It is the rhizome of zingiber officinalis belongs to family zingiberaceae

**Chemical constituents:**

Gingerly, Shogaol, zingiberene

**Uses:**

- 1)Used for treating and preventing certain types of acne
- 2) Also helps to reduce the amount of excess oil in which skin produces <sup>46-47</sup>



**Fig.2: Garlic**

### 4) Clove:

**Synonym:**

Lavang, clove flower, clove bud

**Chemical constituents:**

Volatile oil, Eugenia, acetyl Eugenia, tannin

Clove from the Myrtaceae families for dried flowers of *Eugenia caryophyllus* Thumb. When it comes to the effectiveness of essential oils for treating acne, clove oil is the best. It completely eradicates the bacteria that causes acne and is incredibly effective. Clove oil not only helps in removing acne and pimples but also helps in removing acne scars, blemishes and bumps. <sup>46-47</sup>



**Fig.3: Clove**

### 5) Honey

**Synonym:**

Madhu, Honey purified

**Biological source:**

It is Sugar is accumulated in the hive by bees (*apis melifera*), honeybees (*apis dorsata*) and her species of the apidae family.

**Chemical constituents:**

Fructose, glucose, water, Maltese, sucrose

**Uses:**

It assisting balancing the bacteria on skin, clearance speedup the healing process, reduce wrinkles, remove blackheads<sup>27-28</sup>



**Fig.4: Honey**

### 6) *Sativus cannabis*

*Cannabis sativus* seed oil can be used to treat rosacea acne, dermatitis, eczema, dermatitis, psoriasis, and lick hen planus. This plant's powdered leaves are an excellent dressing for cuts and sores. Extract from *Cannabis sativus* can be applied externally to ease skin irritation. The skin is strengthened and becomes more resilient to viral, bacterial, and fungal infections thanks to the seed oil.<sup>32-33</sup>



**Fig.5: Cannabis Sativum**

### 7) Ashwagandha

Ashwagandha, also known as *Withania somnifera*, is sometimes referred to as the Indian ginseng. It prevents infection, prevents the formation of oil on the skin and is a safe, herbal remedy for acne and pimples. Gram positive bacteria like *Propionibacterium acnes* and *Staphylococcus epidermidis* are the primary players in the pathophysiology of acne vulgaris<sup>52</sup>. Withaferin A, 3-b-hydroxy-2 and 3-dihydrowithanolide F are three physiologically active steroids found in ashwagandha that show promise as anti-inflammatory agents. Ashwagandha also aids in the treatment of acne inflammation. Their roles as antioxidants, anxiolytics, adaptogens, memory enhancers, antiparkinsonian, antivenom, anti-inflammatory, and antitumor properties have been confirmed by earlier researchers. Additional benefits of ashwagandha include antibacterial, hypolipidemic, immunomodulatory, and cardiovascular protection.

#### **Chemical constituents:**

Anafranil, withanine, tropine, choline<sup>36</sup>



**Fig.6: Ashwagandha**

### 8) Tulasi

#### **Synonym:**

Sacred basil, holy basil, tulasi

#### **Biological source:**

It consists of leaves of *Ocimum sanctum*, optimum basilica belonging to family Labiatae

#### **Chemical constituents:**

Volatile oil, 70% Eugenol, methyl eugenol, beta caryophyllene, carvacrol

#### **Uses:**

Antibacterial and healing properties make it a good candidate for an anti-acne face mask<sup>38,39</sup>



**Fig.7: Tulasi**

### 9) Aloe

**Synonym:**

Aloe, Ghritkumari

**Chemical constituents:**

Anthracene glycoside, isobarbaloin, aloe emodin, aloes one

Aloe vera, sometimes called Aloe vera, a member of the Liliaceae family, which includes approximately 360 species. Most of aloe vera (99.5%) is water. Other potentially effective compounds in plants include sugar, Lignin, saponins, anthraquinones, salicylic acid and amino acids. Aloe vera plant contains many nutrients including calcium, iron, magnesium, sodium, phosphorus, silicon and strontium. Aloe vera has long been used as an herbal medicine. to inhibit a variety of infections, and extracts from the plant have been shown to be effective against skin pimples and acne. This succulent is widely used as a remedy for a number of skin issues, especially sunburns. Aloe Vera works well these days when combined with more traditional acne treatments

37-39



**Fig.8: Aloe**

### 10) Curcumin

**Synonym:**

Indian saffron, haldi

**Chemical Constituents:**

Curcumin, the main Bioactive components in turmeric have anti-inflammatory effects. antioxidant, and wound-healing qualities that may make it useful in the treatment of acne. Turmeric is used in Ayurveda and traditional



Chinese medicine. for centuries to treat many ailments. It is said to cure all ailments, including pain and indigestion. Additionally, It is used for therapeutic purposes in traditional medicine. psoriasis, acne, and nappy rash. It has not been established that curcuma longa treats acne or acne scars. While curcumin, a component of turmeric, has shown some promise, no dermatological condition has yet been demonstrated to be affected by it<sup>47</sup>. Previous studies have established their anti-inflammatory, anti-HIV, antibacterial, antioxidant, and nematocidal properties.



**Fig.9: Curcumin**

### 11) Peppermint oil

**Synonym:**

Brandy mint, lamb mint

**Biological source:**

*Mentha piperita* belongs to family Labiatae

**Chemical constituents:**

Volatile oil, flavonoid, tannin, menthone, menthol, resins

**Uses:**

It cleans all the dirt and excess oil from the face, unclog pores and reduce inflammation caused due to acne.



**Fig. 10: Peppermint oil**

### 12) Lemon peel:

**Synonym:**

*Cortex limonis*.

**Origin:**

Lemon peel is the outer shell of the ripe fruit of lemon, a plant from the lemon belongs to family rutaceous

**Chemical constituents:**

Pectin, Volatile oil, limonene, citral and other aromatic compound

**Uses:**

It shows Antibacterial and astringent properties making it an effective natural remedy for acne and blemishes.<sup>35</sup>



**Fig.11: Lemon peel**

**13)Sandalwood oil:****Synonym:**

East Indian sandal wood oil, Chandan

**Biological source:**

It is obtained by distillation from heart wood of santalum album belongs to family santalaceous

**Chemical constituents:** Alpha santalol, beta santalol, isomeric alcohol

**Uses:**

Regular or daily use of Sandalwood powder or oil It helps prevent acne-causing bacteria, exfoliates the skin and relieves sunburn.<sup>33-34</sup>



**Fig.12: Sandalwood oil**

**14) Rose:**

The aqueous extract of the leaves of the Rosa plant, belonging to the Rosaceae family, is used in daily skin care. Rose water is also good for acne. The main components are gallicol, pyrogallol, non-terpenoid eugenol and tribulus aldehyde



**Fig.13: Rose**

#### **15)Tea tree oil:**

##### **Synonym:**

Cymene, melaleuca oil, oleum, teebaum

##### **Biological source:**

Derived from mainly from Australian native plant melaleuca alternifolia belong to family myrteaceae

##### **Chemical constituents:**

Terpinene-4-ol, 1,8-cineole, alpha terminate, p- cymene and alpha pipene

Melaleuca alternifolia, commonly known as the tea tree, is a herb used to heal wounds and skin issues. It can reduce acne scars Due to its antibacterial and anti-inflammatory properties. According to reports from Trusted Source, a 1990 study compare d lotions containing 5% tea tree oil to lotions containing 5% benzoyl peroxide. Both form elations reduce the Number of inflammatory and non-inflammatory acne lesions. The tea tree oil causes fewer side effects even though it took longer to start working. These included redness, irritation, itching, and dryness.



**Fig.14: Tea tree oil**

#### **16) Pine:**

Pinus belongs to the Allaceae family and is one of the largest and most important genera of conifers. It contains about 95 species and varieties and hybrids. Pine trees are widely distributed in the northern hemisphere. The main ingredient of pine is Pycnogenol, which is recommended for acne treatment. <sup>31-32</sup>



**Fig.15: Pine**

### **17) Gentiana lutea:**

It is made up of the Dried rhizomes and roots of *Gentiana lutea* Linn (Gentianaceae) family. Gentiopicrotin and amarogentin, two bitter-tasting secoiridoid glycosides, are the active ingredients in *Gentiana lutea*. The gentian root extract has anti-inflammatory qualities. Applying it to red, irritated skin therefore produces a cooling effect. The extract also has an antiseptic quality that benefits the skin. It stabilises the product and protects the skin's surface from harmful microbes. Therefore, it can be beneficial for healing, especially for skin that is prone to acne and inflammation.<sup>29-30</sup>



**Fig.16: Gentiana lutea**

### **18) Arjun:**

#### **Synonym:**

Patha, Dhanjaya

#### **Biological source:**

*Terminalia arjuna*

#### **Chemical constituents:**

Polyphenols, flavonoids, tannin, triterpenoids, saponins, sterols

*Terminalia arjuna*, a member of the Combretaceae plant family, is one of the traditional plants used in Ayurveda. It treats many diseases such as diarrhoea, acne, cancer, pain, wound healing, heart disease, haemoptysis, lithotripsy and internal diseases, acne. The bark of *Terminalia arjuna* contains triterpenoids, glycosides, flavonoids, tannins, etc. It was found to contain. Tannins have antibacterial, antioxidant, cytotoxic, antitumor, astringent and antihemorrhagic properties.



**Fig.17: Arjun**

**19)Amaranth:**

The unfading flower. *A. cruentus* linn. It belongs to the Amaranthaceae family and is Its native is China and Mexico. Amaranth seeds and leaves can be used as an astringent t and can also help clear skin conditions from acne to eczema to psoriasis. The main component is saponin. <sup>43-44</sup>



**Fig.18: Amaranth**

**20)Indian Sarasparilla:**

**Synonym:**

Jamaica sarasparilla

**Biological source:**

It consists of dried roots from *Smilax ornata* hooker, *s.medica* belongs to family liliaceae

**Chemical constituents:**

Lupeol, hemidesminine, camphor, vanillin, ledol

**Uses:**

It helps to remove the toxins from oxidative deterioration through a UVA and UVB rays. If used for long it helps decrease blemishes, spots, wrinkles, dark circles and fine lines. It also advised for people suffering from acne, pimples, psoriasis, eczema and many other skin issues. <sup>41-42</sup>



**Fig.19: Indian sarsaparilla**

## CONCLUSION

Natural cures are beneficial for all illnesses. Herbal formulas are in high demand on the global market. It is thought that herbal remedies are safer than allopathic ones.

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