A REVIEW ON POLYHERBAL ANTIACNE GEL

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Abstract

Acne vulgaris is a common skin condition that affects a large number of individuals worldwide. Despite the availability of several treatment options, many have undesirable side effects or are ineffective for all individuals. Polyherbal gels have recently gained interest as a natural and effective treatment option for acne vulgaris. These gels are made up of a combination of herbal extracts that work synergistically to target the underlying causes of acne. This review article summarizes the current research on the efficacy and safety of polyherbal gels for acne vulgaris. The article discusses these gels' various mechanisms of action, including anti-inflammatory, antimicrobial, and antioxidant properties, which can effectively control the factors responsible for acne formation. Additionally, the review examines the tolerability and safety of polyherbal gels, highlighting their potential as a promising new treatment option for individuals with acne. Overall, the evidence suggests that polyherbal gels have the potential to offer a safe and effective treatment for acne vulgaris, with fewer side effects than traditional treatments.

Keyword: *Acne , Herbal, poly herbal, gel, effective, advantages, disadvantages, side effects, traditional medicine*

Introduction

Herbal Medicines :- Herbal medicine is use of plants, plant parts, volatile oils, resins, gums, their water or solvent extracts or other form of advanced natural products prepared from plants products with minimal or no industrial processing and is used therapeutically to treat or prevent disease and symptoms of disease. People show more interest in alternative therapy and use of natural products derived from plant sources for primary health care. Herbal plants plays a central role in the healthcare system of large proportions of the world's population as modern pharmaceuticals cost are too high. Herbal formulations are products from medicinal plants.

Present Status of Herbal Medicines

Use of herbal medicinal plants has been expanded worldwide. WHO estimated that 80% of population globally relies on herbal medicines for their primary healthcare. Modern pharmacopeia contains 25% of drugs which are plant based. Herbal medicines are capturing global and national markets. In India approximately 25000 medicinal plant based formulations are used traditionally to treat, prevent and cure diseases. There is high demand of medicinal plants in India. OTC products also contain herbs and plant based active Constituents. An Indian household relies on herbal medicines because they believed that herbal medicines are healthier and safest for any treatment. 365 medicinal plants were included in modern pharmacopeia.

India has no separate category for herbal medicines as per Indian Drugs Act. Herbal medicines are categorized as food and dietary supplements. Poor quality of traditional medicines due to less quality control, quality assurance and regulatory

aspects for herbal medicines. WHO have developed guidelines for Quality control of medicinal plants which provides techniques and measures to be adopted for appropriate cultivation, collection and processing. There is no implementation of this knowledge which results in inferior quality of medicinal plants. Most of the herbal products undergo drug approval process to approve their safety. Herbal medicines efficacy and safety data and toxicological evaluation are not required before marketing of herbal formulation. There is no research protocol, standards and methods available for evaluation, safety and efficacy of herbal medicines. There are increased cases of poisoning associated with use of herbal medicines as there are no stringent regulations and guidelines available. Herbal medicines growth is expanding due to current development in research and development of medicinal plants due to vast knowledge of pharmaceutical chemistry and phytochemistry. Herbal medicines hold a promising role in treatment of various disorders.

Limitations of available acne therapies

Antibiotics are becoming less effective with increasing resistance of Acnes. Oral Antimicrobial should not be use in pregnancy and children under 8 years. It causes tooth discoloration. Oral antibiotics also cause weight gain and headache. Clindamycin and erythromycin as monotherapy has limited effectiveness because of the development of drug resistant strains of Acnes. Antiseborrhic drug, Sulphur produces bad odor and the staining of clothes. Salicylic acid: Skin dryness, stinging, hyper pigmentation in darker skin individuals. Due to androgenic properties of oral contraceptive norethisterone is contradicted in acne. Topical retinol has side effects like skin irritation and flushing. Oral retinol causes dry skin, nose bleeds, muscle pains, increased liver enzymes and increased lipid levels in the blood. High risk of fetal abnormalities during pregnancy. Benzoyl Peroxide causes Irritation and dryness of skin. It can bleach hair, causes irritation to eyes, mouth, lips. Also causes burning, crust, rashes, itching, irritation and stinging. Topical Dapsone is well tolerated but it causes methemoglobinemia. Topical azelaic acid causes skin irritation, hypo pigmentation, skin dryness. Combined oral contraceptive causes Nausea, vomiting at beginning of therapy. Spironolactone leads to Diuresis, irregular menstrual cycle, breast tenderness, hypotension, dryness of skin, irritation, hyperkalemia (preexisting cardiac condition or taking concurrent drugs).

Advantages of Herbal Medicines:

1) Can be used for Acne treatment
2) Less risk of side effects
3) Low Cost
4) Treatment of underlying cause
5) High potency and efficacy
6) Treat disease permanently

There are two main approaches allopathic or modern system of medicine and traditional system of medicine. The major difference between allopathic and traditional medicine is, The natural system of medicine focuses on the entire body and treating the root cause of acne, allopathic

medicine focuses on treating the symptoms i.e. inflammation, redness etc. associated with blemishes. Natural approaches due to no or less side effects this system of medicine is on demand now a day. Herbal cosmetics are natural and free from all the harmful synthetic chemicals which otherwise may prove to be toxic to the skin. synthetic antioxidants BHA (Butylated Hydroxyanisole) and BHT (Butylated Hydroxytoluene) are used as preservatives in lipsticks and moisturizers. BHA and BHT can induce allergic reactions in the skin. The international Agency for Research on Cancer classifies BHA as a possible human carcinogen. Herbal cosmetics contain natural antioxidants like vitamin C. Coal tar is recognized as a human carcinogen and the main concern with individual coal tar a color (whether produced from coal tar or synthetically) is they can cause cancer. But natural colors that are obtained from herbs are safer. Herbal cosmetics are free from parabens that are the most widely used preservative in cosmetics and can penetrate the skin and are suspected of interfering with hormone function (Endocrine disruption). The aim of herbal therapy is to provide safe, efficacious and economical medicines so that people from both developing and developed nations can utilize them.

Disadvantages of Herbal Medicines:

1) No dosage regimens and guidelines available

2) No Quick relief from disease

3) Complexity in standardization of Herbal Medicines

4) Content and strength of active therapeutic chemical constituents vary depends on source and geographical location

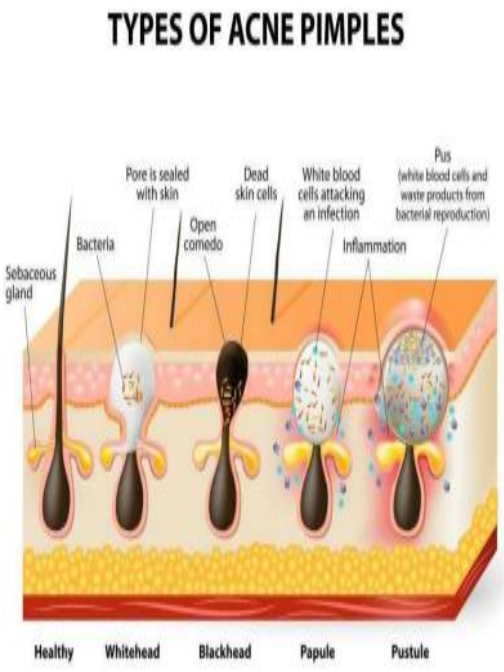
5) Need to conduct clinical trials to assure the efficacy of herbal drugs and to market them as evidence based medicine.

ACNE

Acne is a chronic inflammatory skin condition, characterized by blackheads and whiteheads (called comedones), pimples, and deeper lumps (cysts or nodules). They are caused when hair follicles are clogged with oil, bacteria and dead skins cells, and can occur on the face, neck, chest, back, shoulders and upper arms.

While once thought to be a direct result of overactive sebaceous oil glands, now we know that inflammation is the driving force behind acne. In fact, this inflammation can be seen in the skin even before a pimple pops up. And clogged follicles can also stimulate more inflammation.

TYPES OF ACNE



Acne Vulgaris:- Acne vulgaris is the medical name for common acne -- the

presence of blackheads, whiteheads, and other types of pimples on the skin. The most common spots for breakouts are the face, chest, shoulders, and back. Although mild acne may improve with over

the-counter treatments, more severe forms should be treated by a dermatologist. **Comedones :-** A comedo, or basic acne lesion, is a hair follicle that has become clogged with oil and dead skin cells. Comedones (the plural of comedo) can develop into bumps called whiteheads and blackheads. Products that may trigger comedones are called "comedogenic." Makeup labeled "noncomedogenic" is less likely to clog pores and contribute to acne. **Blackheads :-** Blackheads are comedones that are open at the surface of the skin. They are filled with excess oil and dead skin cells. It's not dirt that causes the comedone to turn black. The black hue results from the irregular reflection of light coming from clogged hair follicles. Blackheads can frequently be treated with over-the-counter medications. **Whiteheads :-** Comedones that stay closed at the surface of the skin are called whiteheads. This happens when oil and skin cells prevent a clogged hair follicle from opening. Many of the same over-the-counter medicines that treat blackheads are also effective against whiteheads **Papules :-** Papules are comedones that become inflamed, forming small red or pink bumps on the skin. This type of pimple may be sensitive to the touch. Picking or squeezing can make the inflammation worse and may lead to scarring. A large number of papules may indicate moderate to severe acne.

Pustules :- Pustules are another kind of inflamed pimple. They resemble a whitehead with a red ring around the bump. The bump is typically filled with white or yellow pus. Avoid picking or squeezing pustules. Picking can cause scars or dark spots to develop on the skin. **Nodules :-** Nodules are large, inflamed bumps that feel firm to the touch. They develop deep within the skin and are often painful. Nodules should be treated by a dermatologist since they can scar. Over-the-counter treatments may not be powerful enough to clear them up, but prescription drugs can be effective.

Cysts :- Cysts are large, pus-filled lesions that look similar to boils. Like nodules, cysts can be painful and should be treated by a dermatologist since they also can scar. People who develop nodules and cysts are usually considered to have a more severe form of acne.

TYPES OF BACTERIA CAUSING ACNE

Propionibacterium acnes:- P. acnes, an opportunistic pathogen that plays an important role in the progression of inflammatory acne vulgaris, are ubiquitously present within the sebaceous follicles of the human skin. These acne-causing bacteria are usually gram positive, nonmotile, fat splitting microorganisms, having the ability to grow under different oxygen tensions. Beingan exclusive occupant of the follicular canal, when clogging of hair follicle happens the bacterium aids in the rupturing of the follicular walls, using their secretory enzymes with degradative properties. These bacterium also target other skin cells, namely, keratinocytes and phagocytic cells like macrophages, stimulating the cells to produce proinflammatory cytokines, including interleukin (IL)-1β, IL-8, IL-12, and tumor necrosis factor-α, leading in the

inflammatory acne disease.The genomic information clearly highlights that the products of the P. acnes have a major impact on the acne process, but not the invasiveness of the organism.

Staphylococcus aureus :- S. aureus, the most prominent member of the skin microbiota, plays a role as a pathogen in many skin infections such as folliculitis and impetigo and their co existence with other microbes in acne lesions has been reported. In order for the pathogen to invade the host cell, it produces extracellular matrix and serum binding proteins such as adhesins [surface protein (SasG)] and the fibronectin binding proteins FnBP-A and FnBP-B. These factors help in their internalization into the host cells by connecting them to the cellular integrins. Once it invades the human skin as a pathogen, it starts producing several extracellular enzymes such as proteases, lipases (geh1), hyaluronidases, and collagenase, that aid in tissue damage and thus helps the pathogen to spread into the deeper tissues.Further, in their pathogenic life cycle, they are known for their production of exfoliative toxins, such as enterotoxins A–E, toxic shock syndrome toxin-1, Panton–Valentine leucocidin, leukocidin E-
D, S. aureus exotoxin, and cytotoxins such as α-, β-, γ- hemolysins. The organism produces enzymes, namely staphylokinase (sak) and aureolysin: the first enzyme binds to defensins preventing them to act against the pathogen, while the latter one binds and cleaves human cathelicidin LL-37, offering further protection for the pathogen to establish their pathogenicity in the human system.

Staphylococcus epidermidis:- S. epidermidis is a facultative anaerobe of cutaneous microbiota harbored in acne lesions. These microbes which are nonpathogenic resident flora of the human skin at some point of life turns into an infectious agent due to extrinsic factors like an immune system deficiency.The first and foremost virulence factor produced by this organism is fatty acid modifying enzyme which esterifies the fatty acids in the skin to cholesterol, as fatty acids are bactericidal for the organism to survive. The bacterium possesses several adhesion factors for its attachment to the skin surface, like surface anchored proteins, fibrinogen binding protein, autolysin protein, PIA, and poly-N-succinyl-glucosamine, helping as a probable attachment factor.

Staphylococcus pyogenes :- S. pyogenes, inhabiting skin surfaces, are β-hemolytic and catalase negative in nature and are found to be inhibited by the free fatty acids released by P. acnes, which breaks the host cell. The pathogenicity is due to the expression of an array of virulence factors by the microbes

Streptococcus agalactiae:- Like other microorganisms, S. agalactiae is also found on the surface of the human skin which causes prominent diseases such as septicemia, pneumonia, etc. Two major virulence factors, namely pore-forming toxins and the capsular polysaccharides, will be discussed here in the mechanism of pathogenesis. Pore-forming toxins such as β-hemolysin/cytolysin and CAMP factor are produced during their pathogenic lifecycle, which mediates their entry into the host cells like epithelial and endothelial cells, by forming pores into the host cells. The β-hemolysin/cytolysin is encoded by the cylE gene and can lead to an inflammatory response in the host cell, due

to their pore forming ability.

Klebsiellapneumoniae :- K. pneumoniae is a gram-negative bacterium found on the skin flora and that causes infections in acne patients undergoing long-term antibiotic therapy. Exhibiting various virulence factors such as capsular polysaccharides, adhesins, siderophores, etc., these virulence factors are responsible for producing papules and pustules in acne patients, called as gram-negative folliculitis.

Designing and development of polyherbal formulation:

Designing of polyherbal formulations by Ayurveda, which emphasizes the use of natural substances and the concept of synergy among various plant components to achieve therapeutic
effects. Furthermore, the article highlights the need for standardization and quality control of polyherbal formulations to ensure their safety and efficacy. The authors suggest that modern scientific methods, such as chromatography and spectroscopy, can be used to identify and quantify the active constituents of herbal formulations and to ensure consistency and reproducibility.

The process is divided into two phases :

Phase a: In the first phase, a survey is conducted of herbal medicines used traditionally for the treatment of acne. The selected five herbs that were commonly used and had potential anti acne activity were: Salvia officinalis, Zataria multiflora, Hypericum perforatum, Achillea millefolium, and Viola odorata. The selected herbs were then subjected to phytochemical screening and evaluation of their antimicrobial activity.

Phase b: In the second phase, the formulation of topical herbal-based products takes place by using the five selected herbs. The formulations were prepared by using a gel base like carbomer or natural origin, with different concentrations of the herbal extracts. The chosen five herbs are as follows: Neem: antibacterial, antifungal, anti-inflammatory, and antiseptic properties, Tea tree oil: antibacterial, antifungal, and anti-inflammatory properties, Aloe vera: anti
inflammatory and wound-healing properties, Lavender: antibacterial and anti-inflammatory properties, Chamomile: anti-inflammatory and soothing properties.Herbs against acne vulgaris: Various herbs and natural products commonly used in the treatment of acne vulgaris, including neem, aloe vera, turmeric, tea tree oil, and green tea. They are also compared for their efficacy for each herbal remedies with that of conventional therapies, such as topical retinoids, benzoyl peroxide, and antibiotics. The review article also discussed the limitations of conventional therapies, such as the development of antibiotic resistance and side effects like dryness and irritation of the skin. The authors suggested that herbal remedies may be a safer alternative to conventional therapies for the treatment of acne vulgaris. A study conducted by the authors by collection 22 different plant species from various regions of India and extracted their active compounds using organic solvents. The extracted compounds were then tested against a range of microorganisms, including bacteria and fungi by using agar well diffusion method.The results of the study showed that several of the plant species had significant antimicrobial

activity. For example, extracts from the plants Terminalia chebula, Emblica officinalis, and Terminalia belerica showed potent activity against a range of bacteria and fungi, including some antibiotic-resistant strains.

Some of the herbs screened in the study and their properties are:

Azadirachta indica (Neem) antimicrobial activity against a variety of bacteria and fungi

Allium sativum (Garlic) Garlic showed antimicrobial activity against both Gram-positive and Gram-negative bacteria.

Curcuma longa (Turmeric) antimicrobial activity against several bacterial and fungal strains. Ocimum sanctum (Holy basil) antimicrobial activity against several bacterial and fungal strains Emblica officinalis (Amla) antimicrobial activity against several bacterial strains **Other Herbs Used Against Acne:**

Tea tree oil: anti-inflammatory, antibacterial, and antifungal
Aloe vera: Shows anti-inflammatory and antibacterial

Neem: anti-inflammatory, antibacterial, and antifungal

Turmeric: anti-inflammatory, antioxidant, and antibacterial

Licorice root: anti-inflammatory and antibacterial

Chamomile: anti-inflammatory and antioxidant

Green tea: anti-inflammatory and antioxidant

Witch hazel: shows astringent and anti-inflammatory

Some botanicals used in treatment of acne:

Calendula (Calendula officinalis): Calendula has anti-inflammatory and antimicrobial properties

Licorice (Glycyrrhiza glabra): Licorice contains compounds that have anti-inflammatory properties

Echinacea (Echinacea purpurea): Echinacea has antimicrobial properties and can help boost the immune system

Method of Preparation :-

There are several methods for preparing polyherbal gel, and the specific method used will depend on the intended use, the properties of the herbs, and the desired texture and consistency of the gel.

Some common methods for preparing polyherbal gel include:

1. Hot infusion method: In this method, the herbs are steeped in hot water or oil to extract their active compounds. The resulting infusion is then mixed with a base material such as glycerin or aloe vera gel to create the gel.

2. Cold infusion method: This method is similar to the hot infusion method, but the herbs are steeped in cold water or oil instead. This method is often used for more delicate herbs that may be damaged by heat.

3. Decoction method: This involves simmering the herbs in water to extract their active compounds. The resulting liquid is then strained and mixed with a base material to create the gel.

4. Emulsification method: In this method, the herbal extracts are mixed with a base

material and an emulsifying agent to create a stable emulsion. This method is often used for polyherbal gels that contain oils or other ingredients that are not water-soluble.

5. Micronization method: In this method, the herbs are ground into a fine powder, and the powder is then mixed with a base material to create the gel. This method is often used for herbs that are difficult to extract using traditional methods.

6. Alcohol extraction method: In this method, the herbs are soaked in alcohol to extract their active compounds. The resulting extract is then concentrated and mixed with a base material to create the gel

Evaluation of Polyherbal gel:

The evaluation of polyherbal gel would depend on its quality and efficacy. **A. Physical properties:**

pH: this was determined by pH paper or pH meter. The standard value of pH for polyherbal gel is meant to be between 5 to 7.

Appearance: the gel should appear uniformly, free from any Discoloration or any visible amount of residue.

Viscosity: The Brookfield viscometer is an ideal equipment for determining the viscosity of the gel. The standard value lies between 20,000 to 50,000 centipoises for poly herbal gel.

B. Chemical properties:

Solid matter: the percentage of solid matter in the poly herbal gel should be between 1% to 2% after drying a sample of gel at certain temperatures.

Drug content: The gel should contain a specified amount of active ingredients as per the label claim.

C. Microbiological properties:

Microbial contamination: the gel should be free from microbial contamination, and the total aerobic microbial count should be less than 10^3 CFU/g. Total yeast or mold count should be less than 10^2 CFU/g. Salmonella and Escherichia strains of bacteria should be absent.

D. Stability:

The stability of poly herbal gel is carried out by an ideal device called Stability chambers. A typical stability study for a polyherbal gel may involve storing the gel at 25°C ± 2°C and 60% ± 5% relative humidity for 3 months or more. During this time, the gel should be evaluated periodically for changes in physical appearance, pH, drug content, and microbial contamination.

Conclusion:

For the development of innovative treatments, plants are regarded as a significant source of potentially advantageous ingredients because the vast majority of them are safe and have little to no side effects. (s). As comparison to cream and ointment, topical administration of gels at pathological locations offers substantial advantages in a faster release of a medicine directly to the site of action. This study indicated that all herbal ingredients have different chemical constituents and shows presence of antimicrobial activity.

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