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Novel Herbal Drug Delivery System

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Abstract: *Also been accepted by people of developed and developing countries that since prurient medicinal different skin diseases. external microbes and environmental pollution, the epidermis plays a major and vital character in from indigenous culture development of the traditional medicines use and developed for the curing foFrom the early advancement, plants have been utilized as a medication for diseases. It has gigantea R. Br., Cassia occidentalis L., Michelia champaca L. Mangifera indica L., Schleichera health, diseases, illness. In the human body, the skin is the largest organ. For the protection from Jform which occurs as well as widely spread in the whole world, basically the primary organisms oleosa (Lour.) Oken, Tephrosia purpurea (L.) Pers., Vernonia cinerea (L.) Less. etc. The present plants having a certain bit in human life to cure various diseases. Ethnomedicinal plants that arise review paper revealed about 56 different species belonging to 33 families being used against ringworms, burns, eczema, allergies, etc. Some of the plant species that help in the fight again skin diseases such indica. Juss., And rographis paniculata (Burm. £.) Wall., Calotropis shielding the human body. But due to day 1o day life scheduled the skin illness are found in a unique us with many medicinal plant species recorded against different skin diseases such as rashes, which are fungi, parasites, microorganisms, viral and bacterial diseases. This review paper provides.*

Keywords: Skin disorder , Microorganism, Traditional

I. INTRODUCTION

In India, around 6000 plants are used in traditional, herbal medicines, etc. Due to the presence of 16 different agro-climatic zones, 25 biotic provenances, 10 vegetation zones, and 426biomass India's diversity is unlatching (Asthanaetal., 2012)[1]. Since prehistoric times plants have been a part of human culture. It is found that about 5000 species possess a distinct medical utility amid 250000 multi-story plant species on the globe (Joy et al., 1998). Though the WorldHealth Organisation (WHO) has estimated that medicines by the people as increasing demand Skin diseases are one such common for providing initial health care, as they were disorder, because of helpless sterilization toexhaustively obtainable and cheap (Nath & dietary food supplements influencing Behera, 2018). Centuries of medicinal plants are individuals around the world, particularly inutilized worldwide for skin diseases caused by both urban areas and rural areas of developingbacteria, microorganisms, fungi, and viruses, countries (Policepatel & Manikrao, 2013)[2]. Skin thus traditional medicinal plants used in India s the body's outer covering, that protects fromare about 4000 years old as medicine is as old s heat and light, injury, and infection which the history of mankind (Al-Douri & Al-Essa, measures up to 6 pounds is the body's largest2010: Dolatkhahi et al., 2014; Prashantkumar& organ and regulates body temperature, stores Vidyasagar, 2008). In couple of years, those water, fat, including vitamin D (Mohanty et al employed in the Ayurveda and different ancient 2019). Many herbs that are rich in antioxidants systems of medicines; particularly there has minerals, and bioflavonoids are of great been an amazing increase in interest within the importance for the skin and can cleanse,medicinal plants (Bhat et al. 2014). The hydrate, Gheal, and balance the skin (Saikia etc. the traditional use of medicinal plants for primary 2006). For skin contaminations some miniature healthcare has been especially significant as the living beings capable which can be bacterial herbal medicines from the closest nature are not contagious, parasitic, or viral in nature (Abbasionly easily accessible and immediately et al, 2010). Everywhere on the world Plants available, but also, most effective, dependable have been utilized by different societies to treat and curative (Mahalik et al., 2015). In the rural skin illnesses or their manifestations brought as well as in urban communities, wound arising about by miniature living beings (Prashankumar from bruises, cuts, and scratches, amongst and Vidyasagar, 2008). Showing the others, are generally untreated at the initial significance of conventional medication in the stages.[3]

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II. HERBAL MEDICINE

Herbal medicine may be defined as a dosage form consisting of one or more plant parts or processed plant parts that provide specific or other benefits in the diagnosis, treatment and prevention of diseases in humans or animals and also may have nutritional value . Herbal drugs constitute a major contribution to all the officially renowned systems such as Ayurveda, Yoga, Unani, Siddha, Homeopathy and Naturopathy. Herbal remedies are medicinal plants that contain as active ingredients plant materials such as juices, gums, fatty oils, essential oils and many other substances of these. They also include crude plant material such as leaves, fruit, seed, bark, root, stem, or other parts of the plants entirely or fragmented by using different local methods of different countries like extraction, purification, fractionation*4*

III. DRUG DISCOVERY CHALLENGES FROM PLANTS AND RECENT ADVANCEMENT

Scientists will require improving the quality and quantity of the natural product compounds that enter the drug development phase to keep pace with the modern drug discovery process. Discovery and development of plantbased drug products have traditionally been lengthier and more complex than other drug discovery methods . Researchers of this arena also require collaboration with other academic departments such as biology, chemistry, ecology, and nutrition to continue their investigations on medicinal plants . Nuclear magnetic resonance spectroscopy (NMR) and mass spectrometry (MS) are currently in wide use for the modern drug discovery process; these methods could be applied to plant-based drug discovery to facilitate compound isolation . In the medicinal plant-based lead discovery and optimization, high throughput X-ray crystallography could also be applied .. Another approach to improve herbal compound development may involve the establishment of the herbal compound and herbal compound derivatives library that combine the features of herbal compounds Omni storial chemistry. Though facing lots of challenges and difficulties by the scientists involved in drug discovery from medicinal plants, compounds isolated from medicinal plants can be predicted to remain an essential component in the search of a new chemical entity having therapeutic potential. However, lots of research is going on in this field.

IV. SCOPE OF NOVEL DRUG DELIVERY SYSTEM FOR HERBAL DRUGS

There is huge potential to utilize novel approaches of delivering herbal products, several researchers are working towards the development of novel drug delivery systems like mouth dissolving tablets, sustained and extended release formulations, muco-adhesive systems, transdermal dosage forms, microparticles, microcapsules, nanoparticles, implants etc. of herbs. Many of them have already reached to market and some of them are at the laboratory

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Many drug molecules such as Digoxin, Quinine, Morphine, Atropine, Colchicine, Bromelain, etc had been isolated from the plants as their active components for the treatment of various diseases. Many of the plant-based herbal formulations have the potential to provide remedy of cancer and inflammation such asCurcumin, Triphala, Pomegranate, Kalonji, Sariva, etc . Novel drug delivery systems have gained the popularity and importance to achieve modified delivery of herbal drugs, thereby increasing the therapeutic effect with lowering toxicity. Lower bioavailability due todecrease drug absorption and lack of target specificity are the two major limitationscurrently available formulations of herbal drugs Novel herbal drug delivery systems are designed to subdue the limitations of the currently available herbal drug formulations due to its wide range of advantage to mankind can be summarized as follows:

The novel herbal drug delivery system can be used to achieve site specificity. Novel drug delivery system enhances the surface area of the drugs, therefore allows quicker absorption and rapid onset of action. The enhanced penetration of nanoparticles through Blood Brain Barrier (BBB)..In the recent past, much attention has been given to development of novel herbal drug delivery systems.

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Bioactive plant extracts many constituents of the herbal drugs will be degraded in the highly acidic pH of the stomach before reaching to the systemic circulation and other constituents may be subjected to first pass metabolism resulting in reduced bioavailability of herbal drugs. If the drug does not reach in the optimum amount to the targeted area will fail to maintain "minimum effective level," then there will be no therapeutic effect of the drug. Nanocarriers applying to herbal remacidic pH of the stomach, liver metabolism and results in the prolonged action of the drug and rapid onset of action due to their small size . Herbal products are considered as a potential candidate for delivery through the novel delivery system because of the following properties: Many natural compounds were shown to produce better results without having side effects than many other drugs or surgical procedures. They can deliver mixtures of multi functional molecules with potentiating and synergistic effects. They have a strong traditional or conceptual base and the potential to be a s drugs in terms of safety and activeness whereas modern medicines e a very strong experimental basis for their use but are potent ixic

VI. FUTURE PROSPECTIVE

Compounds including antioxidants and constituents that can be used in purposeful foods. This kind of collaborative research among the traditional herbal medicines and modern approaches of drug delivery systems, i.e. The widespread uses of natural products with medicinal properties are obtained from commonly used herbs and medicinal plants .Herbal medicines have been used vastly by the major part of the population for curing ailments. All over the world, the exploration has been going on herbal remedies. The development of herbal medicine in the drug delivery system in a number of organizations is being performed at basic and clinical trial levels. Though the herbal formulations are unexpected to cure diseases fully, they can assist in the better regulation of diseases by the patient himself. Besides, it can also improve the quality of life by giving nutritional supplements as well. The only necessity is to develop the better drug delivery system of such drugs at the sites and in the entire body in the doses which will not accommodate with the existing treatment. Toxicity & hypersensitivity reactions of some marked drugs may also overcome through the approach of different delivery of herbal drugs. Hence, using herbal medicine in the novel drug delivery system will increase its effectiveness for

Treatment of many chronic diseases and health benefits. There are so many successful

Examples with evidence are present in the direction of nano research . Herbal medicines also improving resources of advantageous Nanotechnology" has established striking therapies to the pharmaceutical in near future that will improve the health of people. It is expected that the effectual and valuable topicality of natural and herbal product

VII. STANDARDIZATION OF HERBAL DRUG

Standardization of herbal drugs is the process of evaluating the quality and purity of crude drug by means of various parameters like morphology, physical, chemical and biological observation.

Need of standardization: - In recent years there is a spurt in the interest regarding survival of ayurvedic forms of medication. In the global perspective, there is a shift towards the use of medicine of herbal origin. As the dangers and the shortcomings of modern medicine have become more apparent, the majority of Ayurvedic formulations are prepared from herb s.It is the cardinal responsibility of the regulatory authorities to ensure that the consumers get the medication, which guarantee. Purity, safety, potency and efficacy. WHO has emphasized the need to ensure quality control of medicinal plant products by using modern techniques and by applying suitable parameters and standards.

Current Regulation for standardization of crude drugs:-In India a great deal of bulk knowledge exists among ordinary people about the traditional use of herbal medicine. It is difficult to quantify the market size of the traditional Indian system. Since most practitioners formulate and dispense their own recipes .The present annual turnover of product manufactured by large companies is estimated at approximately US$300 million compared to a turnover of approximately US$2.5 billion for modern drugs. According to the study on the attitude of modern medicine practitioners are relatively unfamiliar with Ayurvedic products even though some are practiced. They are willing to try an Ayurvedic product if it reduces disease. Liver and skin disease.

Conventional Methods For Standardization Of Crude Drug :-Standardization of herbal raw drugs includes passport data of raw plant drugs. It includes medico-botanical survey, identification, botanical authentication, macroscopic examination. Testing of drugs as per approved Pharmacopoeial testing protocol- Fully pharmacognostical profile,

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Identification by various chromatographic techniques, Assessment of purity by physico-chemical profi/le, Assessment of strength by active marker or assay estimation and Safety by heavy metal profiling, microbiological limit test analysis, aflatoxins analysis, pesticides residue and biological activity. Further, advances in microscope technology have increased the accuracy and capabilities of microscopy as a mean of herbal crude material identification due to the implication of light and scanning electron microscopes (SEM) in herbal drug standardization .

VIII. WHO GUIDELINES FOR QUALITY OF HERBAL FORMULATION

1. Quality control of crude drug material, plant preparations and finished products.
2. Stability assessment and shelf life.
3. Safety assessment; documentation of safety based on experience or toxicological studies 4) Assessment of efficacy by ethno- medical information and biological activity evaluations.

The bioactive extract should be standardized on the basis of active principles or major compounds along with the chromatographic fingerprints (TLC, HPTLC, HPLC, and GC). Generally, all medicines, whether they are synthetic or of plant origin, should fulfill the basic requirement of being safe and effective.The term 'herbal drugs' denotes plants or plant parts that have been converted into phytopharmaceuticals by means of simple processes involving harvesting, drying and storage.

8.1 Quality Control of Herbal Drugs

Quality control is a term that refers to processes involved in maintaining the quality and validity of a manufactured product15. In general, quality control is based on three important Pharmacopoeial aspects –

- Identity or authenticity- it should have one herb.
- Purity – it should not have any contaminant other than herb.
- Assay or Content -the active constituents should be within the defined limits.

Identity can be achieved by macro and microscopically examinations . In addition to this identity tests, which include simple chemical tests, eg.color or precipitation and chromatographic tests are also necessary. These chemical and chromatographic tests help to provide batch to batch comparability and the chromatogram may be used as a 'fingerprint' for the herbal ingredient by demonstrating the profile of some common plant constituents such as flavonoids, alkaloids and terpenes

Stability Assessment And Shelf Life:- Prolonged and apparently uneventful use of a substance usually offers testimony of its safety. In a few instances, however, investigation of the potential toxicity of naturally occurring substances widely used as ingredients in these preparations has revealed previously unsuspected potential for systemic toxicity, carcinogenicity and teratogenicity.Regulatory authorities need to be quickly and reliably informed of these findings. They should also have the authority to respond promptly to such alerts, either by withdrawing or varying the licenses of registered products containing suspect substances, or by rescheduling the substances to limit their use to medical prescription.

Assessment of Quality All procedures should be in accordance with good manufacturing practices

Crude Plant Material:-The botanical definition, including genus, species and authority, description, part of the plant, active and characteristics constituents should be specified and, if possible content limits should be defined.Foreign matter, impurities and microbial content should be defined or limited. Voucher specimens, representing each lot of plant material processed, should be authenticated by a qualified botanist and should be stored for at least a 10-year period. A lot number should be assigned and this should appear on the product label.

Plant Preparations The manufacturing procedure should be described in detail. If other substances are added during manufacture in order to adjust the plant preparation to a certain level of active or characteristic constituents or for any other purpose, the added substances should be mentioned in the manufacturing procedures.A method for identification and, where possible, assay of the plant preparation should be added. If identification of an active principle is not possible, it should be sufficient to identify a characteristic substance or mixture of substances to ensure consistent quality of the preparation.

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Finished Product The manufacturing procedure and formula, including the amount of excipients, should be described in detail. A finished product specification should be defined to ensure consistent quality of the product. The finished product should be with general requirements for particular dosage form .

Stability The physical and chemical stability of the product in the container in which it is to be marketed should be tested under defined storage conditions and the shelf-life should be established..

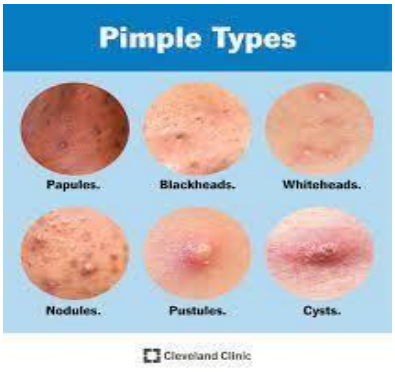
Safety Assessment Herbal medicines are generally regarded as safe based on their long-standing use in various cultures. However, there are case reports of serious adverse events after administration of herbal products. In a lot of cases, the toxicity has been traced to contaminants and adulteration. However, some of the plants used in herbal medicines can also be highly toxic. As a whole, herbal medicines can have a risk of adverse effects and drug-drug and drug-food interactions if not properly assessed. Assessment of the safety of herbal products, therefore, is the first priority in herbal research. These are various approaches to the evaluation of safety of herbal medicines. Several reports suggest that many herbal products contain undisclosed pharmaceuticals and heavy metals..The intentional use of pharmaceutical adulterants is possible. Agrochemicals are used to protect the plant from the crude plant material. Moreover, the mechanism of action, pharmacokinetics and drug-drug interactions of many herbs are still in infancy. Clinicians should not prescribe or recommend herbal remedies without well-established efficacy as if they were medications that had been proven effective by rigorous study

Assessment of Toxicity investigation will also be required because the analysis alone is unlikely to reveal the contributions to toxicity itself. In assessing toxicity of an herbal medicine, the dose chosen is very important.. Toxicity assessment involves one or more of the following techniques- In vivo techniques, in vitro techniques, cell line techniques, micro- array and other modern techniques, standardization and techniques to adequately model toxicity..

8.2 Types of Skin Disorder

- Acne
- Alopecia Areata
- Atopic Dermatitis
- Epidermolysis Bullosa
- Hidradenitis Suppurativa (HS)
- Ichthyosis
- Pachyonychia Congenita
- Pemphigus
- Psoriasis
- Raynaud's Phenomenon
- Rosacea
- Scleroderma
- Vitiligo

Acne



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Acne is a common skin condition that happens when hair follicles under the skin become clogged. Sebum—oil that helps keep skin from drying out—and dead skin cells clog the pores, which leads to outbreaks of lesions, commonly called pimples or zits. Most often, the outbreaks occur on the face but can also appear on the back, chest, and shoulders.
Acne is an inflammatory disorder of the skin, which has sebaceous (oil) glands that connect to the hair follicle, which contains fine hair. In healthy skin, the sebaceous glands make sebum that empties onto the skin surface through the pore, which is an opening in the follicle.
Keratinocytes, a type of skin cell, line the follicle. Normally as the body sheds skin cells, the keratinocytes rise to the surface of the skin. When someone has acne, the hair, sebum, and keratinocytes stick together inside the pore. This prevents the keratinocytes from shedding and keeps the sebum from reaching the surface of the skin.
The mixture of oil and cells allows bacteria that normally live on the skin to grow in the plugged follicles and cause inflammation—swelling, redness, heat, and pain. When the wall of the plugged follicle breaks down, it spills the bacteria, skin cells, and sebum into nearby skin, creating lesions or pimples.For most people, acne tends to go away by the time they reach their thirties, but some people in their forties and fifties continue to have this skin problem.
Acne causes several types of lesions, or pimples. Doctors refer to enlarged or clogged hair follicles as comedones.

Types of Acne:

1. Whiteheads: Clogged hair follicles that stay beneath the skin and produce a white bump.
2. Blackheads: Plugged follicles that reach the surface of the skin and open up. They look black on the skin surface because the air discolors the sebum, not because they are dirty.
3. Papules: Inflamed lesions that usually appear as small, pink bumps on the skin and can be tender to the touch.
4. Pustules or pimples: Papules topped by white or yellow pus-filled lesions that may be red at the base.
5. Nodules: Large, painful solid lesions that are lodged deep within the skin.
6. Severe nodular acne (sometimes called cystic acne): Deep, painful, pus-filled lesions

Novel herbal drug with Anti-Acne Activity

Herbal medicines are gaining increased popularity due to their advantages, such as better patient tolerance, long history of use, fewer side-effects and being relatively less expensive .Furthermore, they have provided good evidence for the treatment of a wide variety of difficult to cure diseases . These plants are used alone or in combination with synthetic drugs to treat diseases. More importantly, other than consumption as a preventive or treatment remedy, they might be accompanied with synthetic drugs to reduce their side effects . With no exception, botanical drugs are also used accompanied by other methods or alone to treat acne vulgaris. Many medicinal plants with anti-inflammation and antibacterial activities are used in different ways in the treatment of acne and other infectious diseases. *Matricariarecutita*, *Calendula officinalis* and *Triticum aestivum* are commonly used species of these plants . Creams or aqueous infusions made from plants including astringents and composites such as tannins are used topically on skin after cleansing or a steam bath. *Hamamelis virginiana* has tannins and extraction of epidermis is commonly used to treat acne because it is very safe for topical prescription. Other plants containing tannins are white oak's bark (*Quercus alba*), walnut's leaf (*Juglans regia*), *Agrimonia eupatoria*, *Syzygiumcuminum*, *Syzygiumcuminum*, *Ledum latifolium*, *Alchemilla mollis*, *Lavandula angustifolia*, *Verbascum thapsus*, *Krameria triandra*, *Rheum palmatum*, *Hypericum perforatum* and *Rumex crispus* .. Other plants that are traditionally used topically or as a depurative include *Bellis perennis*, *Viola tricolor*, *Elymus repens* and *Taraxacum officinale*. Topical use of horsetail depurative (*Equisetum*

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species) is recommended due to the high amount of silicic acid and yellow milk of *Aloe ferox* fresh leaves because of anthranoids.

Vitex agnus-castus is used for acne before menstruation. The whole fruit extract acting on follicle stimulating and luteinizing hormone levels in the pituitary gland led to an increase in progesterone and decrease in estrogen levels through the dopaminergic mechanism, declining the level of premenstrual prolactin. German Commission E has recommended daily intake of 40 mg *Vitex agnus-castus* extract for the treatment of acne. Pregnant and nursing women should not use this plant. Adverse side effects such as gastrointestinal disturbances and skin rashes have been reported In addition to the traditional use of herbal medicines as anti-acne, antibacterial activities of some plants in order to determine their potential as acne herbal treatment have been investigated . An anaerobic pathogen, *P. acnes*, plays an important role in acne pathogenesis and seems to begin the inflammatory process through stimulating the production of reactive oxygen species (ROS) and release of inflammatory and proinflammatory cytokines. Interestingly, the inhibitory effect of licorice (*Glycyrrhiza glabra*) is not associated with bacterial resistance induction of the growth of *P. acnes* in vitro .

Topical use of 50% *Aloe vera* gel with tretinoin cream was well tolerated during eight weeks in a randomized double-blind clinical trial with 60 patients suffering from mild-moderate acne and was significantly more effective than tretinoin and vehicles. German Commission E has confirmed the topical use of *Solanum dulcamara* and edible use of *Saccharomyces cerevisiae* because of their antibacterial effect as an acne remedy . In China, *Lemna minor* has been used topically to treat acne. A clinical trial noted that consumption of gugulipid, standardized extraction of oleoresin of an Indian herbal plant named *Commiphora mukul*, for three months, was effective in treating acne. Interestingly, the patients with oily skin respond remarkably to gugulipid. It should be noted that the aforementioned studies had a number of methodological limitations, for instance, there were only 10 individuals in each group (and without placebo), thus there was not enough power to determine significant differences between the medicines.

Use of 2% lotion of green tea (*Camellia sinensis*) topically, during six weeks among 20 patients suffering from mild to moderate acne, was found to be effective compared with pretreatment. Tannins and flavonoids of green tea may possess an anti-acne effect, since they seem to have an antiseptic effect while tannins also have an antiinflammatoryeffect. In Western traditional medicine the root of *Mahonia aquifolium* or *Berberis aquifolium* has been used to treat chronic skin rashes (pustule). The main effective substances of *Mahonia* extracts include two alkaloids of Protoberberine, namely Jatrorrhizine and Berberine, which have inhibited the in vitro growth of *Staphylococcus coagulase*, *P. acne* and *Candida* species. Berberine (100 µmol/mL) in an animal model inhibited fat production in Sebaceous by 63% .

Berberine alkaloid is a bitter substance with anti-fat production and anti-inflammatory effect on 3T3-L1 fatty cells, and its anti-fat production effect, has been related to down regulation of fat production enzymes and transcription factors. However, the exact mechanism of Berberine and herbs enriched in Berberine is still unknown . Tea tree oil (TTO) has a broad spectrum of antibacterial properties and reduces skin inflammation due to inhibition of histamine release. Five percent tea tree oil and 5% benzoyl peroxide improved acne in a threemonth single-blind clinical trial on 124 patients, however, the effect of tea tree oil began slowly and a few patients in the tea tree oil group showed skin complications . While the mentioned study had no placebo group, a 45-day double-blind, randomized trial with 60 patients showed the efficacy of 5% topical gel of tea tree oil on mild to moderate vulgaris acne. The efficiency of tea tree oil gel for the total numbers of acne lesions and intensity index of acne was found to be 3.55 and 5.75 times higher than the placebo, respectively

Gluconolactone is made of a polyhydroxy acid formed by *S. boulardii*. The results of a double-blind clinical study on150 patients with topical usage of a 14% gluconolactone solution showed the removal of inflamed acne lesions, which was significantly superior when compared to the placebo and comparable with 5% benzoyl peroxide, however, with less adverse side effects . The plants, which have gained more popularity for the treatment or prevention of Acne vulgaris during the past two decades, are presented with more details below.

Achyranthes aspera

This medicinal plant is traditionally used for the treatment of Acne vulgaris, eruptions of the skin, boils, scabies and other skin diseases. Saponin, alkaloid and non-alkaloid fractions obtained from the leaves of this plant have enormous inhibitory effect on the Epstein-Barr virus early antigen activation in Raji cells, with the most inhibitory activity

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(96.9%; 60% viability) observed for the non-alkaloid fraction, which contains non-polar compounds. In the in vivo two-stage mouse skin carcinogenesis test the total methanolic extract possessed a pronounced anti-carcinogenic effect (76%). The results revealed that the leaf extract and the non-alkaloid fractions were valuable antitumor promoters in carcinogenesis. The plant has abortifacient properties in rodents and also has contraceptive activity, which might be due to its potent estrogenic activity .

Allium cepa

Onion extract gel has shown the ability to improve the appearance of scars in patients with seborrheic keratosis. This extract gel has been shown to improve the scar's appearance by improving its redness, softness and texture at excision site four, 6 and 10 weeks after the extract usage . In another study, the antimicrobial and antifungal properties of a *A. cepa* and *A. sativum* were revealed against *Malassezia furfur*, *Candida albicans* and some other *Candida* sp, as well as some strains of dermatophytes and Acne vulgaris microbes. The results indicated that *A. cepa* and *A. sativum* might be promising in the treatment of bacterial and fungal-associated infections .

Azadirachta indica

In a study, conducted on an anti-acne formulation prepared from herbal extracts, it was revealed that ethanol extract of *Azadirachta indica*, *G. glabra*, *Andrographis paniculata*, *Ocimum sanctum*, and green tea possessed the potential for inhibiting acne. In this study the anti-acne formula successfully acted against *Propionibacterium* and *Staphylococcus epidermidis* . Aqueous extract of *Azadirachta indica* leaves also possess chemopreventive potential against murine skin carcinogenesis. Skin tumors have been shown to enhance the expression of proliferating cell nuclear antigen in comparison to the control group. In this study, skin tumors exhibited a high level of lipid peroxidation .

Cannabis sativus

The seed oil of *Cannabis sativus* is useful for the treatment of acne rosacea, seborrhoeic dermatitis, eczema, dermatitis, psoriasis and lichen planus. The leaves powder of this plant is very useful as a wound and sore dressing. *Cannabis sativus* extract is externally useful to relieve pain in itchy skin. The seed oil strengthens the skin and makes it more resistant to bacterial, fungal and viral infections .

Echinacea angustifolia and Echinacea purpurea

The extract of *Echinacea purpurea* has been shown to readily kill *P. acnes*, which is the main cause of acne vulgaris. In cell culture models, *P. acnes* induced substantial secretion of several pro-inflammatory cytokines, such as IL-6 and IL-8. However, the *E. purpurea* was able to completely reverse this effect to normal leaves. Hence, *E. purpurea* provided a safe two-fold benefit to acne patients by inhibiting bacterial-induced inflammation and inhibiting the proliferation of organisms . Echinacea has also been used to treat other skin problems such as psoriasis, skin wounds, burns, ulcers, herpes and hemorrhoids .

Rosmarinus officinalis

Rosmarinus officinalis is a household plant, which is grown in many parts of the world. It is used as a beverage drink, flavoring food, as well as in cosmetics. *Rosmarinus officinalis* contains rosmarinic acid. Chronic UV exposure has manifestations such as photo-cancers and photo aging. Aqueous extract of *R. officinalis* is effective in prevention of photo damage induced by UV radiations due to its antioxidant effect. Infections are also associated with oxidative stress. Therefore, the compounds, which possess antioxidant properties, might be beneficial in this way, regardless of their antibacterial activity. *Rosmarinus officinalis* oil has also been effective against *P. acnes*, a type of bacteria that causes acne. In a study, the antibacterial properties of *R. officinalis* essential oil was evaluated against *P. acnes* in which significant changes were reported in size and morphology of *P. acnes* in response to treatment

Melaleuca alternifolia

Melaleuca alternifolia or tea-tree is a tree or tall shrub in the plant genus *Melaleuca*. It is native to Australia, and occurs in the north coast and adjacent areas of New South Wales. It also grows on swampy flats and along streams and where

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it occurs, it is often the dominant species. Tea tree oil is a broad-spectrum agent against Grampositive and Gram-negative bacteria and even *S. aureus* resistant to methicillin and yeasts such as *C. albicans* in vitro. Its mechanism of action has been attributed to monoterpenes, which cause disruption of the plasma membrane barrier. Other than antimicrobial activity, tea tree oil has monocyte activators and anti-inflammatory activities. Topical use of low concentrations of tea tree oil has anti acne activity with low side effects. It is effective in chronic infectious wounds and osteomyelitis

Eucalyptus globulus, E. viminalis and E. maculata

In one study, the leaf extractions of 29 *Eucalyptus* species were examined for anti-microbial activities. Extractions of *Eucalyptus globulus*, *E. maculata* and *E. viminalis* were able to inhibit the growth of six grampositive bacteria including *P. acnes*, *S. aureus*, *Enterococcus faecalis*, *Bacillus cereus* and *Alicyclobacillus acidoterrestris*, and a fungi, Trichophyton mentagrophytes, yet they did not show a strong inhibitory activity against gram-negative bacteria. A component of *E. maculate* (8-desmethyl-eucalyptin) also had strong inhibitory activity against the above-mentioned microorganisms. The authors concluded that *Eucalyptus* extracts and some components isolated from this plant had an inhibitory effect on microorganisms causing acne and Athlete's foot infection, as well as some fungal infections. Clinical trials with positive effects are summarized in below

Medicinal Plants	Family	Used Part(s)	Characteristics
Aloe vera	Xanthorrhoeaceae	extracts	anti-bacterial and anti-inflammatory properties
Azadirachta indica	Meliaceae	extracts	anti-bacterial and anti-inflammatory properties
Curcuma longa	Zingiberaceae	extracts	anti-bacterial and anti-inflammatory properties
Hemidesmus indicus	Apocynaceae	extracts	anti-bacterial and anti-inflammatory properties
Terminalia chebula	Combretaceae	extracts	anti-bacterial and anti-inflammatory properties
Withaniasomnifera	Solanaceae	extracts	anti-bacterial and anti-inflammatory properties
Butyrosperm um paradoxum	Sapotaceae	oil	antibacterial activity

Pemphigus

is a disease that causes blistering of the skin and the inside of the mouth, nose, throat, eyes, and genitals. The disease is rare in the United States.

Pemphigus is an autoimmune disease in which the immune system mistakenly attacks cells in the top layer of the skin (epidermis) and the mucous membranes. People with the disease produce antibodies against desmogleins, proteins that bind skin cells to one another. When these bonds are disrupted, skin becomes fragile, and fluid can collect between its layers, forming blisters.

The two main forms of pemphigus are:

- **Pemphigus vulgaris** is the most common type in the United States. Blisters form in the mouth and other mucosal surfaces, as well as on the skin. They develop within a deep layer of the epidermis and are often painful. There is a subtype of the disease called pemphigus vegetans in which blisters form mainly in the groin and under the arms.
- **Pemphigus foliaceus** is less common and only affects the skin. The blisters form in upper layers of the epidermis and may be itchy or painful.12

Other rare forms of pemphigus include

- Paraneoplastic pemphigus
- IgA pemphigus.
- Drug-induced pemphigus

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Symptoms

- Pemphigus vulgaris
- Pemphigus foliaceus

IX. HERBAL DRUG USED IN PEMPHIGUS

Following drugs were prescribed

Oral Formulation

- Kamdudha Ras 250 mg
- Muktashukti 250 mg
- SanjeevaniVati 1 gm
- SanshamaniVati: 1 gm
- Shanka bhasma 500 mg

Mix the combination of above mentioned drugs and make small packets in equal quantities and give 1 BD with normal water to the patient. Paripathadi kadha 20-20 ml BD Content of Topical Gel Formulation Aloe vera Turmeric Honey Cow Ghee Karanj Oil The gel prepared from above ingredients used locally 03 times daily. Shatdhout ghrut cream (Twice daily) Follow up period: After every 10 days n in skin disease. The Ama Pachak action removes diseases caused by toxins including auto-immune problems where Ama is considered as a toxin. Paripathadi Kadha is an ayurvedic decoction which helps to relieve burning sensation thus considered useful for inflammatory skin diseases. It reduces fever and heat stroke, reduces skin rashes and blisters, the Pitta shamak effects offers benefits in skin ailments where Pitta vitiation is observed. The Shankha bhasma possess Katu Rasa thus helps to reduce acidity and improves digestive ailments which can cause formation of Ama, Laghu Guna is responsible for absorption of drug at the site of action. Tikshna Guna removes and prevents Ama while Ushna Virya helps to break Ama and auto-immune pathogenesis. According to Ayurveda Karanja oil is good for skin to cure boils and wounds, the Ropan and cleaning effects helps in skin disease such as; Pemphigus Vulgaris. Aloe vera as topical gel formulation imparts antiinflammatory properties thus reducing itching and burning sensation. The hydrating properties of Aloe vera help to moisturize skin and provide cooling and soothing effects therefore relieving symptoms of inflammation in skin diseases like; Pemphigus Vulgaris. ShatadhautaGhrita as topical formulation provides moisturizing property, helps to treat dry skin, and removes scars and blisters, the astringent qualities balances skin Doshas and prevents discharge from skin and imparts symptomatic relief in skin diseases associated with inflammatory manifestations. Ayurveda helps to normalize the autonomic functions through enhanced vagal tone and reduction in Ama also reduces autoimmune destructions. The reduction in inflammation by prescribed medicines also imparts beneficial effects in disease conditions. Turmeric acts as an antiinflammatory drug and relieves pain and itching. Oil used in therapy also offers anti-inflammatory effects and provides relief in burning sensation. The patient described relief from stress due to the positive effects of therapy which also boost his morale and confidence level. This psychological change imparts other health benefits and fast recovery from typical manifestations of disease. Therapy prevents formation of toxins and corrects Agni thus both therapies (oral & topical) offer improvement in disease synergistically. The prescribed drugs balance Doshas and potentiated Dhatus thus exhibited marked improvement in classical symptoms of Pemphigus Vulgaris. The drugs used in therapy improved digestion and corrected Pitta Dosha which mainly involved in disease pathogenesis. Detoxification by Ayurveda therapy helps greatly in stopping disease pathogenesis. The Raktashodhak medicines remove impurities of blood and fasten the healing process of the body. The cooling and soothing effects of topical gel formulations relieves symptoms of burning sensation and pain, moreover the wound healing capacity of topical gel formulations reduces percentage of affected area and relieves itching at

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S. No	Formula and Ingredients		
	Science name	Botany Family	Weight
1	*Crinum latifolium* L.	Amaryllidaceae	20 gram
2	*Hedyotis diffusa* (Willd.)	Rubiaceae	20 gram
3	*Biota orientalis* (L.) Endl.	Cupressaceae	15 gram
4	*Smilax glabra* Roxb.	Smilacaceae	15 gram
5	*Lonicera japonica* Thunb.	Caprifoliaceae	20 gram
6	*Forsythia suspensa* (Thunb.) Martin Vahl.	Oleaceae	12 gram
7	*Salvia miltiorrhiza* Bunge.	Lamiaceae	8 gram
8	*Excoecaria cochinchinensis* Lour.	Euphorbiaceae	12 gram
9	*Angelica sinensis* (Oliv.) Diels.	Apiaceae	8 gram
10	*Prunella vulgaris* L.	Lamiaceae	12 gram

Alopecia areata

It is a disease that happens when the immune system attacks hair follicles and causes hair loss. Hair follicles are the structures in skin that form hair. While hair can be lost from any part of the body, alopecia areata usually affects the head and face. Hair typically falls out in small, round patches about the size of a quarter, but in some cases, hair loss is more extensive. Most people with the disease are healthy and have no other symptoms.

The course of alopecia areata varies from person to person. Some have bouts of hair loss throughout their lives, while others only have one episode. Recovery is unpredictable too, with hair regrowing fully in some people but not others.

There is no cure for alopecia areata, but there are treatments that help hair grow back more quickly. There are also resources to help people cope with hair loss. Anyone can have alopecia areata. Men and women get it equally, and it affects all racial and ethnic groups. The onset can be at any age, but most people get it in their teens, twenties, or thirties. When it occurs in children younger than age 10, it tends to be more extensive and progressive.

If you have a close family member with the disease, you may have a higher risk of getting it, but for many people, there is no family history. Scientists have linked a number of genes to the disease, which suggests that genetics play a role in alopecia areata. Many of the genes they have found are important for the functioning of the immune system.

People with certain autoimmune diseases, such as psoriasis, thyroid disease, or vitiligo, are more likely to get alopecia areata, as are those with allergic conditions such as hay fever.

It is possible that emotional stress or an illness can bring on alopecia areata in people who are at risk, but in most cases, there is no obvious trigger.

Type:

There are three main types of alopecia areata:

1. **Patchy alopecia areata.** In this type, which is the most common, hair loss happens in one or more coinsized patches on the scalp or other parts of the body.
2. **Alopecia totalis.** People with this type lose all or nearly all of the hair on their scalp.
3. **Alopecia universalis.** In this type, which is rare, there is a complete or nearly complete loss of hair on the scalp, face, and rest of the body.

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Symptoms

Alopecia areata primarily affects hair, but in some cases, there are nail changes as well. People with the disease are usually healthy and have no other symptoms.

Hair Changes

Alopecia areata typically begins with sudden loss of round or oval patches of hair on the scalp, but any part of the body may be affected, such as the beard area in men, or the eyebrows or eyelashes. Around the edges of the patch, there are often short broken hairs or "exclamation point" hairs that are narrower at their base than their tip. There is usually no sign of a rash, redness, or scarring on the bare patches. Some people say they feel tingling, burning, or itching on patches of skin right before the hair falls out.

When a bare patch develops, it is hard to predict what will happen next. The possibilities include: The hair regrows within a few months. It may look white or gray at first but may regain its natural color over time.

Additional bare patches develop. Sometimes hair regrows in the first patch while new bare patches are forming.

Small patches join to22 form larger ones. In rare cases, hair is eventually lost from the entire scalp, called alopecia total is.

There is a progression to complete loss of body hair, a type of the disease called alopecia universalis. This is rare.

The following below table are used in treatment of alopecia areata

List of plants having hair growth promoting, nutritional support, and antidandruff activity

S. No. Plant Family Common name

1. Acacia concinna Mimosaceae Shikakai
2. Achillea millefolium Asteraceae Yarrow
3. Achyranthes aspera AmaranthaceaeApamarg
4. Adiantum capillus Adiantaceae Hair fern
5. Albizia amara Fabaceae Silk plant
6. Allium cepa Liliaceae Onion
7. Aloe vera Liliaceae Medicinal aloe
8. Amaranthus spinosus L. AmaranthaceaeBathua
9. Arctium lappa Asteraceae Burdock
10. Aristolochia bracteol Aristolochiaceae Birthworts
11. Arnica montana Asteraceae Arnica
12. Artemisia abrotanum Asteraceae Southernwood
13. Avena sativa Poaeceae Wild oats
14. Azadirachta indica Meliaceae Neem
15. Bacopa monnieri Scrophulariaceae Brahmi
16. Brassica spp. Brassicaceae Mustard
17. Berberis vulgaris Berberidaceae Barberry
18. Betula pendula Betulaceae Birch
19. Cajanus cajan Fabaceae Pigeon pea
20. Calendula officinalis Asteraceae Pot marigold
21. Capsicum annum Solanaceae Pepper
22. Cardiospermum halicacabum Sapindaceae Ballon plant

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23. Cassia alata Fabaceae Dadmari
24. Cedrus atlantica Pinaceae Cedar wood
25. Centella asiatica Umbelliferae Gotu kola
26. Chelidonium majus Papaveraceae Celandine
27. Cinnamomum camphora Lauraceae Camphor
28. Cinnamomum zeylanicum Lauraceae Cinnamon
29. Citrus aurantifolia Rutaceae Key lime
30. Citrus limon Rutaceae Lemon
31. Coccus nucifera Arecaceae Nariyal
32. Cyclea peltata Menispermaceae Raj patha
33. Cyperus rotundus Cyperaceae Nagarmotha
34. Datura innoxia Solanaceae Datura
35. Daucus carota L. Apiaceae Carot
36. Eclipta prostrata Asteraceae False daisy
37. Emblica officinalis Euphorbiaceae Amla
38. Eucalyptus sp . Myrtaceae Eucalyptus
39. Ficus racemosa Moraceae Bargad
40. Gardenia gummifera Rubiaceae Gummy gardenia
41. Gmelina asiatica Verbenaceae Asian bushbeech
42. Geranium sibiricum Geraniaceae Siberian geranium
43. Glycine max Fabaceae Soybean
44. Glycyrrhiza glabra Fabaceae Liquorice
45. Hamamelis virginiana Hamamelidaceae Witch hazel
46. Hibiscus rosa sinensis Malvaceae China rose
47. Hibiscus rosa sinensis Linn Malvaceae Gudhal
48. Hydrocotyle asiatica Apiaceae Gotu kola plant
49. Juglans nigra Juglandaceae Black walnut
50. Juglans regia Juglandaceae Walnut
51. Juglans regia L Juglandaceae Akhrot
52. Juniperus communis Cupressaceae Juniper berry
53. Lactuca sativa L. Asteraceae Lettuce
54. Larrea divaricata Zygophyllaceae Creosote bush
55. Lavandula angustifolia Lamiaceae Lavender
56. Lawsonia inermis Lythraceae Henna
57. Medicago sativa Fabaceae Alfalfa
58. Melaleuca alternifolia Myrtaceae Tea tree
59. Melissa officinalis Lamiaceae Lemon balm
60. Mentha piperita Lamiaceae Pippermint

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