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Topical Treatment of Dermatological Disorders Using New Herbal Biomedicines

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Abstract

The use of isolated plant chemicals and herbal extracts in the treatment of wounds and skin conditions is on the rise. Recent years have seen the development of numerous new herbal medicines, cosmetics, and medications for the treatment of various skin disorders. In this non-systematic review, we concentrate on herbal medications that have undergone controlled clinical trials or rigorous preclinical research. The herbal biomedicines are used to treat a variety of skin conditions, including atopic dermatitis (St. John's wort, licorice, tormentil, bitter substances, evening primrose), psoriasis (araroba tree, lace flower, barberry bark, indigo, turmeric, olibanum, St. John's wort), actinic keratosis (birch bark, petty spurge), herpe (birch bark, onion).

Keywords: Acne • Actinic keratosis • Psoriasis • Rosacea • Atopic dermatitis • Wound healing

Introduction

For millennia, skin diseases have been treated with herbal remedies. Salicylic acid from willow bark (Salix spp.) (for desquamation), 8-methoxypsoralen from Ammi visnaga (L.) Lam. (for photochemotherapy), and tannins from oak bark, black tea, or hamamelis bark are among the plant substances that are still employed in topical therapies. These plants were evaluated negatively for about 30% of them. There were 25 plants listed in the favourable monographs that were relevant for dermatological therapies. They include well-known medicinal plants including marigold, chamomile, and hazel. However, because there haven't been many high calibre clinical researches conducted, the majority of these plants have only received a low level of proof for their efficacy. The therapeutic potential of medicinal plants that have historically been used in dermatology has been investigated in recent years, and some of them have been created and approved as drugs or medical devices to treat skin problems. In addition, a growing number of herbal products, often known as "cosmeceuticals," have been produced in the medical cosmetics industry. The most intriguing recent experimental and clinical trials using cosmeceuticals and herbal medications for skin conditions are highlighted in this review. A literature search focused on specific skin problems in genuine plant reviews was conducted. We mainly focused on controlled clinical studies with a substantial amount of evidence. This evaluation is not solely focused on systematic evidence, though, since we have also included information on the scientifically proven benefits of plant extracts and exciting new treatment choices for dermatologists. By doing this, even while clinical studies are currently lacking or being prepared, we could point to novel advantageous therapeutic approaches. According to the UK National Health Service's suggestion, the clinical trials' quality was rated on a scale from "levels of evidence" (LOE) A to D.

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Literature Review

Atopic dermatitis (AD) is a chronic, pruritic inflammatory skin disease. Dermatologists often prescribe glucocorticoids to the patients, but patients and parents of children with AD worry about the side effects of glucocorticoids, especially in long term therapy. They ask for herbal therapies because they expect similar effectivity and fewer side effects. A comprehensive, evidence-based review on clinical studies with herbal products for AD has been published recently. Some of the studies are highlighted here [1]. For the treatment of burns and wounds, hypericum oil made from St. John's wort is traditionally used. Hyperforin, a lipophilic phloroglucin derivative, has antibacterial, anti-inflammatory, and differentiation-promoting qualities for keratinocytes. In a randomised, placebo-controlled half-side comparative pilot research involving 21 AD patients, the effectiveness of an ointment standardised to 1.5% hyperforin was examined. Over the course of four weeks, the therapy was administered twice each day (LOE-A). Licorice (Glycyrrhiza glabra L. and Glycyrrhiza uralensis Fisch. ex DC.) has a well-researched and comprehensive anti-inflammatory action. The triterpenes glycyrrhizin and glycyrrhetinic acid of licorice were used in the majority of investigations on skin [2]. The flavonoid isoliquiritigenin and the chalcone licochalcone A, however, both exhibit anti-inflammatory properties. In a randomised, placebo-controlled trial, topical ointment with 2% glycyrrhetinic acid was tried on 281 adult participants with mild to moderate AD. In the impacted areas, the application was made three times each day. Verum greatly outperformed the vehicle (placebo) after five weeks (improvement of 80% vs. 10%). (LOE-A). A cream using Licochalcone A as an anti-inflammatory component demonstrated anti-inflammatory effects that were superior to placebo in a placebo-controlled research including 26 individuals (LOE-A). Furthermore, it has been demonstrated that a herbal formulation containing glycyrrhizinic acid (0.6%) and licorice extract (0.1% Glycyrrhiza uralensis root extract) as the main active ingredients exhibits anti-inflammatory effects 48 hours after application of a cream and placebo-controlled UV-erythema test [3]. The licorice-based remedy had comparable results to 1% hydrocortisone acetate. Additionally, in a non-interventional pilot research, it decreased the severity score in 10 AD patients who received twice-daily treatment for 2 weeks (LOE-B). Since ancient times, dermatologists have utilised a variety of tannins, including those found in black tea (Camellia sinensis (L.) Kuntze), witch hazel (Hamamelis virginiana L.), and oak bark (Quercus spp.). Tannins are used to treat acute, oozing eczema as wet-lipid wraps or local baths. In a 48-hour occlusive patch test, a cream containing 2% tannins from the rhizome of tormentil (Potentilla erecta (L.) Raeusch.) exhibited a corticoid-like vasoconstrictive action [4]. It was successful in treating 24 individuals with mild to moderate AD and shown placebo-controlled anti-inflammatory characteristics comparable to hydrocortisone in the UV-erythema test (LOE-A).

Over the course of two weeks, the application was made twice daily without the use of a placebo (LOE-B). Since the beginning of Ayurvedic medicine more than 5000 years ago, bitter medicines have been utilised to enhance appetite and aid with digestion. TAS2Rs, which are bitter taste receptors, have only lately had their molecular structure revealed, and it has been established that they are expressed in the human epidermis as well. Salicin from willow bark (from Salix spp.) and amarogentin from Gentiana lutea (L.) are examples of bitter substances that bind to the skin's bitter taste receptors and subsequently cause calcium influx and an increase in the expression of proteins that form the skin barrier, including filaggrin. Additionally, keratinocytes were induced to produce lipids by bitter chemicals. The lipid content of the epidermal stratum corneum on the volar forearm was considerably raised by 5% gentian extract in a placebo-controlled, double-blind half-side comparison with 33 participants [5]. In this area of the body, keratinocytes produce almost all of the skin lipids. For four weeks, the application was made twice each day. A significant rise in the lipid content could already be seen after two weeks of treatment (LOE-B). It's interesting to note that the predilection areas for AD (flexures of the arms and knees) correspond to skin regions where keratinocytes, not sebaceous glands, are solely responsible for the formation of lipids. Thus, topical therapy with bitter medicines is particularly beneficial for dry and atopic skin with decreased epidermal lipid synthesis. Due to the high concentration of -linolenic acid in evening primrose seed oil, it is helpful for AD [6]. Both internally and in topical preparations, it is used. Only a small number of reliable studies have looked into how evening primrose oil affects AD. According to a recent meta-analysis of the available research, evening primrose oil has a moderately positive impact on itching, scaling, and crusting in AD (LOE-A). Psoriasis can also be treated topically with herbal medications. Psoriasis is a chronic, immune-mediated skin condition that causes itchy or burning red and scaly spots on the skin. The effectiveness of herbal treatments for psoriasis has been assessed in three systematic reviews [7].

Northern America is the native home of the shrub known as the barberry, Mahonia aquifolium. Native Americans have long used it to cure psoriasis. Traditional medicines from Northern America and Europe include tinctures and ointments made from Mahonia bark. The effectiveness and safety of a 10% Mahonia ointment in the treatment of psoriasis were recently proven in a randomised placebo-controlled double-blind research including 200 psoriasis patients. For 12 weeks, the application was made twice daily (LOE-A) [8].

In both TCM and Aryuvedic medicine, turmeric is crucial. Curcumin, the primary active element in turmeric, exhibits anti-inflammatory, antibacterial, and anti-oxidative activities in vitro. The therapeutic potential of curcumin in psoriasis has been studied in a few recent laboratory and clinical investigations. By inhibiting phosphorylase kinase, reducing pro-inflammatory cytokines like IL-17 and TNF-, and enhancing the epidermal barrier by increasing the expression of involucrin and filaggrin in vitro, curcumin may reduce the severity of psoriasis. However, there are currently no randomised placebo-controlled studies using turmeric and curcumin for psoriasis. Hippocrates, Galen, and Dioscorides prescribed olibanum-containing ointments for the treatment of a variety of skin conditions during the Greco-Roman era, including psoriasis, burns, warts, bleeding, and wounds. In a recent open label application research, 200 patients with mild to moderate psoriasis received treatment three times per day for 12 weeks with an olibanum ointment containing 5% 3-O-Acetyl-11-keto-boswellic acid [9]. Both the PASI and serum indicators such leukotrien B4, TNF-, VEGF, and PGE2 were dramatically decreased (LOE-B). 13 patients (or 6.5%) experienced contact dermatitis.

Discussion

Sebaceous gland hyperactivity, epidermal hyperproliferation, and perifollicular inflammation are the hallmarks of acne vulgaris. Examples of the most significant pathogens associated with skin that is prone to acne include Propionibacterium acnes (P. acnes) and Staphylococcus aureus (S. aureus). An analysis of the available botanical and phytochemical treatments for acne vulgaris was published in 2014. In a single-blind, randomised study, 124 acne patients received topical applications of 5% tea tree oil or 5% benzoyl peroxide. Signs and symptoms had significantly improved with both treatments after three months of treatment. The two therapies were identical to one another (LOE-B). A vehicle-controlled, randomised, double-blind research with 60 acne patients found that using a 5% tea tree oil gel twice daily for 45 days was effective (LOE-A). Epigallocatechin-3-gallate (EGCG), the primary polyphenol in green tea, has been demonstrated to have anti-inflammatory, apoptotic, and sebosuppressive actions on human sebocytes. Additionally, P. acnes is subject to its antimicrobial actions. In an 8-week randomised, split-face clinical experiment with 35 patients, EGCG effectively reduced acne in those who received either 1% or 5% EGCG solution twice daily. (LOE-A). A prospective, non-randomized trial on 20 acne patients who used a lotion with 2% green tea extract twice daily for six weeks showed the lotion's effectiveness (LOE-B). Hop extract exhibits anti-inflammatory and antioxidant properties. Hop extract stopped P. acnes and S. aureus from growing in the microdilution test at concentrations of 3.1 and 9.4 g/mL, respectively. Additionally, an agar diffusion test using a gel formulation containing 0.3% hop extract (w/w) demonstrated antibacterial efficacy against P. acnes and S. aureus (inhibition zone values: 5.5 mm and 3 mm, respectively) (LOE-C). Therefore, clinical trials should be conducted to assess hop extract as a potential alternative treatment for acne-prone skin.

Conclusion

Salicylic acid, methoxsalen, and chrysarobin are examples of botanical substances that have historically been utilised and currently have a significant impact on the management of psoriasis. Recent randomised clinical trials have demonstrated the efficacy of the indigo alkaloid indirubin in treating psoriasis. It has been demonstrated that licochalcone A and glyrrhetinic acid from licorice are efficient treatments for atopic dermatitis. For the treatment of superficial epithelial skin cancer, the toxic diterpene ester ingenol mebutate from petty spurge has received approval as a highly effective prescription medication (actinic keratoses). Betulin-oleogel made from birch bark has just recently received approval as a medication for the topical treatment of burns and superficial wounds. These instances show that summarised plant chemicals and extracts have a lot of potential to be made into over-the-counter or prescription medications for dermatology.

Acknowledgement

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Conflict of Interest

None.

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