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WONDERS OF HERB'S FOR THE MANAGEMENT OF ALOPECIA AREATA: A REVIEW

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ABSTRACT

Alopecia is a prevalent dermatological disorder defined by hair loss which poses a significant concern for individuals worldwide Alopecia can develop because of several circumstances, including genetic predispositions, environmental influences, exposure to chemicals or medications, nutritional deficiencies, prolonged sickness, or acute stress. Traditional treatment options, such as pharmaceutical interventions, have shown limited efficacy and may be associated with side effects. This abstract explores the potential of herbal remedies in managing alopecia. Herbal therapies have gained attention due to their perceived safety, natural origin, and historical use in traditional medicine. The review encompasses a comprehensive analysis of various herbs and botanical extracts that have demonstrated potential in promoting hair growth, reducing inflammation, and addressing underlying causes of alopecia. Herbs like, ginseng, aloe vera, and lavender have shown promising results in scientific studies, exhibiting anti-inflammatory, antioxidant, and hormone-regulating properties. Additionally, by promoting hair follicles and enhancing blood circulation to the scalp, essential oils made from herbs like rosemary have shown benefits for hair development. Recognizing the necessity of more study and clinical trials to prove their safety and effectiveness is essential. It is advised to speak with medical professionals before using herbal therapies as part of alopecia management plans.

KEYWORDS: alopecia, nutrients, herbal, anti-inflammatory.

1. INTRODUCTION

Alopecia areata is an autoimmune disorder of severe hair loss that forms small patches. hair loss takes place from all body parts and mainly from scalp. Alopecia areata main causative factor was found to be autoimmunity other auto immune diseases also occurs along with AA such as vitiligo, morphea, atopic dermatitis, pernicious anaemia, and diabetes mellitus. Patients diagnosed with AA also have disorders like anxiety, depression. Corticosteroids are mainly used for management of AA though other therapies are also available.[1] When hair loss takes place in full scalp then the condition is known as alopecia totalis. when the conditions spread throughout body it is called as alopecia universalis.[2] Hair loss is mainly due to hereditary factors and metabolic disorders such as hypothyroidism and hyperthyroidism, exposure by certain chemicals, medicines, environmental factors, deficiency of certain nutrients. Some of the drugs such as anti-cancer, immunosuppressant, oral contraceptives and NSAIDS are responsible for alopecia. The two most discussed forms of alopecia are androgenic alopecia and alopecia areata but other forms which are lesser known are chemotherapy areata and trichotillomania. Several synthetic therapies as corticosteroids, dithranol, tretinoin, minoxidil are available in market many side effects are reported when these synthetic drugs are used.[3] Alopecia patients' hair regrowth takes many months and years. patients tend to go psychochemical trauma.

Table. 1 different form of alopecia.

Classification of Alopecia areata	Elaboration
Patchy alopecia	One or more isolated hair loss patches, or several connected patches.
Alopecia totalis	Complete or almost complete loss of scalp hair
Ophiasis	Hair loss around the head in a band-like pattern, more especially along the edges of the temporal and occipital bones.
Alopecia incognito	Widespread complete hair loss without nail involvement, yellow spots, and short, miniature regrowing hairs, together with a positive pull test result.
Alopecia universalis	Entire or nearly total hair loss on the body's hairy areas

Many off-label treatment options are available but it has limited effects. JAK inhibitors are emerged as suitable treatment option. JAK inhibitors inhibit T cell and inhibit JAK and STAT signalling pathway.[4]

2. EPIDEMIOLOGY

Alopecia was found in 0.1 to 0.2% of the population studied. 70% to 80 %of people in which alopecia was found were less than 40 years of age.[5] Both genders male and females are affected but some studies have indicated dominance of disease in males is more as compared to females.[6] Alopecia occurs roughly to 2% of the population when documented in north America, Asia, and Europe.

Normal hair growth - The concept of "anagen" denotes the stage of active growth, which includes follicle development and the synthesis of new hair. Anagen development and the hair follicle's functioning stage are included in the first phase of the structural classification, while the follicle's degeneration is distinguished as a distinct phase (catagen).[7]

In the anagen phase, the follicle deeply penetrates the dermis, with its base growing into an onion-shaped bulb that contains undifferentiated pluripotent matrix cells. The best estimate of the duration of catagen in humans is two to three weeks (Kligman 1959); in rats and mice, it is most likely only a few days. Telogen can vary greatly in length on the surface of the human body, from very short on the scalp to very lengthy overall.[8]

3. PATHOGENESIS OF ALOPECIA AREATA

AA mainly occurs due to loss of immune privilege of anagen hair. inflammatory cells attack hair follicles. when the active phase the ULBP gene cluster hair upregulated in hair follicle. IFN-Gamma acts on IFN receptor which uses JAK -STAT transduction pathway. along with this CD8+T cells produce IFN gamma which then sends signals JAK-1 AND JAK -2 and causes IL-15 production. after binding to IL -15a receptor, IL-15 binds to surface of CD 8+ and this gets activated and activates IFN gamma through JAK STAT signalling. hair follicle breakdown takes place and many lymphocytes attack hair follicle and this causes hair loss.[9]

3.1 GENETICS

Alopecia also has a genetic basis wide family history of atopy, down syndrome, auto immune poly endocrinopathology- candidiasis and other auto immune disease and its combination are generally found. familial alopecia causes risk of alopecia in new generation and the relatives of alopecia patients are also prone for alopecia areata Cytotoxic T lymphocyte-associated antigen 4 is known as CTLA 4. This molecule is in charge of the negative regulation of the T-cell activation gene, which is essential for alopecia areata in individuals with severe alopecia. In genetically modified individuals, alopecia areata results from proinflammatory signals

(such substance P and interferon-γ) that increase MHC class Ia expression in human hair follicle epithelium. These signals attack follicle-associated autoantigens to preexisting autoreactive CD8+ T cells. An increase in lymphocyte attacks is the result of these signals' transmission and activation of other cells, including mast cells and CD4+ T cells. Autoantigens, such as melanogenesis-associated peptides, are only in the anagen stage when they assault anagen follicles. Alopecia areata in mice models explains this factor.[10]

3.2. IMMUNOLOGY

It is believed that a healthy anagen hair follicle lacks a major histocompatibility complex and is an immunological structure. Increased production of MHC class I and II antigens on the hair follicle and the lack of this immunological activity in AA result in T-cell interaction with HLADR antigens expressed by hair follicle keratinocytes. The pathophysiology of AA is thought to be primarily reliant on T-cell interaction with hair follicle keratinocyte-produced HLA-DR antigens and this loss of immunological privilege.[11]

3.3 NERVOUS SYSTEM

Another possible factor in AA is neurogenic inflammation. When the condition is active or when hair is growing back, many AA patients report itching, tingling, formication, and/or discomfort. Both human and animal models of AA have been shown to exhibit changes in the expression of neuropeptide and neurotrophins.[11]

4. LIFESTYLE FACTORS LINKED TO ALOPECIA AREATA

- obesity
- Smoking
- Alcohol use
- Sleep disturbance

4.1 SMOKING

The genus Nicotiana tabacum, which includes tobacco, is indigenous to the tropics. It includes nicotine, a leaf component with an addictive effect on human health which is potent. Cigarette smoke causes the synthesis of several inflammatory cytokines and lowers the levels of anti-inflammatory cytokines; however, the precise pathophysiology of smoking-related alopecia is still unknown. Additionally, smoking stimulates the skin's IL-17-producing cells. Thus, the aetiology of alopecia areata may involve Th17-mediated inflammation in hair follicles.[12]

4.2 ALCOHOL USE

To shed light on the potential contribution of alcohol to the pathophysiology of alopecia areata, a statistical study was performed. Alopecia areata risk was decreased among regular drinkers (hazard ratio: 0.49). However, given that alcohol has been found in multiple studies to aggravate skin inflammation in psoriasis and atopic dermatitis patients, this conclusion may require to account for alcohol-mediated skin inflammation.[12]

4.3 OBESITY

65 alopecia areata patients were included in the study. SALT was used to evaluate hair loss severity, and results ranged from 2 to 100% (mean SALT score: 30%). 51 (78%) patients had patchy alopecia areata, 7 (11%) had alopecia totalis, and 7 (11%) had alopecia universalis. Thirteen patients (32%) had active hair loss.[13]

5. HERB USED IN ALOPECIA AREATA

5.1 Nutritional Supplement

5.2 5-alpha reductase blockers and DHT blockers

5.3 Aromatherapy and increased blood flow to the scalp.

Table. 2 Herbs That Help Treat Alopecia by Providing Nutritional Support.[14]

Biological source	Family	Common name	Part used	Chemical constituent	Action
Avena sativa	Poaceeae	Wild oats	Seeds	Fibres, Fe,	Nutritional supply
Cajanus cajan	Fabaceae	Pigeon pea	Seeds	Different protiens and minerals	Nutritional use
Juglans regia	Juglandaceae	Akhrot	Fruit	Cu, Mn, protiens and fats	Nutritional support
Medicago sativa	Fabaceae	Alfalfa	Leaves	Proteins, calcium, minerals, vitamins	Nutritional support

Table – 3 Formulations for Management of Alopecia Areata.[15]

Agents	Formulations
Bergamot	Topical bergamot extract
Caffeine	lotion for the skin containing caffeine once a day
Dabao Chinese herbal extract	A hair tonic applies 2 times daily
Ginkgo biloba	Ginkgo biloba leaf ethanolic extract applied topically
Ginseng	Application of panax ginseng methanolic extract
Hibiscus	Topical 2% hibiscus rosa sinensis extract

5.1.1 MICRONUTRIENTS INVOLVED IN ALOPECIA AREATA

Micronutrients are trace minerals and vitamins, which are necessary for human diets even though they are needed in very small amounts. The physiological functions of these nutrients have a wide range of uses; they can be hormones, biologic substrates, or cofactors for enzymes There are several grounds to believe that micronutrients may have a part in AA. Given their part in cellular turnover, which happens often in the progressively distinguishing hair follicle, micronutrients are essential to the regular hair follicle cycle. Additionally, several micronutrients lessen oxidative stress, which is thought to have a role a key role in pathogenesis of AA. Others, like vitamin D, may alter the immune response by preventing the multiplication of Th1 cells, which are the most common kind of T-helper cells in AA Consequently, a deeper comprehension of these micronutrients' roles could help in prevention and treatment of alopecia areata.[16]

6. HERBAL PREPARATIONS USED IN ALOPECIA AREATA

6.1 Garlic (Allium sativum L.) and onions (Allium cepa L.)

Traditional therapies for spot baldness have included the topical use of garlic. The primary ingredient in a clove of garlic is a derivative of an amino acid that contains sulphur and has no smell.

An enzyme breaks it down into a yellow liquid called allicin by crushing, grinding, or cutting it, and this is thought to be the source of its medicinal qualities. Since there have sadly been relatively few studies on the effectiveness of garlic in treating spot baldness, it is currently unknown how garlic stimulates hair growth. Due to the immuno-dependent nature of spot baldness, garlic's ability to modulate the immune response may have an impact on the condition.[17]

6.2 Camellia sinensis L., or green tea.

Components of green tea effective in alopecia areata Green tea has many polyphenols, the most well-researched of which is epigallocatechin-3-gallate (EGCG). According to certain research, EGCG may modify immunological responses in addition to its anti-inflammatory and antioxidant qualities.[18] It has been shown that green tea has anti-inflammatory qualities, which may be relevant when considering alopecia areata, an autoimmune condition associated with inflammation.[19]

Immune modulation: Research indicates that green tea may have an effect on immune system function, which may have an effect on the onset or course of autoimmune diseases such as alopecia areata.[20]

6.3 Ginkgo biloba

An herbal supplement called ginkgo biloba is made from the leaves of the ginkgo tree. It's thought to have anti-inflammatory and antioxidant qualities. According to a study conducted in 2012 that was published in the Journal of Korean Medical Science, ginkgo biloba may help treat alopecia areata by reducing inflammatory reactions.[21]

6.4 Polygonum Multiflorum (Fo-Ti)

Polygonum multiflorum, a traditional Chinese plant used for hair-related problems, is sometimes referred to as Fo-Ti or He Shou Wu. According to a 2014 study that was published in the Journal of Ethnopharmacology, Polygonum multiflorum may encourage the formation of hair follicle cells, which in turn may increase hair regrowth.[22]

6.5 Serenoa repens (Saw Palmetto)

In addition to being investigated for its ability to cure hair loss , saw palmetto is a natural treatment frequently used for prostate-related disorders. There is some evidence that saw palmetto may help with androgenetic alopecia, but its effectiveness for alopecia areata is less obvious. One such study was published in the Journal of Cutaneous and Aesthetic Surgery (2012).[23]

6.6 Aloe vera - Popular for its calming and anti-inflammatory qualities is the plant aloe vera. The potential benefits of this substance in treating different skin problems have been studied. The Journal of Dermatological Treatment (2019) published a study indicating that tretinoin and aloe vera together could be useful in treating alopecia areata, although there isn't much solid evidence to support this theory.[24]

7.OILS USED IN ALOPECIA AREATA

7.1 Jojoba oil – Jojoba oil is a natural oil derived from the seeds of the jojoba plant. (Chinesis Simmondsia). While there is limited scientific evidence specifically examining the use of jojoba oil in alopecia areata, it has been suggested that certain properties of jojoba oil may contribute to its potential benefits for the hair and scalp.

7.1.1 Moisturizing Properties: Jojoba oil contains moisturizing properties. It closely resembles the natural sebum produced by the skin, which may help in maintaining the scalp's moisture balance.[25]

7.1.2 Anti-inflammatory Effects: Compounded with eicosenoic acid and myristic acid, jojoba oil has anti-inflammatory properties. The anti-inflammatory qualities of jojoba oil may potentially have a calming impact on the scalp, as inflammation is thought to contribute to alopecia areata

7.1.3 Nutrient Content: Essential vitamins and minerals found in jojoba oil include zinc, vitamin E, and B-complex vitamins. These nutrients are essential for hair health and may contribute to maintaining a healthy scalp environment.[26]

7.1.4 Rosemary oil: It has been proposed that rosemary oil may help with alopecia, a disorder marked by hair loss, among other possible advantages for hair health. Although certain studies and anecdotal evidence support these claims, it is important to keep in mind that more research is need to discover whether rosemary oil is a successful treatment for alopecia**.**

8.1 Promotion of Hair Growth

A Research in the 2015 issue of "Skin med" journal revealed that rosemary oil may help patients with androgenetic alopecia (a common kind of hair loss) grow more hair just as well as minoxidil, a common prescription for hair loss.[27]

8.1 Lavender oil

8.1.1 Aromatherapy and Hair Growth

The benefits of essential oils, such as lavender, on mouse hair growth were examined in a 1998 study named "Aromatherapy in promoting hair growth" that was published in the Archives of Dermatology. According to the study, applying essential oils increased the quantity of hair follicles, which may have a beneficial impact on hair development.[28]

Although there isn't much information specifically on lavender oil and alopecia areata, a 1999 study called "Randomised trial of aromatherapy" that was published in the Archives of Dermatology looked at the benefits of essential oils, including lavender, on alopecia areata patients. When comparing the treated group to the control group, the study found no discernible promotion of hair growth.[29]

8.2 Coconut oil

8.2.1 Moisturizing Properties: Coconut oil is known for its moisturizing properties, and applying it to the hair and scalp may help prevent dryness and breakage. This can contribute to overall hair health.[30]

8.2.2 Antifungal Properties: Coconut oil has antifungal properties, and certain scalp conditions, such as dandruff or fungal infections, could potentially contribute to hair loss. By addressing these conditions, coconut oil might indirectly support hair health.[31]

8.2.3 Protein and Nutrient Content: Coconut oil contains fatty acids and some nutrients that may be beneficial for hair. It may help in reducing protein loss from hair strands.

8.2.4 Massage and Circulation: Massaging the scalp with coconut oil could stimulate blood circulation, which is important for delivering nutrients to the hair follicles.[32]

9. CONCLUSION

The exploration of herbal remedies for alopecia opens avenues for potential therapeutic options with lesser side effects than conventional treatments. Continued research and a better understanding of the mechanisms behind these herbal interventions are essential for advancing the field of natural hair loss management.

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