

Title- Role of herbal products in curing Vitiligo

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Abstract

Plants produce a wide diversity of secondary metabolites which serve them as defence compounds against herbivores, and other plants and microbes, but also as signal compounds. In general, secondary metabolites exhibit a wide array of biological and pharmacological properties. Because of this, some plants or products isolated from them have been and are still used to treat infections, health disorders or diseases. Vitiligo is a skin disorder that is caused due to oxidative stress in the body resulting in the destruction of melanocytes, which are the cells responsible for the

pigmentation of the skin. On their destruction the skin gets depigmented resulting in patches of skin losing their colour. In this review we focus on how plant based herbal products help in curing vitiligo.

Keywords: Vitiligo, pigment, herbal, melanocytes, metabolites

1. Introduction

Vitiligo is a psychologically devastating disorder that affects 1% of the world's population [1]. Vitiligo is an acquired depigmentation disorder which mainly affects the melanocytes cells of the epidermis basal layer. This is an autoimmune disease, an immune response

against self-molecules. The main symptoms are characterized by the appearance of macules and achromic or hypochromic patches on the skin and mucous membranes due to the disappearance of melanocytes in the affected area[2]. The lesions can appear in any size and shape and in any area. Some of the people also develop vitiligo in auditory and ocular apparatus. It just does not necessarily affect the skin, ocular diseases such as uveitis or even neurosensorial hearing loss may also occur, being detected in 13% to 16% of patients in previous studies [3]. This is an everlasting skin condition which can be characterized by patches of skin losing their skin colour and becoming white.

Its area of influence spreads through all over the body even in the hair and inside of the mouth and nose. It can be sometimes found to be genetic and in some cases a family history of some autoimmune diseases like hyperthyroidism, alopecia areata etc. work like catalysts. Vitiligo is not contagious. But people suffering from vitiligo often fall prey to social stigma which leads them to psychological distresses. The onset of vitiligo is mainly observed during childhood and in young adults within the age limit of

20yrs-30yrs. In about 30% of the known cases there is a positive family history [4].

2. Types of vitiligo

Vitiligo can be classified into three types- Segmental, Non-Segmental and Mixed Vitiligo[5]. In segmental cases, mostly one side of the body is involved and the affected area of skin does not expand with time. It can affect multiple segments of our body. Almost 10% of the known cases of vitiligo constitute of this type. Non-Segmental type constitutes most of the known vitiligo cases; it is more common and affects both sides of the body. It usually begins with short lived discoloration of the hand, feet or face. Acrofacial type can affect the face, head, hands and feet, preferably involve the periteneal region and the extremities of digits [20]. Mucosal type affects the oral and genital mucosae. Areas of mucosa may also be affected in patients with acrofacial. Universal is the form that affects the largest extent of tegument (80-90% of body surface), and it is the most common form in adulthood. The generalized or common form usually precedes it. In generalized or common form macules or patches are often symmetrical; it can affect any part of the tegument, mainly hands, fingers, face and trauma-exposed areas. Mixed Vitiligo is a

combination of both Segmental and Non-Segmental vitiligo in the infrequent cases

where Segmental becomes Non-Segmental in the course of time [5].

Characteristics	Non-Segmental vitiligo	Segmental vitiligo
Prevalence(%)	72-95	5-8
Distribution Pattern	Symmetrical, not limited to the dermatome	Unilateral, limited to the dermatome
Onset	Any age	Young age
Course	Variable Variable	Initial rapid progression, then the activity of the lesions limited to the period upto 2 years
Koebner's Phenomenon	Often present	Rarely present
Association with autoimmune diseases	Frequent	Extremely rare
Etiology	Probably autoimmune	Likely neurochemical

Table 1: Major Types of Vitiligo

3. Major causes of Vitiligo

Melanin is a very necessary pigment that plays a very important role in the production of the skin colour. In the case of vitiligo there is a partial or complete loss of melanocytes causing patches of skin producing irregular white spots[5]. The cause of vitiligo has been given by a rise in the internal or external phenol or catechol concentrations and reactive oxygen species[6][7]. It has also been proposed that

phenol-containing chemicals hold the ability to compete with tyrosine resulting in the production of reactive quinines[8]. This conversion reinforces the distributed redox balance that is seen in case of vitiligo where there is an increase in the hydrogen peroxide. Non-cytotoxic quantities of O-quinones, derivatives from estrogen are used for haptation to produce an immune response [6]. They serve as surrogate substrates to tyrosinase causing haptation resulting in increased autoimmunity [9].

4. Diagnosis of Vitiligo

The only sign of vitiligo can be stated as the presence of patchy areas of depigmented skin which tend to occur on the extremities. In some cases people experience a sharp itching before the occurrence of the next patch. The patches can initially start from a small area and tend to grow, spread and change its shape. Most skin lesions that occur are prominent on the face, wrists and hands. The loss of skin pigmentation is the most prominent around the body orifices, like the mouth, eyes, nostrils, genitalia, umbilicus etc. Some affected areas have an increased skin pigmentation around the edges [10]. To differentially diagnose vitiligo is a very difficult process. To diagnose vitiligo exactly one needs to be able to differentiate between different skin conditions like complete depigmentation, hypo pigmentation and the normal colour of the skin. In case of patients having a very light skin complexion, the diagnosis of vitiligo becomes very difficult. Wood's light is an equipment which has been proven to be very useful in the diagnosis of patients with vitiligo having skin type I and skin type II. Techniques and equipments like Pure Tone And Speech Audiometer, Sound Treated

Room, Cochlear Emission Analyzer Madsen, Immittance Meter, Evoked Response Audiometer Nickolet Compact Four, Wood's Light Lamp have been very useful in the diagnosis of vitiligo [11]. In case of the use of Wood's light the skin colour changes to fluoresce when it is affected by certain bacteria, fungi, and changes to the pigmentation of the skin.

5. Herbal compounds for treatment of vitiligo

Herbal compounds of different nature and effects have been used since ancient times to cure various diseases. Vitiligo is one such disease for which herbal compounds has been used as a cure. Plants have been the basis for the medical treatment since historical times known widely as traditional medicine and continue to be in practice today in modern medicine. Modern medicine makes use of certain plant-derived compounds as the basis for evidence based pharmaceutical drugs.

Ginkgo biloba (also called the "maiden hair tree") is one of the oldest trees on Earth whose leaves and seeds are largely used in medicine. Its extracts have shown to be highly effective for treating different allergies, menstrual syndrome, headache etc

[12]. In recent times its extract have also shown its miracle in treating vitiligo. The research and data analysis show that the herbal compounds has the property of controlling the activity of vitiligo and inducing repigmentation of white macules and more so if administered with other conventional therapies[13,14]. *Cucumismelo* (also known as “Muskmelon”) is a plant whose extract is rich in antioxidants that naturally have a high superoxide dismutase activity which is supposed to be important in stopping the destruction of melanocytes by oxidative stress during the first stage of vitiligo. Khellin, derived from plant *Amnivisnaga* is a naturally occurring furanochromone. The exact mechanism of work has not yet been clearly stated but it seems to act by stimulating melanocytes proliferation and melanogenesis [15]. In this treatment the patient orally intakes a khellingelatin capsule after 2.5 hours of irradiation with UVA. This session is repeated 2-3 times a week and is quite safe and is similar to PUVA therapy. It is a herbal product which possesses antioxidant and immune-modulating activities. In recent studies it has been observed that *Picrorrhiza* Kuroda's potential use in association with phototherapy can treat vitiligo.

6. Conclusion

This study documented that plant metabolites present in certain medicinal plants possess the ability to combat against vitiligo. Vitiligo which is a disease caused due to oxidative stress in the melanocytes resulting in their destruction and depigmentation of the skin leading to patches can be cured by the use of different herbal products which possess the ability to alter the melanocyte-specific factors. Herbal compounds rich in polyphenols and anthocyanins possess antioxidant properties that can also help in combating vitiligo.

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