Role Of Atrilal (Ammi Majus Linn.) In The Management of Shvitra

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***Abstract*—Shvitra is an important disorder of skin pigmentation described in Ayurvedic literature and is commonly correlated with vitiligo based on its clinical presentation. Although the condition does not usually produce significant systemic morbidity, the appearance of depigmented patches can have a considerable psychological and social impact on affected individuals. The management of vitiligo remains challenging, and the search for effective and safe therapeutic options continues. Among medicinal plants traditionally used for disorders of pigmentation, Ammi majus L. has attracted considerable interest because of its rich content of furanocoumarins, particularly xanthotoxin (8-methoxypsoralen) and bergapten (5-methoxypsoralen). Historically, preparations derived from A. majus were used along with sunlight exposure for the treatment of leucoderma and vitiligo, and this traditional approach contributed to the development of modern psoralen-based photochemotherapy. The present review discusses the traditional relevance, phytochemical constituents, possible pharmacological mechanisms, therapeutic evidence, and safety considerations associated with A. majus in the management of Shvitra. The available evidence suggests that its photosensitizing furanocoumarins may promote repigmentation through interaction with ultraviolet radiation; however, the risk of phototoxicity necessitates careful dose standardization and medical supervision. Further well-designed clinical and experimental studies are required to establish the therapeutic role of A. majus specifically within an Ayurvedic framework and to determine its safety, efficacy, and appropriate method of administration.**

***Index Terms*—Shvitra, Vitiligo, Atrilal, Ammi majus, furanocoumarins, xanthotoxin, psoralen, repigmentation, Ayurveda**

I. INTRODUCTION

Vitiligo is a common acquired disorder of pigmentation characterized by the appearance of depigmented or hypopigmented patches on the skin. Although it is generally not associated with serious systemic illness, the visible nature of these lesions can have a profound impact on an individual's social and psychological well-being. People affected by vitiligo may experience social stigma, embarrassment, emotional distress, and reduced self-esteem, which can significantly influence their body image and overall quality of life. Vitiligo is one of the oldest and most common disorders of skin pigmentation, affecting approximately 1–2%[1] of the global population. In India, its prevalence has been reported to range from 0.25% to 4%[2] based on data from dermatological outpatient records. Given its chronic and sometimes progressive course, as well as the considerable psychosocial burden associated with the condition, the search for safe, effective, and accessible treatment options for vitiligo continues.

In Ayurveda, skin disorders are broadly classified under the term Kushtha, within which Shvitra is described as a distinct clinical entity. Based on the similarities in its clinical presentation, Shvitra is often correlated with vitiligo in contemporary medicine. According to Ayurvedic principles, the condition is believed to result from the vitiation of the Tridoshas and the involvement of various Dhatus, particularly Rasa (lymph), Rakta (blood), Mamsa (muscle tissue), and Meda (adipose tissue)[3]. The prognosis and treatment of Shvitra are influenced by factors such as the duration of the disease and the depth of tissue involvement. As the condition becomes chronic and progressively involves deeper Dhatus, it is considered increasingly difficult to manage.

The management of vitiligo has evolved considerably over time and includes topical therapies, phototherapy, photochemotherapy, and other approaches aimed at restoring pigmentation. Among these, psoralen-based photochemotherapy has historical importance. Interestingly, the therapeutic potential of Ammi majus L., a plant belonging to the family Umbelliferae, is closely associated with the discovery and use of psoralen compounds. The plant has a long history of traditional use in the management of vitiligo, particularly in Unani[4] and Middle Eastern medical traditions. Historical evidence indicates that preparations from A. majus were used in conjunction with sunlight exposure for repigmentation, an approach that bears a striking resemblance to the principle underlying modern psoralen plus ultraviolet A (PUVA) therapy[5].

Atrilal (Ammi majus Linn.) is an important herbal antivitiligo medicine that belong to the family Umbelliferae. It was in use since ancient time for treatment of vitiligo and mentioned in many Unani classical texts. The previous pharmacological studies showed that Atrilal (Ammi majus linn) was used effectively in the treatment of vitiligo, psoriasis, tinea and many other skin diseases.[6]

Although A. majus is not traditionally described as a classical Ayurvedic drug, under the same established framework as Bakuchi, its pharmacological profile and historical use in depigmentation disorders make it a plant of interest when exploring potential therapeutic approaches for Shvitra. Therefore, this review aims to examine the available evidence regarding A. majus, with particular emphasis on its phytochemical constituents, proposed mechanism of

action, historical and clinical use in vitiligo, and its possible relevance to the management of Shvitra.

II. BOTANICAL AND PHARMACOLOGICAL PROFILE OF AMMI MAJUS

Ammi majus L. belongs to the family Umbelliferae and is native to regions including Egypt, with distribution extending across Europe, the Mediterranean region, and West Asia. The plant has been used traditionally for several medicinal purposes, but its dermatological applications have received particular attention. In traditional systems of medicine, especially Unani medicine, the fruits & seeds of A. majus have been used in the management of vitiligo and other skin disorders.[7]

The therapeutic significance of A. majus is largely attributed to its furanocoumarin content. Important constituents reported from the plant include xanthotoxin (8-methoxypsoralen or 8-MOP), bergapten (5-methoxypsoralen), imperatorin, and isopimpinellin, along with other phytoconstituents such as flavonoids, terpenoids, proteins, and essential oil components. Among these, xanthotoxin and other psoralen derivatives are particularly relevant to the treatment of pigmentary disorders because of their photosensitizing properties.[8]

III. HISTORICAL USE IN VITILIGO

The association between A. majus and the treatment of vitiligo has a long history. Traditional preparations obtained from plants containing psoralen compounds were used in combination with exposure to sunlight to induce pigmentation in depigmented areas. Historical accounts indicate that A. majus was among the plants used in such approaches, and subsequent scientific investigation led to the identification of 8-methoxypsoralen as an important active photosensitizing compound. This historical progression represents an important link between traditional plant-based medicine and modern photochemotherapy.[9]

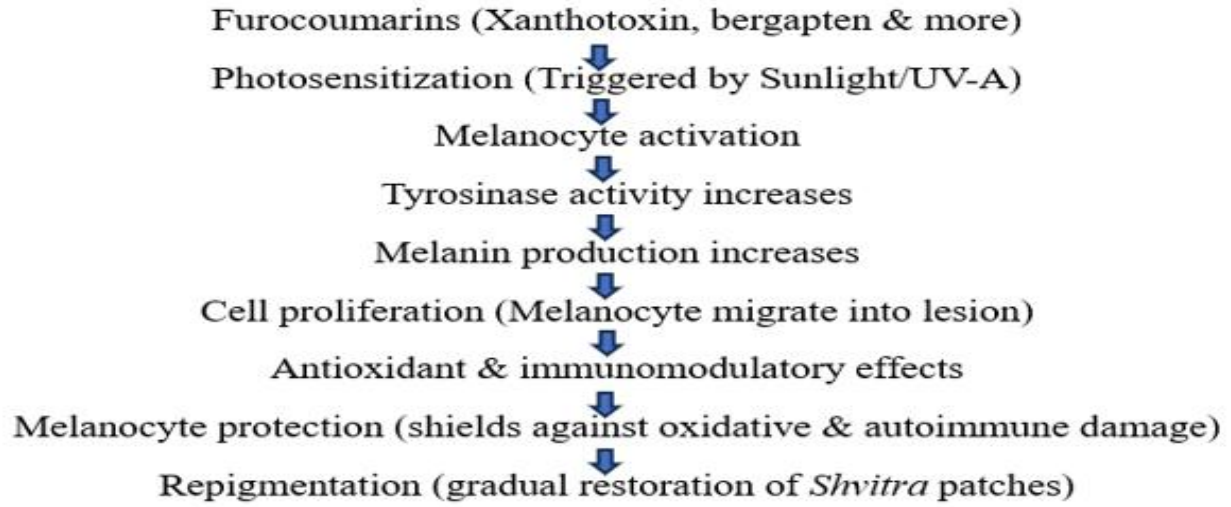
The development of psoralen-based therapy subsequently provided a scientific basis for the use of photosensitizing compounds in vitiligo. Psoralens are capable of interacting with DNA after activation by ultraviolet radiation, particularly UVA. This photochemical activity forms the fundamental basis of PUVA therapy, which has been used in the management of several dermatological conditions, including vitiligo.[10]

IV. PHYTOCHEMICAL BASIS OF REPIGMENTATION

The potential role of A. majus in repigmentation is primarily associated with its furanocoumarins. Xanthotoxin, also known as 8-methoxypsoralen, is one of the most extensively studied compounds obtained from A. majus. When activated by UVA radiation, psoralen molecules undergo photochemical reactions that can influence cellular and molecular processes in the skin.

The therapeutic response observed with psoralen-based treatment is thought to involve stimulation of melanogenesis and repigmentation of depigmented areas. Historically, patients treated with

psoralen compounds have been reported to develop areas of pigmentation, including pigmentation beginning around hair follicles, which may subsequently extend into larger areas of depigmented skin. These observations support the potential of psoralen-containing preparations to stimulate repigmentation under controlled phototherapeutic conditions.[11]



From a modern dermatological perspective, the photosensitizing activity of the furanocoumarins in A. majus provides the most plausible explanation for its role in repigmentation. However, it is important to distinguish the pharmacological mechanism of A. majus from the broader Ayurvedic understanding of Shvitra. The traditional Ayurvedic concepts of Dosha, Dhatu, and disease pathogenesis cannot be directly equated with the molecular mechanisms of psoralen-mediated phototherapy.

V. EVIDENCE FROM EXPERIMENTAL AND CLINICAL STUDIES

The therapeutic activity of A. majus in vitiligo has been investigated historically through studies involving crude plant preparations and isolated furanocoumarins. Early research focused on the use of extracts of A. majus and its active constituents for the treatment of leucoderma. Subsequent investigations explored compounds such as xanthotoxin and imperatorin, providing early evidence for their potential role in repigmentation[12].

An early clinical report involving 18 patients treated with xanthotoxin and imperatorin derived from A. majus demonstrated varying degrees of repigmentation. More than 50% improvement was reported in four patients, including one patient who initially achieved complete clearance, although depigmentation recurred after several months. Moderate improvement was observed in six patients, while some patients showed only slight or no improvement. The study also noted marked local inflammatory reactions following ultraviolet exposure, highlighting the importance of controlled administration and monitoring.[13]

These early findings suggest that A. majus and its furanocoumarins possess genuine biological activity relevant to repigmentation. However, the evidence should be interpreted cautiously because many of the available studies are historical, involve small sample sizes, or predate current

standards for clinical trial design. Moreover, the use of crude plant extracts introduces variability in the concentration of active constituents, making it difficult to establish consistent dose-response relationships.

VI. POSSIBLE ROLE IN THE MANAGEMENT OF SHVITRA

From an Ayurvedic perspective, the clinical presentation of Shvitra is characterized by alterations in normal skin coloration, and the condition is traditionally understood through the involvement of Doshas and Dhatus. The potential relevance of A. majus to Shvitra lies primarily in its ability to promote repigmentation rather than in a clearly established classical Ayurvedic indication.

According to Ayurvedic principles, Ammi majus (Atrilal) may exert its therapeutic effect in Shvitra (vitiligo) through a combination of Kapha-shamana, Ama-pachana, Deepana[14], and stimulation of Bhrajaka Pitta. Its Katu–Tikta Rasa and Ushna Virya[15] are considered capable of reducing Kapha and correcting impaired metabolic processes, thereby supporting the removal of Ama and restoration of Agni. The action of Bhrajaka Pitta, which governs the complexion and metabolic activity of the skin, may be enhanced, potentially promoting normal Varna (skin pigmentation). Improved Rasa–Rakta Dhatu circulation may facilitate nourishment of the affected skin tissues, while Twak Poshana supports the maintenance and regeneration of Twak Dhatu. Collectively, these actions may help restore the functional integrity of the skin and gradually support repigmentation of Shvitra lesions.

However, the available literature does not provide sufficient evidence to conclude that A. majus directly treats Shvitra according to the classical Ayurvedic concept of disease. Future studies could explore whether standardized A. majus preparations, when appropriately administered, can provide clinically meaningful repigmentation and whether such treatment can be integrated safely with established Ayurvedic management approaches.

VII. SAFETY AND LIMITATIONS

Despite its therapeutic potential, the use of A. majus requires considerable caution. The same photosensitizing properties that may contribute to its therapeutic effect can also cause adverse reactions when the plant or its extracts are used improperly. Excessive exposure to sunlight or UVA following administration of psoralen-containing preparations may result in erythema, inflammation, blistering, and phototoxic dermatitis. A documented case report described severe phototoxic dermatitis following systemic use of an herb containing psoralens derived from A. majus fruit in combination with sunlight exposure.[16]

The current evidence base also has several limitations. Much of the literature consists of historical studies, case reports, and investigations of isolated psoralen compounds rather than contemporary, well-designed clinical trials evaluating standardized A. majus preparations. Furthermore, there is limited direct evidence examining A. majus specifically in patients diagnosed according to Ayurvedic criteria for Shvitra. These gaps emphasize the need for further research.

VIII. FUTURE PERSPECTIVES

The historical importance and pharmacological properties of A. majus make it a promising drug for further investigation in pigmentary disorders. Future research should focus on the development of standardized extracts with defined concentrations of key furanocoumarins, particularly xanthotoxin and bergapten. Experimental studies should investigate their effects on melanocyte activity, melanogenesis, oxidative stress, and the cellular mechanisms involved in repigmentation. From an Ayurvedic research perspective, further work is needed to establish whether A. majus can be meaningfully incorporated into the conceptual and therapeutic framework of Shvitra. Pharmacognostic identification, phytochemical standardization, Ayurvedic pharmacodynamic assessment, and well-designed clinical studies could help clarify its position in integrative management. Such research may provide a bridge between the traditional understanding of pigmentary disorders and modern evidence-based approaches to repigmentation.

IX. CONCLUSION

Ammi majus L. occupies an important place in the history of plant-based approaches to vitiligo and the development of psoralen-based photochemotherapy. Its fruits are rich in furanocoumarins, particularly xanthotoxin and related compounds, which possess photosensitizing properties that may contribute to repigmentation when combined with controlled ultraviolet exposure. Historical and clinical evidence supports the biological potential of A. majus in vitiligo, although the existing evidence is largely based on older studies and requires confirmation through modern, standardized clinical research.

In the context of Ayurveda, A. majus may be considered an interesting plant for investigation in relation to Shvitra, particularly because of its potential to restore pigmentation. Its therapeutic potential, particularly through its psoralen constituents, warrants further investigation using rigorous pharmacological and clinical methodologies. Given the possibility of significant phototoxic reactions, any therapeutic application should be standardized and undertaken under appropriate professional supervision. Overall, A. majus represents a valuable example of a traditional medicinal plant whose historical use has contributed to modern understanding of repigmentation therapy, while also highlighting the need for careful integration of traditional knowledge with contemporary scientific evidence.

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