Cullen corylifolium (L.) Medik: A Multifunctional Medicinal Weed with Emerging Therapeutic Significance

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Abstract

Cullen corylifolium (L.) Medik, a member of the Leguminosae, commonly known as Babchi, is an well-known medicinal plant that is found throughout tropical and subtropical areas, particularly in India. Babchi, a weed found in fallow lands and field margins, has become extremely valuable in both classical and modern medicinal approaches because of its own rich reservoir of bioactive chemicals. Its seeds are used as medicine. Babchi is said to have a number of biological properties reported for various biological activities, such as skin disorder treatment, antioxidant, antimicrobial, anti-inflammatory, anti-aging and antibacterial. The plant is a hardy and adaptable species that thrives in arid dry wastelands, roadsides and agricultural fields. In addition, this chapter is expected to enhance interest in Babchi and could contribute to the development of novel formulations with improved therapeutic potential.

Keywords: Medicinal, Babchi, bioactive, skin disorder

Introduction

Plants have long been central to traditional medicine and continue to offer new therapeutic potential. Their renewed popularity is due to effectiveness and fewer

side effects compared to synthetic drugs [6]. According to WHO, about 80% of the global population relies on plant-based medicines for primary healthcare, especially in rural and tribal areas [1].

Cullen corylifolium (L.) Medik., commonly known as Babchi, is a significant medicinal plant widely used in treating skin disorders such as leucoderma, psoriasis, leprosy, and pruritus [1][6]. Its seeds are particularly valued and contain bioactive compounds like psoralen, isopsoralen, bakuchiol, and flavonoids [2]. Psoralen stimulates melanin production under sunlight, aiding skin treatment [3].

The plant is extensively used in Ayurveda and Unani systems for various therapeutic purposes [1]. This chapter highlights its ethnobotany, phytochemistry, traditional uses, and pharmacological importance [2].

Botanical Taxonomic Classification

Kingdom : Plantae

Division/Phylum: Angiosperms / Angiospermae
Class : Eudicots / Dicotyledoneae
Order : Fabales / Rosales
Family : Fabaceae (Leguminosae)
Subfamily : Faboideae / Papilionaceae
Genus : *Cullen*
Species : *Cullen corylifolium* (L.) Medik.

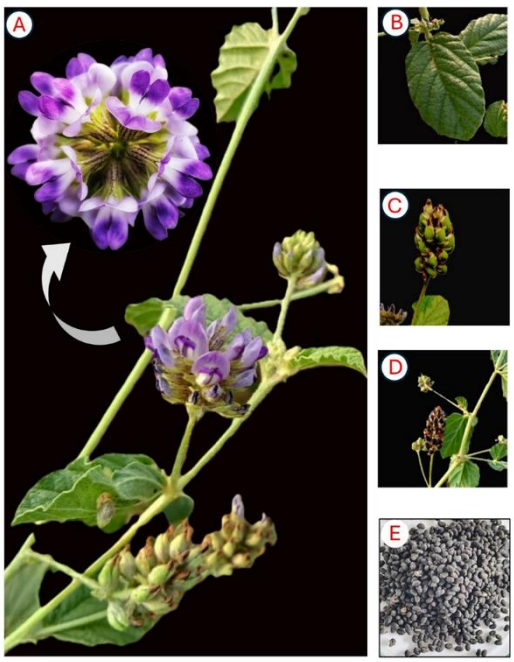


Fig. Morphological characters of *Cullen corylifolium* (A) *C. corylifolium*: Twig showing flower and stem (B) *C. corylifolium*: Leaf (C) *C. corylifolium*: Mature fruits with one seeded pods (D) *C. corylifolium*: Dry pods (legumes) (E) *C. corylifolium*: Seeds

Botanical Description: Babchi is an erect annual herb belonging to the family Fabaceae. The plant grows up to 95 cm tall, with grooved stems and branches that are conspicuously gland-dotted and bear a few appressed hairs.

Leaves: Leaves are broadly ovate-elliptic, measuring 3.5–11 × 2.5–9 cm. They are gland-dotted, with a cuneate or rounded base, inciso-dentate margins, and a mucronate apex. Both surfaces are hairy and nigro-punctate. Petioles are about 1 cm long, hairy, and also gland-dotted; stipules are lanceolate and persistent.

Flowers: Inflorescences are dense, short, axillary racemes bearing

bluish-purple flowers on very short pedicels. The calyx is hairy on the outside, with upper teeth linear-lanceolate and lower teeth ovate, the latter being twice as long as the upper. The corolla is twice the length of the calyx.

Pods: 8 mm across, ovate-oblong, compressed, black, punctate; seeds smooth, adhering to the pericarp. Common, in black soil wastelands.

Phytochemical Constituents: Babchi seeds are a treasure of secondary metabolites responsible for its therapeutic effects.

Sr. No.	Compound Group	Important Constituents	Medicinal Role
1	Furocoumarins	Psoralen, Isopsoralen	Skin disorders treatment
2	Flavonoids	Bavachin, Bavachalcone	Antioxidant, antimicrobial
3	Coumarins	Psoralidin	Anti-inflammatory
4	Essential oils	Volatile aromatic compounds	Antimicrobial
5	Meroterpenes	Bakuchiol	Anti-aging, antibacterial

Bakuchiol is particularly noteworthy and is now widely used in dermatological and cosmetic formulations worldwide as a natural alternative to retinol. The coumarin components include psoralenoside, isopsoralenoside, psoralen, isopsoralen and prosalidin [2]. The main flavonoid components are bavachin, neobavaisoflavone and isobavachalcone. Psoralen, isopsoralen, corylifolin, corylin and psoralidin [2].

Phytochemistry: The chemical constituents of the fruit include isoflavones and corylinin, along with six known compounds: isopsoralen, psoralen, sophoracoumestan A, neobavaisoflavone, and daidzin. Additionally, the fruit contains corylinal, neobavaisoflavone, the methyl esters of two compounds, psoralenol, 5′-formyl-2′,4-dihydroxy-4′-methoxychalcone, and bavachromanol. The essential oil contains various chemical constituents, including α-elemene, γ-elemene, β-caryophyllenoxide, limonene, 4-terpineol, linalool, and geranyl acetate [4].

Pharmacological Properties

This plant is also pharmacologically studied for its anti-leucoderma activity, anti-acne activity, anti-psoriatic activity, anti-eczema activity, antibacterial activity, Antifungal activity, antiviral activity, antioxidant activity, anthelmintic activity, insecticidal and genotoxic activity, protective effect against retinal damage, anti-Alzheimer activity, antidepressant activity, anti-diabetic activity, antiprotozoal

activity, anti-obesity activity, immunomodulatory activity, anti-cancer activity and neuroprotective activity [1].

Traditional Uses

- Effective in skin diseases like leucoderma, psoriasis, eczema, and infections [6]
- Used for blood, digestive, respiratory, and bilious disorders [1]
- Helps in asthma, cough, diabetes, and constipation [3]
- Exhibits antibacterial, antifungal, anthelmintic, diuretic, and laxative properties [7]
- Seeds and oil applied in topical treatments, especially for vitiligo; psoralen promotes pigmentation [2][3]
- Acts as a blood purifier and improves skin, hair, and nails [6]
- Useful in wounds, ulcers, inflammation, and kidney or bone disorders [2]
- Supports reproductive health and shows anticancer and hepatoprotective effects [6]

Agricultural and Economic Importance

In dryland regions, Babchi can be grown as a valuable therapeutic crop while being frequently considered a weed. It can thrive in drought circumstances and requires very little in the way of agricultural inputs. Babchi is becoming more and more popular in the cosmetics and natural medicine sectors. Additionally, farmers in rural areas have a strong chance of making money from its cultivation.

Propagation / Cultivation

The crop is established by direct sowing, requiring about 8 kg seeds per hectare without pre-treatment. Sowing is done before the monsoon after proper land preparation. Seeds are planted at 60 × 30 cm spacing with basal NPK (60:60:30 kg/ha) and farmyard manure application. Regular weeding and limited irrigation ensure good growth under rainfed conditions. The crop matures in 7–8 months, with multiple harvests between December and March. It can also be propagated through tissue culture methods [4][6].

Safety and Precautions

Despite its benefits, Babchi should be used cautiously. Psoralens may cause photosensitivity and skin irritation, while excessive doses can affect liver and kidney health, alter urine color, and lead to hyperacidity or gastritis. Adverse effects like nausea and vomiting have also been reported [4]. It should be taken in recommended doses under medical supervision, especially during pregnancy, lactation, and in children. Certain foods are advised to be avoided during treatment [4].

Conclusion

C. corylifolium is widely used for treating leukoderma, psoriasis, vitiligo, asthma, ulcers, and kidney disorders, and also acts as an aphrodisiac and anti-inflammatory. It contains bioactive compounds like essential oils, coumarins, alkaloids, flavonoids, and terpenoids, with proven pharmacological value. With proper validation, cultivation, and standardization, it can become an effective herbal drug. Its potential in cosmeceuticals, along with possible anticancer and neuroprotective applications, highlights its future importance.

References

1. Ansari Mohd Masihuzzaman, Munshi Younis Iftikhar, Bilal Alia and Khanam Farheen (2022). Babchi (Psoralea corylifolia Linn.): An effective Unani medicine for dermatological disorders: A review. International Journal of Unani and Integrative Medicine, 6(1): 17-21.
2. Shadab and Shariq Shamsi (2019). Psoralea corylifolia Babchi: A popular herb of Unani, Ayurvedic and Chinese system of medicine for Vitiligo. International Journal of Herbal Medicine, 7(4): 51-55.
3. Jinal D. Chaniyara, Payal N Vaja and Chetan H Borkhataria (2021). Beneficial Herbal Drug of Psoralea corylifolia for Leucoderma. International Journal of Pharmaceutical Sciences Review and Research, 67(2): 65-69.
4. Ambesh Jha, Bonju Pokharel, Bishundayal Prasad Patel and Ramdev Chaudhary (2023). Traditional and Contemporary uses, Phytochemistry and Pharmacology of Psoralea corylifolia Linn. Journal of Ayurveda Campus, 4(1):69-79.
5. Singh P., Tiwari Y. and Mukopadayay S. (2022). A review: pharmacological and Medicinal properties of Babchi (Psoralea corylifolia). International Journal of Health Sciences, 6(S6): 3565-3572.
6. Khushboo P. S., Jadhav V. M., Kadam V. J. and Sathe N. S. (2010). Psoralea corylifolia Linn. “Kushtanashini” Pharmacognosy Reviews, 4(7): 69-76.
7. Priyanka Pandey, Rakesh Mehta and Ravi Upadhyay (2013). Physico-chemical and preliminary phytochemical screening of Psoralea corylifolia Scholars. Research Library Archives of Applied Science Research, 5(2):261-265
8. Mazhar Farooqui, Vidya Pradhan, Javed V. Khan and Tanveer A. Khan (2016). Primary phytochemical study of Psoralea corylifolia L. and Caesulia axillaris Roxb. Journal of Chemical and Pharmaceutical Research, 8(3):198-201.