Chapter IV

Combretum albidum G. Don: a medicinal liana of India

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ABSTRACT

Combretum albidum is a significant medicinal climber belonging to the family Combretaceae, widely recognized for its therapeutic properties in traditional medicine. Phytochemical studies of *C. albidum* have revealed the presence of various bioactive compounds, including flavonoids, tannins, saponins, and alkaloids, which are associated with its medicinal properties. Traditionally, different parts of the plant, such as leaves, roots, and bark, are used in the treatment of ailments like fever, diarrhoea, wounds, and skin infections. It also exhibits potential antibacterial, antifungal, and antioxidant activities, making it a promising agent for the development of novel therapeutics. Keeping this in mind, an attempt has been made to present its botany, ecology and associated plants to bring attention towards its conservation in natural habitat. The photographs are provided for the easy identification in the field.

Keywords: *Combretum*, medicinal climber, traditional medicine, phytochemicals, pharmacological uses

INTRODUCTION

The family Combretaceae is also known as 'Indian almond family'. The species of this family are evergreen trees, shrubs or lianas that are found mainly in tropical and subtropical Africa, Asia, and America (Bokhad and Rothe 2013; Sharma et al. 2021). Generally, leaves are simple and arranged alternately while flowers tend to be small and white or yellowish in color. Some of the notable genera include: *Combretum*, *Terminalia*, *Conocarpus* etc. The family is ecologically and economically significant, providing timber, fuelwood, and medicinal products (Zalke et al. 2018). For their

antimicrobial and anti-inflammatory properties, most of species have been used in traditional medicine. Additionally, fruits from this family such as Indian almond (*Terminalia catappa*) can also be eaten and contain a wide range of nutrients. The family has great significance in different ecosystems as well as human societies by providing diverse range of benefits and usage (Ejidike et al. 2023). Among them, *Combretum albidum* commonly known as "Buffalo Calf" in English. It is extensive a woody twine that occupies the upper canopy of the host tree. Its distribution is limited to semi-evergreen and dry deciduous forests, particularly along riverbanks (Zalke et al. 2018). It is a valuable plant known for its numerous medicinal applications. It has been utilized for medicinal purposes by tribal communities for an extended period in India. Various parts of the plant contain significant chemical constituents that contribute to its therapeutic properties (Bokhad and Rothe, 2013). The plant has a history of usage as old as records exist in African and Asian traditional medicine. It is known popular as Ayurvedic medicine and is used in fever, diarrhoea, and skin infections, and many other diseases. Pharmacological studies on *Combretum albidum* have proven its activity as an antimicrobial, antioxidant, anti-inflammatory, and anticancer agent.

The plant contains several active compounds like flavonoids, phenolic acids, and terpenoids which exert the medicinal properties (Sharma et al. 2021). The heart wood of the plant also yields beta sitosterol, gallic acid, ellagic acid, oleanolic acid, betulinic acid, arjunolic acid, botulin, ursolic acid, beta sitosterol and gallic acid (Kumar et al. 2015). The present study deals with the exploration this medicinal plant, its morphology, medicinal and pharmacological uses.

MORPHOLOGY

Combretum albidum is a deciduous climber native to tropical and subtropical regions of Africa. Morphology of *C. albidum* is below (Saxena and Brahmam, 1995; Sharma et al. 2021; Plate 1):

Leaves: The leaves are simple, alternate, and arranged spirally along the stem. They are ovate or elliptical in shape, with a slightly acute or obtuse apex. The base of the leaf is rounded. Upper surface is dark green, while the undersides are paler. Leaf venation is pinnate.

Flowers: The flowers are small and arranged in spikes at the end of branches. These spikes form short, oblong, or almost globe-like clusters. Flower color is typically yellowish-white. Each flower has five petals and numerous stamens.

Inflorescence: The inflorescence consists of terminal spikes. These spikes are composed of densely packed flowers.

Sepals and Petals: Sepals are triangular-ovate and curve outward. There is a hairy ring below the insertion of the stamens. Petals are small and inconspicuous.

Fruits: The fruit is a globose capsule. When young, it is green, but it turns red as it matures. The capsule has four wings. Each fruit contains a solitary seed.

MEDICINAL USES

Combretum albidum is used as a folk remedy to treat various ailments. The plant is used as an effective remedy for jaundice, diarrhea, dysentery and skin problems by Muthuvans, Chinnar tribe of Idukki District, Kerala and

Paliyan tribes in Sirumalai Hills of Eastern Ghats (Sreedhar et al. 2013). Leaves of *Combretum albidum* are used for treating jaundice. They have been traditionally employed to address liver-related problems (Kumar et al. 2015). Leaves are reported to cure wounds and cuts. Bark of this plant is utilized for managing various skin infections to help soothe skin ailments and promote healing. A decoction made from the fruits of *Combretum albidum* is used to treat dysentery and diarrhoea (Zalke et al. 2013). The fruit extracts may have antimicrobial and anti-inflammatory effects. The stem, seed oil, and roots of this plant are reported to address eye-related issues. The oil or extracts may help alleviate eczema symptoms. Seed oil and root are reported to cure eye problems, malarial fever and eczema (Bokhad and Rothe, 2013). In summary, *Combretum albidum* holds promise as an unexplored medicinal plant with potential therapeutic applications. Further research into its chemical constituents and pharmacological activities could enhance its role in healthcare.

BIOACTIVE COMPOUNDS

C. albidum, is known for its rich content of bioactive compounds with significant medicinal properties. Among these, glycoside, carbohydrate, flavonoid, phytosterols, phenolic compounds and saponin are the most prominent. These compounds exhibit strong antioxidant, antimicrobial, and anti-inflammatory activities, making the plant valuable in traditional medicine (Rajalingam et al. 2016; Kumar et al. 2017). Tannins contribute to its astringent properties, while flavonoids are known for their ability to scavenge free radicals, thus protecting cells from oxidative damage (Chandari and Ramasamy, 2016).

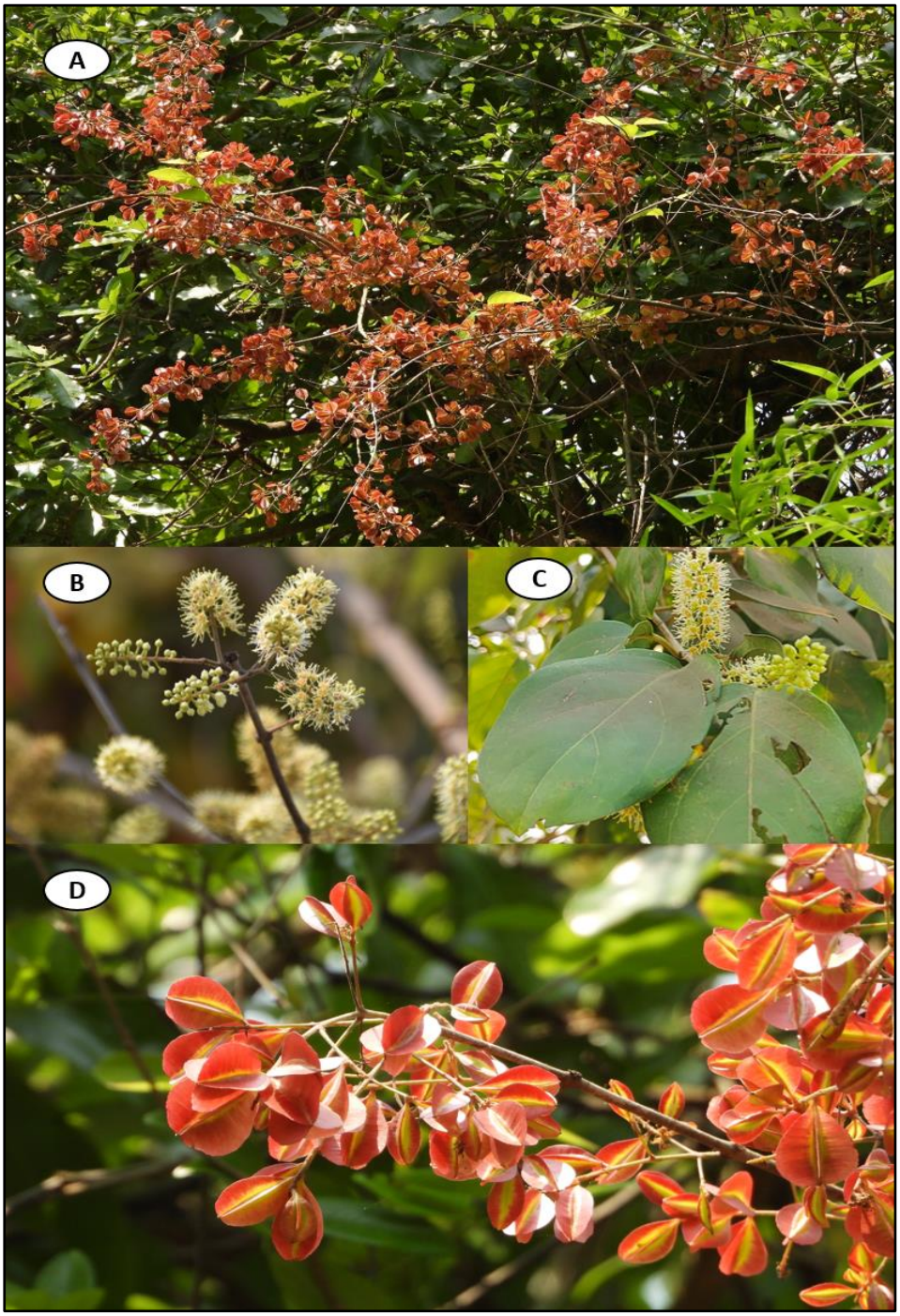


Plate 1: A) Habitat of *C. albidum*, B) Flower, C) Leaf, D) Fruits of *C. albidum*

The presence of phenolic group of compounds further enhances the plant's therapeutic potential, as they are involved in the prevention of various diseases, including cardiovascular disorders. Additionally, alkaloids and saponins found in *C. albidum* play significant roles in anti-cancer and anti-diabetic effects (Bokhad and Rothe, 2013; Sharma et al. 2021).

PHARMACOLOGICAL USES

Some pharmacological activities associated with *C. albidum* are antioxidant activity, antimicrobial activity, anti-inflammatory activity, antidiabetic activity, anticancer activity, analgesic activity, and wound healing activities (Sreedhar et al. 2012; Kumar et al. 2017). It contains high levels of phenolic compounds and flavonoids, which have strong antioxidant properties. Extracts from *C. albidum* have been shown to possess antimicrobial properties, effective against a range of bacteria, fungi, and viruses. This could suggest potential applications in treating infections (Chandari and Ramasamy, 2016; Sharma et al. 2021). It is also a potential species for managing inflammatory conditions. It has been used traditionally to manage diabetes. It may have anticancer properties, possibly through mechanisms like apoptosis induction in cancer cells. It has often used for pain relief. This suggests that *C. albidum* may also have analgesic properties (Rajalingam et al. 2016). It has also been traditionally used in wound healing due to their antimicrobial and anti-inflammatory properties, which could accelerate the healing process (Kumar et al. 2017).

CONCLUSION

The medicinal and pharmacological activities of *C. albidum* shows potential value as a key therapeutic agent. It is abundant in bioactive compounds, in which there are tannins, flavonoids, phenolic acids,

alkaloids, and saponins. It has also a vast array of pharmacological values, like antioxidant, anti-inflammatory, antimicrobial, anti-cancer, and anti-diabetic activities. These activities not only validate its traditional use in herbal medicine. It is essential to utilize analytical methods to thoroughly identify and quantify the bioactive compounds present. Comprehensive pharmacological investigations, including clinical trials, are necessary to validate its effectiveness and safety for applications in human health.

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