ABSTRACT

Premna serratifolia L. is a significant medicinal plant belonging to the family Verbenaceae. There is a great demand for this medicinal plant in the pharmaceutical industry, since it is one of the key ingredients of a large number of Ayurvedic preparations like Arishtam, Avaleham, Kwatham, Ghritam and Thailam. The taxonomic status of Premna serratifolia L., has been a topic of intense discussions among taxonomists from the early period of Linnaeus due to extremely polymorphic features exhibited by this species reported from different geographic regions of the world. The genus Premna is considered by taxonomists as an “extremely difficult genus in which flower features are almost as vague and little distinct as those of the extremely variable leaves”. From the Ayurvedic point of view, there is considerable disagreement among the commentators of modern Nighantus regarding the identity of Premna serratifolia as a genuine drug. In the Indian traditional Ayurvedic system of medicine, the drug plant Agnimantha (Sanskrit name) is described as an essential constituent of Dashamoolam. Two different species viz., Premna serratifolia L. and Clerodendrum phlomidis L.f. (Clerodendron phlomidis) are equated to the source plant Agnimantha, providing a ‘controversial drug’ status to these two medicinal plants. Consequently, Clerodendrum phlomidis is widely used as the source drug of Agnimantha in most of the North Indian states. However, Premna serratifolia L. is used instead of Clerodendrum phlomidis as the genuine drug of Agnimantha throughout Kerala. In Kerala, various morphotypes of Premna serratifolia are used by traditional practitioners attributing differential therapeutic properties to these morphotypes and Clerodendrum species viz., Clerodendrum inerme is rarely used as a substitute drug of Clerodendrum phlomidis. A perusal of literature revealed that not many studies were done on the pharmacognostic and phytochemical aspects of the different morphotypes of Premna serratifolia L. in Kerala. Hence, the present study explicitly aims to resolve the ambiguity regarding the taxonomic and ayurvedic status of Premna serratifolia L., with special reference to its six morphotypes in Kerala using reliable tools and techniques in pharmacognosy and phytochemistry. The study also aims to check the presence of biologically active
compound and its activity in *Premna serratifolia*. The typical pharmacognostic parameters, conventionally used for the screening of crude drug plants in pharmaceuticals, were also analyzed along with morpho-anatomical characterization. The phytochemical studies with special reference to detection, screening and characterization of bioactive compounds were carried out using sophisticated chromatographic (HPTLC, HPLC, LC-MS, GC-MS and Flash chromatography) and spectroscopic (UV, FTIR and NMR) techniques. The generated phytochemical data were subjected to statistical analysis with the help of SPSS software to enumerate the chemotaxonomical phylogeny of the six morphotypes of *Premna serratifolia* in Kerala. These studies have brought to light the unifying features of the different morphotypes in terms of anatomical/ pharmacognostic and phytochemical characteristics showing their origin from a common ancestor. Diacytic type stomata, multicellular labiate glandular trichomes and characteristic odour of the leaves/root barks are common for all six morphotypes and hence can be considered as the specific diagnostic characters of this species. However, the morpho-taxonomical and phytochemical studies based on the leaf morphology and secondary metabolites of the roots revealed the presence of two distinct parallel lineages, with morphotypes M1 and M2 in one group and the rest of the morphotypes viz., M3, M4, M5 & M6 in another group. This finding is in agreement with Linnaeus (1771) who considering the complexity of the Ceylon material being a mixture of more than one taxon, divided this into two species viz., *Premna integrifolia* and *Premna serratifolia* based on the morphology of their leaf margin being entire and serrate respectively. However, the presence of a common visual analytical chemical marker (a diterpenoid - 6,11,12,16-tetrahydroxy -7-oxo-8,11,13-triene) showing orange fluorescent band at Rf 0.68 with characteristic UV, FTIR and LC-MS spectra in all six morphotypes provide a reliable means to ensure quality standards for the drug *Premna serratifolia* L. in Kerala. Further phytochemical analysis based on antioxidant assay as a guide has resulted in the identification of acteoside as the active principle of the root woody tissues of this medicinal plant. This compound could account for most of the pharmacological activities reported for the roots of *Premna serratifolia* L. in Kerala.