

Pharmacognosy of Malvaceae- A Comprehensive Review

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ABSTRACT

The family Malvaceae has great importance in pharmacology and pharmacognosy. The pharmaceutical properties, phytochemical assessments are reviewed. The intriguing features of Malvalceae family is discussed.

KEYWORDS: *pharmaceutical properties, phytochemical assessments, pharmacology, pharmacognosy, Malvaceae*

INTRODUCTION

The flowers of Malvaviscus they are arboreus are characteristically solitary and arise from the axillary regions of the leaves, contributing to the plant's distinctive ornamental appearance. Morphologically, they exhibit a precise tubular structure with petals that remain tightly coiled in a spiral arrangement and do not completely unfold, unlike many other members of the Malvaceae family. This unique floral configuration not only copious the aesthetic appeal of the plant but also plays quiet a functional ecological role. The partially closed, twisted petals contribute to the prolonged floral longevity by protecting the reproductive structures from the environmental stress and excessive moisture loss. Additionally, the elongated tubular shape and the vibrant coloration are particularly well adapted to attract specific pollinators, especially the humming birds are drawn to the nectar-rich flowers and also facilitate effective pollination through their feeding behaviour (Biswas et al.,2002). Pharamcognosy is a stream in pharmacology (Dr. S. Sreeremya, 2026a). The use of several plant source to remediate disease is an ancient age old practice(Dr. S. Sreeremya,2026c).Advancements in integrated field like genomics and bioinformatics also has paved way in enriching the stream of health care (Dr. S. Sreeremya,2026b). Several ancient medical records can be referred (Dr. S. Sreeremya, 2026d). In the contemporary period, the knowledge of plant and its pharmacological actions are recorded in pharmacopeia (Dr. S. Sreeremya, 2026e).

Organoleptic and Macroscopic Features: Macroscopic and the organoleptic evaluation of the

flowers reveals several distinguishing sensory characteristics that are much useful for their preliminary identification. The flowers exhibit a much striking bright red coloration is one of their most prominent visual features. Upon handling, they demonstrate a soft, the mucilaginous texture attributable to the presence of the polysaccharide-rich constituents, and they emit a mild, subtle aroma that is neither overpowering nor quiet pungent. These sensory attributes collectively differentiate the flowers from those of closely rakished species within the Malvaceae family, which may vary in color intensity, surface texture (Yanomami et al., 2014), or the fragrance. Such organoleptic profiling serves as an important initial step in the pharmacognostic assessment, allowing for the rapid and cost effective identification of crude plant material prior to more advanced analytical techniques such as the microscopic examination, physicochemical testing, or chromatographic and spectroscopic analyses.



Figure: 1

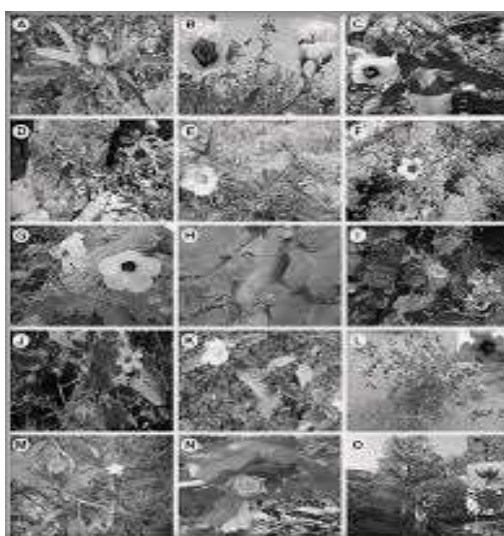


Figure: 2

Malvaceae (the mallow family) is the family of the flowering plants containing about 243 genera and 4225 species (Milliken et al., 2015). It is distributed all over the world in the tropical regions and includes the economically important plants such as cotton, okra and the other ornamental shrubs. It is a large genus belonging to this family, comprising about 150 annual or perennial herbs, shrubs or even the small trees. It is native to tropical and subtropical countries of America, Africa, Asia and Australia (Fig-1 and 2). The genus has a pivotal importance which is attributed to valuable fibers obtained from the different species of the genus such as *A. theophrastii* and also due to several species grown as garden ornamentals such as the *A. ochsenii* and *A. Vitifolium* (Giovannini et al., 2016).

PHYTOCHEMICAL ANALYSIS

Phytochemical assesment of the genus revealed the presence of flavonoids, sterols, triterpenes, anthocyanins and the fatty acids (Fig-3 and 4).



Figure: 3

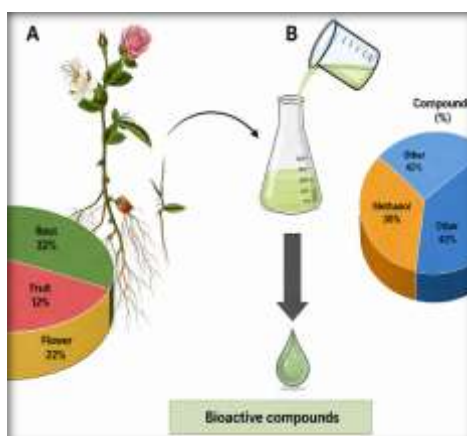


Figure: 4

The *Abutilon hirtum* is a perennial herb or shrub, 0.5-2.5m in height [Synonym: *A. graveolens* (Roxb. Ex Hornem.) Wight & Arn. and *Sida hirta* Lam.]. Traditionally, the roots are availed as

expectorant, analgesic and antipyretic, while the leaves or the flowers are applied to abscesses, in addition to the fruits are eaten raw and the water extract of the bark is given to ease childbirth in Kenya. Precisely one study could be traced concerning the anatomical features of the leaf and stem. The recent study includes full description of the macro and the micromorphological features of the leaf, stem, root and flower, which could be helpful in the authentication and identification of the plant (Giovannini et al.,2017).

PHARMACOGNOSY-OVERVIEW

Preliminary qualitative , phytochemical analysis for the leaf and stem parts of the *C. millenii* revealed the presence of the alkaloids, cardiac glycosides, flavonoids, saponins, tannins and the anthraquinone was absent for the leaf and stem. These secondary metabolites are reported to have many biological and salso therapeutic properties. Studies carried in recent journals revealed the presence of alkaloids, the saponins, tannins, glycosides, flavonoids, terpenoids but the anthraquinone was found absent in all their researches. The presence of the certain chemical constituents in solving taxonomical problems. The Leaf and stem powder is deep brown and light brown respectively, with no specific odour or taste. They both have a poor flow property with angle of repose 40.60 and 36.80 with a fine to coarse texture. The Diagnostic powder microscopic features include polygonal epidermal cell shape and the straight anticlinal cell wall pattern, unicellular trichome and the anisocytic stomatal complex type respectively (Chan et al.,2015).

The Hausner's ratio values less than 1.25 indicate good flow while those greater than 1.25 bioindicates poor flow. From the study, Hausner's ratio and Carr's index of both the leaf and stem were greater than 1.25 and 23 % respectively and these bioindicate that the powder has a poor flow property. This is as a result of few factors that affect a powder's flow ability hence affecting the powder characteristics. The factors encompass: moisture contents, temperature, the particle size, particle shape (texture) and time of storage at rest. The angle of repose is considered to be the most classical technique availed for characterizing the flow properties of powders. Angle of repose is a characteristic rakished to inter-particulate friction or the resistance to movement between particles. For the monkey Cola studied, with keenly it exhibited poor flow due to the fiber-like nature of their powders as same poor flow was also recorded in the Cola pachycarpa leaf and stem powders. Researchers availed the micromeritic method to obtain a fair flow in *Solenostemon monostachyus*. This result may

be availed in the identification and authentication of *C. millenii* as seen to be an inherent characteristic nature (Pezzuto et al.,1997).

The pH values for the cold infusion for both leaf and stem ranges between 3.96 – 4.24 while hot infusion was between 6.23 – 6.77. The Consumption of acidic beverages (as seen with herbal teas) can result in irritation of the oral mucosa. Researchers have reported similar observation on their work adding that the consumption of acidic infusion and decoction of herbal drugs has the biopotential of wearing off the teeth enamel leading to dental problems. From the analysis and results, the most acidic impacts on the dental enamel by causing demineralization of the tooth (Mount et al,2015).

Quantitative study is an essential factor in setting the standard of crude drugs and the physical constant parameters could be useful in detecting any adulterant in the drug. The Low moisture content with less than 14% indicates less chances of the microbial attack of crude drug during storage. For the stem of the *C. millenii* with 16.33% signifies that care must be taken during storage to avoid the degradation of the drug as a lower value 4.49% was recorded for the leaf. The moisture content of the crude drug is directly related to its stability when there are chances of microbial growth (Dharmananda et aal.,1997). The lower the moisture content, much higher will be the stability of that drug as recorded in the leaf of *C. millenii* (4.48%), chances of microbial growth will be less and vice versa. The shelf life of the drug also aggrandizes with lower moisture contents. Significant amount of the moisture was found in air-dried material of stem (16.33%). Therefore, the powdered drug of the *C. millenii* should be stored with care and in dried form. The total ash for the leaf and stem as 5.5 and 12.03 %w/w respectively were within the accepted limit of 14 %w/w. Researchers reported that the total ash value is a bioindicative of the impurities present in a drug as this is constant for a plant sample. Various solvents like the methanol, ethyl acetate, ethanol and water were used to determine the bioextractive value, which is an important quality control parameter for herbal drugs. The bioextractive values for the leaf and stem were more with polar solvents, i.e water (26.30 and 22.50), the ethanol (24.30 and 16.80), methanol (20.90 and 2.50) but decreased as the polarity decreased, e.g., the ethyl acetate (6.60 and 1.10) respectively . Fluorescence analysis is also an important biotool for the determination of constituents in herbal drugs and it garners an idea about the chemical nature. The powder drug analysis was carried out by treating the samples with the various chemical reagents, and observations were

made in visible light and the ultra violet light of short and long wavelengths (Carrubba et al.,2012).

CONCLUSION

The phytochemical assessment of few member of Malvaceae showed the presence of these secondary metabolites are reported to have many biological and therapeutic properties. Studies carried in recent journals revealed the presence of alkaloids, the saponins, tannins, glycosides, flavonoids, terpenoids but the anthraquinone.

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