IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

# *Malvaviscus Arboreus* Cav.: Review On Its Phytochemical Aspects And Pharmacological Properties.

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**Abstract**

Malvaviscus arboreus is a flowering plant of the Malvaceae family. This plant has several medical applications, including the treatment of whooping cough, wounds, fever, hypertension, sore throat, bronchitis, gastritis, and liver difficulties, stomach-ache, diarrhoea, liver and gall bladder problems, cystitis, and renal illnesses. Botanical research has been done on the leaf, flower, petiole, and stem. The plant has yielded a diverse array of chemical compounds such as cardiac glycosides, flavonoids, terpenoids, alkaloids, tannins through isolation process. Experiments from several research revealed that extracts from various parts had a wide variety of therapeutic benefits such as antibacterial activity, antifungal activity, antioxidant activity, hepatoprotective activity, gastroprotective activity, and anticancer activity. The rich pharmacological effects and underscores the importance of further investigation to elucidate the mechanism underlying its diverse therapeutic actions. The wide range of chemical constituents in the plant underscores its significance in traditional medicine and its potential for the development of novel therapeutic agents.

**Key words:** *Malvaviscus arboreus*, anti-inflammatory activity, anti-bacterial, anti-fungal, gastroprotective activity.

## I. INTRODUCTION

Medicinal plants serve as the conventional source of medicinal remedies for the prevention and treatment of illness, especially in developing nations where modern medical treatments and therapies are not readily available[1]. These plants have the ability to naturally produce and store secondary metabolites such as alkaloids, glycosides, steroids, tannins, as well as being rich in essential vitamins and minerals, making them valuable for their therapeutic applications. Each part of a medicinal plant exhibits unique characteristics that are utilized for various medicinal purposes [2]. Malvaviscus arboreus is one among such plant commonly known as Sleeping Hibiscus which belonging to the family Malvaceae. This plant is native to Central and South America, the southeastern United States, and Mexico[3]. The primary importance of *M. arboreus* lies in its ease of cultivation, ability to withstand drought. Its properties make it a valuable resource for medical purpose in various regions. M.arboreus holds various uses within the traditional medicinal practices. For example, the flowers exhibit anti-cancer, antimicrobial and cytotoxic qualities, while the leaves possess anti-fungal and vasorelaxant properties. Furthermore, the stems demonstrate hepatoprotective effects(4). Similar

to other medicinal plants *M. arboreus* contains bioactive compounds like alkaloids, flavonoids, and terpenoids, which contributes to its therapeutic properties [5].

## II. PLANT DESCRIPTION

*M.arboreus is* typically a perennial plant or shrub belonging to the mallow family. Usually, it reaches a height of about 1-4 m tall. This plant is characterised by its stalked light green leaves and the flowers are bright red. The petals are wrapped around the stamens when they are fully opened. Stems woody, branches with simple and stellate hairs, later becoming glabrate. Flowers are bisexual, ascending, about 5-15 mm long having 5 lobed calyxes. Fruit is capsule, globose-cylindrical, about 1.5cm across, fleshy, edible. Seeds are reniform or sub globose, brownish. Petioles are puberulent, about 2-5 cm long, stipules linear spathulate, caducous, about 3-5 mm [6].

## III. PHYTOCONSTITUENT COMPOSITION.

Earlier studies conducted on *M. arboreus* have documented the existence of a diverse array of phytochemical compounds across different anatomical components of the plant [7]. These compounds encompass alkaloids, flavonoids, saponins, triterpenoids, fatty acids and all of which have been successfully extracted from various plant parts(8).The leaves of M. arboreus contain compounds such as protocatechuic acid, chlorogenic acid, gallic acid, p-coumaric acid, ferulic acid, and hydroxybenzoic acid [9]. Hesperidin and luteolin were the major flavonoids identified in the red flower of this plant [10].

## IV. PHARMACOLOGICAL PROPERTIES

Antimicrobial activity

The anti-microbial property of M. arboreus have been performed in ethanolic red flower extract (ERF) by Hanaa S.S. Gazhwi.etal.in 2022.They used eight different strains of marine pathogenic bacteria in this study. The different strains were B. subtillus, B. cereus, E. faecalis, S. typhimurium, V. fluvialis , S. aureus and V.damsela. The anti-bacterial effectiveness of the ERF was compared with the amoxicillin/clavulanic combination. They evaluated the anti-bacterial effect by measuring the size of the zone of inhibition after 24h.The ERF of M. arboreus showed an antibacterial activity against most the tested strains with an average inhibition zone ranging between 10 and 20mm as compared with the positive control amoxicillin/clavulanic combination. The negative control DMSO showed no zone of inhibition. The ERF of M. arboreus showed a strong antibacterial effect against V. damsela with an inhibition zone of 20 ± 0.2mm.[11]

Antifungal activity

They performed the antifungal study on four different plant species namely Lantana camara, Hibiscus rosa-sinesis cv. red flower, Hibiscus rosa cv. white flower, Malvaviscus arboreus. The antifungal property of M. arboreus was performed by Niama Boughalleb.etal.by extracting the volatile compounds from the leaves, flower and stem. The samples were subjected to steam distillation for about 5 hours and then followed by two successive extractions with Chloroform.

Volatile components extracted from the leaves, stems and flowers of Malvaviscus arboreus, shown to have antifungal activity. Stems of this plant were more strongly antifungal than the extract from the leaves. The extract from the flowers was least effective. The different plant parts were shown to have antifungal activity against Alternaria solani, Botrytis cinerea, Fusarium solani f. sp. cucurbitae, F. oxysporum f. sp. niveum, Pythium ultimum, Rhizoctonia solani and Verticillium dahlia.[12]

Antioxidant activity

Anti-oxidant property of the ethanolic red flower extract (ERF) of M. arboreus was studied by Hanaa.S, S. Gazwi .etal. They performed different assays to evaluate the antioxidant property of ERF of M. arboreus. They performed ABTS+, DPPH and FRAP assay to evaluate the radical scavenging activity. From their study they showed that the ERF exerted high free radical activity against DPPH radical when compared with the antioxidant capacities of Trolox.[13]

Anticancer activity

Ethanol Extract of Malvaviscus arboreus Red Flower (ERF) shows anticancer activity against hepatocarcinoma cell line HepG2. Using the SRB test on HepG2 anticancer activity of ERF was evaluated. The ERF prevented the growth of the HepG2 cell line with an $IC_{50}$ of 67.182 g/L. Increase in cancer cell death point out that ERF had anticancer potential against HepG2 cells [14] . According to another study performed by Artanti.etal.in ethanolic extract of M. arboreus exhibit cytotoxic activity. MTT assay was used to determine the cytotoxic potential and the $IC_{50}$ value was found to be 152,45 µg/mL[15] .

Gastroprotective activity

The study was conducted by Yrvinn Campos. etal. in fresh flowers of Malvaviscus arboreus. They performed maceration with water to extract the aqueous extract and they identified the bioactive potential compound from the extract. A mixture of Kaempferol-O-sambubioside and Kaempferol-O-sophoroside (MaSS) isolated from flowers of this species was tested as a preventive treatment on gastric lesions induced with ethanol in rats. MaSS was obtained by chromatographic methods and administered by oral pathway to male Sprague Dawley rats with ethanol induced gastric lesions. They used famotidine at a dose of 10mg/Kg and L-arginine at a dose of 300mg/Kg as positive control. Tween 20 was used as negative control. MaSS obtained from M. arboreous prevents damage to the gastric mucosa against the harmful effects of ethanol. MaSS act as a preventive agent against gastric lesions is due to its actions on the local concentration of cytokines IL-6 and IL-10. This molecule is considered a regulator of acute inflammation, it also regulates chronic inflammation. The chemical precursor of MaSS is kaempferol, which is capable of reducing IL-6 levels in people with peptic ulcer disease, which is a risk factor for stomach cancer [16] .

Hepatoprotective activity

The total extract of the aerial parts and its derived fractions (petroleum ether, dichloromethane, ethyl acetate, and aqueous) of M. arboreus shows hepatoprotective action. Plant extract were orally administered to adult male albino rats for six consecutive days, followed by injection of $CCl_4$. After that, all rats were sacrificed by cervical decapitation. Blood samples were then collected from each group to determine the serum levels of alanine transaminase (ALT), aspartate transaminase (AST), alkaline phosphatase (ALP), total bilirubin (TB). Liver tissues were also obtained to assess the levels of malondialdehyde (MDA), total antioxidant capacity (TAC), and for histopathological examination. M. arboreus has decreased the extent of liver damage with variable degrees, where the highest protective effects were observed for the ethanolic and dichloromethane fractions. The ethanolic and dichloromethane fractions significantly prevented the CCl4-induced elevation of serum ALT by 76.1% and 70.5% and AST by 71.8% and 74.3%, respectively. They also reduced the increased levels of ALP by 75.1% and 62.8% as well as TB by 84.4% and 70.6%, respectively. The ethanolic and dichloromethane fractions significantly diminished the CCl4- induced elevation of MDA levels by 95.6% and 66.6%, and improved the hepatic TAC by 58.6% and 74.7% respectively. It was found that ethyl with the maximum effects were recorded by the ethyl acetate fraction [17].

## V. CONCLUSION

Popularity of natural products or their derivatives role in diseases cure and prevention is increasing worldwide due to less side effect properties. Malvaviscus arboreus Cav.is an old plant with significant biological and economic value. Traditionally this plant is used for medicinal purposes. Different parts of this plant have been used to treat whooping cough, wounds, fever, hypertension, sore throat, bronchitis, gastritis, and liver problems, cystitis, and kidney diseases. This review provided an overview of studies on the botanical studies and medicinal uses of M.arboreus.

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