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## Medicinal properties of *Malachra capitata*

**Ankita Patel and Dr. Sonu Rahi**

### Abstract

*Malachra capitata* belonging to family Malvaceae is very common erect or underground shrub. It grows up to 1.5 metres tall. The plant is usually erect, covered throughout with a rather dense tomentum of fine close stellate hairs, the stems often bearing a few long spreading hairs. *M. capitata* is planted as fibre plant in India, formerly also in Cuba. The fiber is excellent, 8-9 feet long, and that experts have declared it little, if at all, inferior to jute. Roots and leaves are in some regions used as medicines. But though it is very commonly found it is neglected. The plant is used medicinally; especially the root extracts are reported to be used medicinally as compared to other parts. This paper is representing of medicinal and pharmacological properties of *Malachra capitata*.

**Keywords:** Medicinal plant, *Malachra capitata*

### Introduction

*Malachra capitata* is belonging to family Malvaceae. It is very commonly seen near disturbed areas. It is annual or perennial, erect herbs or under shrubs, to 1.5 m high; stems, petioles and peduncles densely pubescent with prickly stellate and simple hairs. Leaves alternate, orbicular or ovate, 3-5 angled or lobed, cordate at base, crenate to serrate at margin, obtuse or rounded at apex, 3-14 x 4-20 cm, velutinous with stellate and simple hairs on both surfaces, glabrescent, 5- nerved at base; petioles 2-8 cm long; stipules 1-2 cm long, filiform, rarely forked, hispid. Inflorescences 0.5-1.5 cm long, stout bearing 3-7 heads; each head with 2-5 flowers encircled by 3 or 4 leafy bracts; bracts ovate to orbicular, cordate to rounded at base, entire or crenate-serrate at margin, acute at apex with a slightly recurved tip, 0.5-2 cm across, folded along midnerve, stellate-pubescent and also with stiff bristles at margin and on nerves beneath. Calyx cupular, accrescent; lobes oblong to deltoid, acuminate, ca 6x 1.5 mm, 3-nerved with a few stiff simple hairs at apex. Corolla ca 1.5-2.5 cm across, bright yellow; petals obovate, ca 1.5 x 1 cm, ciliate at base, densely stellate-hairy outside, glabrous inside. Staminal column ca 1 cm long, pubescent with both stellate and simple hairs and a few glandular hairs, antheriferous throughout. Ovary glabrous; styles ca 1.3 cm long, glabrous, 10-branched; stigmas capitate, hairy. Schizocarps obpyriform, 5-6 mm across; mericarps 5, 3-gonous, acute at base, rounded at apex, ca 3 x 2 mm, glabrous, reticulate with brownish nerves, whitish; seeds 3-gonous, ca 2.5 mm long, covered with minute stellate hairs, brownish black.

### Medicinal uses

#### Folklore

- Decoction of roots and leaves considered emollient in enemas and for bathing purposes (William, 1921)<sup>[9]</sup>.
- Roots used as traditional remedy for many diseases: diarrhea, convulsion, inflammation, fever, wound healing.
- In Antilles, used as an emollient.
- In West Bengal, India, used for infertility- raw fruits given daily during the menstrual period, for 3 months.
- In Indian traditional medicine, used for treatment of epilepsy and inflammation.
- In the Krishna district of India, leaf paste is used as an external ointment for treating skin eruptions.
- In India's Akola district, plant used for gastric disorders and jaundice.

**Phytochemical screening and medicinal uses**

**Antiviral Activity / Stems and Leaves:** In a study of forty-seven ethanol crude extracts of 42 plants for antiviral activity against Foot and Mouth Disease type O, the leaves and stems of *Malachra capitata* showed low antiviral activity (Chungsamarnyart, Narong *et al.* 2007) [4].

**Anti-Ulcer Activity / Roots:** Study evaluated the anti-ulcer activity of aqueous extract of roots of *Malachra capitata* against pylorus ligation and ethanol induced gastric ulcer in rats. Results showed significant anti-ulcer activity in both models, with gastric anti-secretory effect in pylorus-ligated rats and gastric cytoprotective effect in ethanol induced gastric ulcers. Ranitidine and misoprostol were used as standard drugs (Pratyusha *et al.* 2012) [6].

**Corrosion Inhibition / Leaves:** Study evaluated an extract of leaves for corrosion inhibition on mild steel in 1N H<sub>2</sub>SO<sub>4</sub>. Weight loss results showed the extract of *M. capitata* leaves is an excellent corrosion inhibitor. Adsorption of active molecules led to the formation of a protective layer on the surface of the mild steel (Patel *et al.* 2009) [5].

**Anti-Epileptic Activity:** Study evaluated an aqueous extract of *M. capitata* showed anti-convulsant activity on MES (Maximum Electroshock) and PTZ (Pentylentetrazole) induced seizure models in albino Wistar rats. Anticonvulsant activity may be due to potentiation of GABA activity (Gopi, *et al.* 2012) [3].

**Corrosion Inhibition / Leaves:** Extract of *M. capitata* leaves was investigated as corrosion inhibitor of mild steel in 1N H<sub>2</sub>SO<sub>4</sub>. Results showed the leaves of MC to be an excellent corrosion inhibitor, with a mixed mode of inhibition, with adsorption of active molecules providing formation of a protective layer on the surface of mild steel (Patel *et al.* 2009) [5].

**Toxicity Study / Roots:** Acute toxicity study of roots in rats showed the extract to be safe at doses of 2000 mg/kg body weight orally per OECD guidelines. In chronic study, no significant changes were observed with hematological, hepatic, and renal parameters (Deodhar *et al.* 2016) [2].

**Antidiarrheal / Roots:** Study evaluated an aqueous extract of roots for antidiarrheal activity using castor oil-induced diarrhea, enteropooling and small intestinal transit model in rats. Results showed significant ( $p < 0.001$ ) reduction of castor oil-induced frequency and enteropooling. At 200 and 400 mg/kg, there was significant inhibition ( $p < 0.001$ ) in castor oil-induced charcoal meal transit (Gopi *et al.* 2012 and Deodhar *et al.* 2016) [3, 2].

**Erythrocyte Protective Activity/Antioxidant:** Study evaluated the antioxidant activity of aqueous extract of *M. capitata* in rats with carbon tetrachloride (CCl<sub>4</sub>)-induced erythrocyte damage. Results showed the extract protected against the loss of functional integrity and membrane lipid alteration in RBCs induced by oxidative stress, together with inhibition of accumulation of lipid peroxidation products (Kumar *et al.* 2012) [10].

**Flavonoids/Antioxidant:** HPLC studies of methanol extracts of root, stem and leaf samples yielded appreciable

amounts of flavonoid gallic acids (root and stem), quercetin (root), rutin and ferulic acid (leaf). (see constituents above) Sindhu and Neelamegam, 2015) [8].

**Hepatoprotective:** Study evaluated an aqueous extract of *M. capitata* showed significant protection against CCl<sub>4</sub> induced toxicity model in male Wistar albino rats (Deodhar *et al.* 2016) [2].

**Antibacterial / Stem and Roots:** Study evaluated ethanol extracts of leaf, stem, and root of *Malachra capitata* for antimicrobial activity against *Micrococcus* sp, *Bacillus subtilis*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Salmonella typhimurium*. Stem and root extracts were active against all test organisms. Leaf extract was effective against *Micrococcus* and *E. coli* only (Bhowal and Yawalikar, 2015).

**Antimicrobial:** Study of ethanol extracts of leaf root, stem, and leaf showed potential activity against bacteria (*E. coli*, *P. aeruginosa*, *B. subtilis*) and fungi (*C. albicans*, *C. paraapsolisis*, and *A. niger*). (see constituents above) Sindhu and Neelamegam, 2015) [8]. Study screened methanolic, chloroform and benzene extracts of leaves of *M. capitata* for antimicrobial properties. The methanolic extracts at different concentrations inhibited the growth of *E. coli* and *L. monocytogenes*. Concentration of 50 mg/ml showed highest diameters zone of inhibition ranging from 1mm to 11mm. Phytochemical screening of leaf extracts yielded alkaloids, carbohydrates, flavonoids, and saponin (Naik *et al.* 2018) [7].

**Antioxidant / Roots:** Study evaluated an aqueous extract of roots for antioxidant activity using DPPH scavenging and reducing power assays. Results showed significant dose dependent inhibition of DPPH activity (Kumar *et al.* 2012) [10].

**Silver Nanoparticles / Antibacterial / Leaf:** Study reports on the green, eco-friendly and convenient method of silver nanoparticles synthesis using n-hexane extract of leaf as reducing agent. The green synthesized AgNPs showed excellent antibacterial activity against all tested bacterial strains *viz.* *B. subtilis*, *M. luteus*, *S. aureus* and *P. aeruginosa* (Srirangam *et al.* 2017) [11].

**Biogenic Amines Post-Seizure/Anticonvulsant Activity:** Study evaluated the relationship between seizure activities and altered monoamines such as noradrenaline (NA), dopamine (DA), serotonin (5-HT) and gamma amino butyric acid (GABA) in forebrain of rats in MES and PTZ models. Results showed significant reduction ( $p < 0.01$ ) in SOD, glutathione peroxidase, glutathione reductase and catalase in rat brain due to epilepsy, which was significantly restored ( $p < 0.01$ ) by the aqueous extract of *M. capitata*. Similar dose dependent results were obtained in the PTZ model. The anticonvulsant activity may be due to antioxidant properties, which delays generation of free radicals in MES and PTZ induced epilepsy (Deodhar, 2016) [2].

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