

**MELOCHIA CORCHORIFOLIA L: A REVIEW**

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**ABSTRACT**

*Melochia corchorifolia* belongs to the family *Sterculiaceae* and is a common weed found in many regions throughout tropical and subtropical regions. In folk medicine, in India, the leaves and roots of *Melochia corchorifolia* are used to treat urinary disorders, abdominal swelling, dysentery and snakebites. The plant contains various Phytoconstituents like alkaloids, glycosides, terpenoids, steroids, phenolic compounds, flavonoids and it also contains carbohydrates, proteins and fatty acids. The extract of plant possesses the following pharmacological activities viz., Anthelmintic, Hepatoprotective, Antioxidant, Antibacterial, Anticancer, Diuretic, Antiurolithiatic and CNS stimulant activities. The main idea regarding the creation of this

review paper is to highlight the medicinal importance of different parts of the plant of *Melochia corchorifolia* and it may give a good revision for further studies on different parts for future researcher.

**KEYWORDS:** *Melochia corchorifolia*, Folklore uses, Chemical constituents, Pharmacological activity.

**INTRODUCTION**

The role of traditional medicines in the solution of health problems is invaluable on a global level. Medicinal plants continue to provide valuable therapeutic agents, both in modern and in traditional medicine.<sup>[1]</sup> With the associated side effects of the modern medicine, traditional medicines are gaining importance and are now being studied to find the scientific basis of their therapeutic actions.<sup>[2]</sup> Research work on medicinal plant has been intensified and information on this plant has been evaluated. This research will go a long way in the

scientific exploration of medicinal plants for the benefit of man and is likely to decrease the dependence on synthetic drugs.<sup>[3]</sup>

*Melochia corchorifolia*, is also known as chocolate weed, is a weed plant this is typically seen in the wastelands. It has been most frequently observed to grow in open areas, such as highways. The proliferation is completed via seed. It is often thought that germination can be better significantly by scarification. With scarified seed, germination is done at temperature of 35-40<sup>0</sup>C.

*Melochia corchorifolia* was used as a source of fiber for making dilly bags and other objects in the north-central Arnhem Land region. It was noted as a source of very strong fiber. It is utilized for decoration or food purposes. The leaves of *Melochia corchorifolia* are consumed as a potherb in West Africa and Southern Africa. The cooked leaves present a popular, slimy side dish in Malawi. Such utilization of leaves is also quite common in Indo-China and India. Additionally, the stems are used for tying bundles and are used in the construction of roofs of houses. The leaves have traditionally been utilized for several remedies. For example, it was used to reduce ulcers, abdominal swelling, and headache and chest pain. Among other benefits of the plants, its roots and leaves can help with snakebites, sores and the sap (plant juice) can be treated on wounds due to Antaris.

### **Taxonomy**

Kingdom	-	Plantae
Subkingdom	-	Tracheobionta
Super division	-	Spermatophyta
Division	-	Magnoliophyta
Class	-	Magnoliopsida
Subclass	-	Dilleniide
Order	-	Malvales
Family	-	Sterculiaceae
Genus	-	<i>Melochia L.</i>
Species	-	<i>Melochia corchorifolia</i>



**Fig. 1: *Melochia corchorifolia* plant.**

### **Vernacular names**

Chocolate-weed, Wire Brush, red weed (English), Indonesia: orang-aring (general), jarring (Suundanese), gendiran (Javanese), Malaysia: lemak ketam, lemak kepiting, bayam rusa (Peninsular), Philippines: bankalanan (Iloko), Kalingam (Panay Bisaya), Thailand: Khaang paak put (Chiang Mai), sa aeng bai mon (Chai Nat), seng lek (Ang Thong), India: Tikiokra (Bengali), Bilpat (Hindi), Ceruvuram (Malayalam), Chyeron, Dasoderotan (Oriya), Pinnak, Kuppundu (Tamil), Bettada thutthi, methuri gida (Kannada), Ganugapindikura (Telugu).

### **Geographical distribution and Morphology**

*Melochia corchorifolia* is common in Southeastern regions of the United States. It has been observed to grow from North Carolina to all the way south into Mississippi. In addition, it is prevalent in tropical areas of Africa, Asia and Australia. Sunny or dimly shaded humid regions of riversides, lakesides are its familiar natural habitats. This plant also grows typically as weed in cotton, soya bean and rice plants.

*Melochia corchorifolia* has ovate leaves; the petioles are generally 5 cm long with linear stipules of 5mm long. The veins extend to be from 7 cm long to 5 cm long. This plant is an annual or perennial type of herb. It usually develops to be up to 1.3-2.0 m tall; stem with line of stellate hairs. It's simple, ovate leaves are normally arranged spirally with the margins very intensely serrated. The blade of the leaves is narrow to broad to the tip and it measures up to 7.5 cm× 5.5 cm.

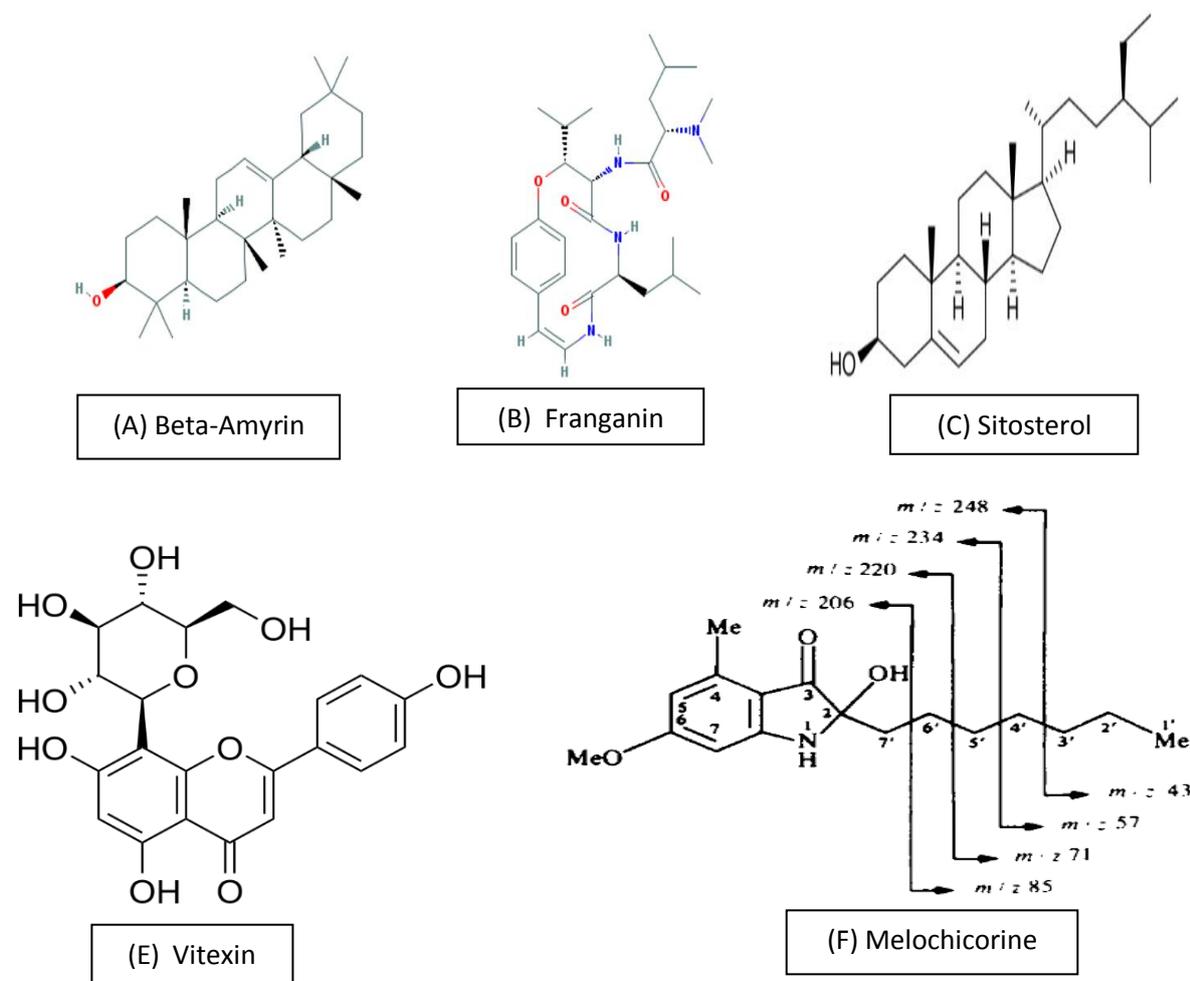
The inflorescence of *Melochia corchorifolia* comprises crowded cymes with linear bracts. This plant species has flowers of 5 green sepals. The flowers of *Melochia corchorifolia* are purple, with 5 petals, 5-7 mm long. Flowers are bisexual, regular with calyx campanulate of 3 mm long. It is also short-teethed and consists of petals of 8 mm long, white with yellow base inside. The stamens are fused close to the top of the filaments. This purple flower has superior ovary with 5 styles joint at the base. The flowering occurs from July to October. The fruit contains a 5-valved capsule which measures up to 5 mm in diameter. It holds very few seed, approximately 1seed per locale. The seeds are wrinkled and brown, about 2.0-2.5 mm long in length. Fruits usually develop from September to December.<sup>[4]</sup>

### Phytoconstituents

The methanol extract of aerial parts of *M. corchorifolia* was shows the presence of Phytochemicals as follows, **Alkaloids:** The alkaloids are fraganine, frangufoline adouetine-y' and melofoline (cyclopeptide alkaloids), melochicine (a pseudo-oxindole alkaloid) and 6-methoxy-3-propenyl-2-pyridine (pyridine alkaloid). **Pyridine derivatives:** pyridoxine, 4-methoxypyridine, nicotinic acid. **Flavonol glycosides:** Hibifoline, triflin and melocorine. **Triterpines:** friedelin, friedelinol and  $\beta$ -amyrin. **Flavonoids:** vitexin and robunin. **Aliphatic compounds:** Ethylstearate, tetratriacontanol, nonacosylnon-4-enoate, 24-ethyl-2-methyltritetracont-1-ene-3, 23-diol and 27-methyloctacosane-1, 3-diol. And  $\beta$ -D-sitosterol, sterarate, D-glucoside, cyclopeptide alkaloids, a new pseudooxindole alkaloid, melochirone active compounds have been isolated from *M.corchorifolia*.<sup>[5,6,7,8,9]</sup>

The dried powdered leaves of *M. Corchorifolia* showed following composition (dry weight content %), High crude protein content (23.31%), Crude lipid value (13.3%), Low available carbohydrate value (30.03%), High dietary fiber content (23.33%), High ash content (620.16% wet weight), Low energy value (275.66kcal/100 g).

**Minerals:** Potassium (7.25 mg/100g dry weight), Sodium content (90.00 mg/100 g dry weight) is the lowest among the macro elements determined. Other mineral composition in mg/100 g dry weight is: Copper (33.50), Iron (19.91), Manganese (9.68) and Zinc (6.73).<sup>[10]</sup>



**Fig. 2:** Structure of some important chemical compounds identified in *Melochia corchorifolia*.

### Folk uses

In Papua New Guinea, the leaves of an unidentified *Melochia* species are applied to the forehead to treat headache. *Melochia corchorifolia* is used as fodder for cattle. Leaves are sometimes used as vegetable. Fruit powder is used for ear problems, anthelmintic, dysentery, abdominal swelling and snake bites.<sup>[11]</sup> Leaves are used for unspecified stomach disorders in Coastal East Africa. In Benin the seed is used to treat stomach ache. Pulses stored in gunny bags treated with the solution have shown a reduction in the number of eggs laid and in damage done by the storage pest *Callosobruchus maculatus*.<sup>[12]</sup> In Malaysia the leaves are used for poulticing sores and swelling of the abdomen, and the sap is applied as an antidote to wounds caused by arrows poisoned with *Antiaris toxicaria* Lesch. Leaves and roots are used for poulticing in cases of smallpox. A decoction of the leaves and roots is used internally to treat dysentery, and a decoction of the leaves to stop vomiting. A leaf decoction is prescribed in compound mixture against urinary disorders. A decoction of the plant is applied in folk

medicine in India as a cure for abdominal swelling, dysentery<sup>[13]</sup> and water snake bites.<sup>[14]</sup> The sap is applied to heal wounds poisoned by *Antiaris*. The plant is also used to relieve gastralgia and headache.<sup>[15]</sup> The stem bark yields a valuable fiber. Stem and leaves decoction with oil are useful for preventing bad consequences from snake bites; leaves occasionally edible.<sup>[16]</sup> In Jharkhand leaves of *Melochia corchorifolia* are consumed as sag, leaf and roots are anti-dysenteric. Leaf is applied as poultice for swelling of abdomen and sores. Leaf and stem boiled in oil is used to prevent bad consequences from bites of water snakes.<sup>[17]</sup> Santhal tribes of Jharkhand consume leaves as vegetable.<sup>[18]</sup> Tribal of Uttar Pradesh, India use the decoction of leaves to treat dysentery.<sup>[19]</sup>

### Pharmacological activity

The following pharmacological work has been carried out on this plant they are Anthelmintic activity, Hepatoprotective and Antioxidant capacity, Antibacterial activity, Diuretic and Antiurolithiatic activity, CNS stimulant activity and Anticancer activities.

**Anthelmintic activity:** Anthelmintic activity of *Melochia corchorifolia* plant extracts using *Pheitima posthuma* (Indian earth worm) experiments were conducted by Palaksha *et al.*<sup>[20]</sup> All the extracts were found to possess vermiguge and vermucidal activity with 100 mg/ml concentration and the results were compared with standard drug Albendazole. Aqueous and ethanol extracts from the stem of *Melochia corchorifolia* were investigated by Palaksha *et al.*<sup>[21]</sup> for their anthelmintic activity against *Pheritima posthma*. Both the extracts exhibited highly significant anthelmintic activity at highest concentration of 60 mg/ml. Piperazine citrate was included as standard reference and normal saline as control.

**Hepatoprotective and Antioxidant Activity:** Hepatoprotective and Antioxidant capacity of *Melochia corchorifolia* aerial part extracts proved by Rao *et al.*<sup>[22]</sup> and Rao.<sup>[23]</sup> Antioxidant activity was evaluated by using three free radicals (Superoxide, Hydroxy and DPPH) and hepatoprotective activity was assessed against CCl<sub>4</sub> induced liver intoxication in rats. From the results obtained during the study it could be concluded that *M. corchorifolia* aerial part extracts have antioxidant and hepatoprotective components.<sup>[22]</sup>

**Antibacterial activity:** Antibacterial activity of different extracts of *Melochia corchorifolia* on eight bacterial strains by using cup plate method experiment were evaluated by Rao *et al.*<sup>[24]</sup> and Rao.<sup>[23]</sup> Methanol, Ethanol and Ethyl acetate extracts were tested against *Pseudomonas aeruginosa*, *Bacillus megaterium*, *Klebsiella pneumonia* and *Staphylococcus*

*aureus* at concentration of 400µg/cup. The methanol extract showed better activity against tested bacterial strains compared to other extracts. Extracts showed good zone of inhibition against gram<sup>-ve</sup> organisms than gram<sup>+ve</sup> organism. *In vitro* antibacterial activity of *Melochia corchorifolia* extracts employing a standard agar cup plate methanol experiment were explained by Palaksha *et al.*<sup>[20]</sup> Petroleum ether, chloroform and methanol extracts (50mg/ml) were tested against gram negative (*Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and *Escherichia coli*) and Gram positive (*Bacillus subtilis* and *Staphylococcus aureus*). Both gram positive and gram negative bacteria were sensitive to the extract.

**Antioxidant Activity:** The free radical scavenging activity of *Melochia corchorifolia* plant extract were investigated by Palaksha *et al.*<sup>[25]</sup> by determining DPPH, Nitric oxide, Hydroxyl and Hydrogen scavenging activity. Petroleum ether, chloroform and ethanol extract of plant parts exhibited strong free radical scavenging activity in all the tested methods and showed maximum scavenging of DPPH, Nitric oxide, hydroxyl and hydrogen peroxide at 100µg/ml concentration.

**Antioxidant and Anticancer activities:** The antioxidant and anticancer activities of methanol extract of aerial parts of *Melochia corchorifolia L* were investigated by Harini *et al.*<sup>[26]</sup> The antioxidant assays such as DPPH radical, ABTS<sup>+</sup> radical action, OH<sup>+</sup> radical scavenging assays, Phosphomolybdenum reduction and Fe<sup>3+</sup> reducing power assay were studied for the methanol extract of *M. corchorifolia*. The *in vitro* anticancer activity, the IC<sub>50</sub> values of DPPH<sup>+</sup> radical, ABTS<sup>+</sup> radical cation, OH<sup>+</sup> radical scavenging assay were 35.26, 10.50, 49.36µg/mL concentration, respectively. The cytotoxic activity for MCF<sup>7</sup> (breast cancer) cell line was 66.84% at 100µg/mL concentration by MTT assay method. Palaksha *et al.*<sup>[27]</sup> evaluated the *in vitro* Anticancer activity on *Melochia corchorifolia* extract on HCT-116(Human colon cancer) cell line shows good percentage of cytotoxicity when compared to *M.corchorifolia* on MCF-07(Michigan cancer foundation) breast cancer cell line.

**Diuretic and Antiurolithiatic activity:** The Diuretic and Antiurolithiatic activities of chloroform and ethanol extract of *M. corchorifolia* experiment were evaluated by Palaksha *et al.*<sup>[28]</sup> The diuretic activity on both chloroform and ethanol extract at dose 200 and 400mg/kg body weight produced diuresis and the volume of urine was 0.44 and 0.16ml (chloroform) and 0.51 and 0.70ml (ethanol) after 5 hrs. When compared to chloroform treated groups the ethanolic extract of *M. corchorifolia* treated group shows good diuretic activity. *In vitro* Antiurolithiatic activity of chloroform and ethanolic leaf extracts of *M. corchorifolia* exhibits

dose and time dependent percentage inhibition. But when compared with chloroform extracts the ethanolic extract showed maximum inhibition at 67.16%.

**CNS Stimulant activity:** CNS Stimulant activities of *M. corchorifolia* using different animal models evaluated by Palaksha *et al.*<sup>[29]</sup> CNS stimulant activity was tested by using various methods like Photoactometer, Rotarod, Tail suspension method; Pharmacological studies have been conducted on the ethanol extracts of *M. corchorifolia* L. leaves to evaluate their effects on the CNS. Caffeine was used as a standard and Diazepam was used as a negative control. The ethanolic extract of the *M. corchorifolia* possesses a potent CNS stimulant activity.

## CONCLUSION

Plants are natural sources of bioactive compounds to treat various life threatening diseases. *Melochia corchorifolia* has showed various phytochemicals which means that it can be used for treating diseases. The review shows the activity of various parts of the plant and its pharmacognostic profile. Extracts and Phytoconstituents isolated from this plant have shown to produce different pharmacological response, Which includes Anthelmintic, Hepatoprotective, Antioxidant, Antibacterial, Anticancer activities. Considering all the above medicinal importance of *Melochia corchorifolia* it can be concluded that further studies on these plants may helpful for future researchers to develop some new medicinal drugs.

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