



A REVIEW ON PHARMACOLOGICAL AND PHYTOCHEMICAL STUDY OF ABROMA AUGUSTA

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Abstract:

Abroma Augusta is used for some medicinal purposes in traditional medicine. The phytochemical composition of bitter melon was investigated using standard analytical methods. Phytochemicals like tannin, flavonoids, phenolic compounds, alkaloids, saponins, steroids, cardiac glycosides, phlobatannins and anthraquinones were also found present/ absent. The proximate composition showed the per cent of tannin, flavonoids, phenolic compounds, alkaloids and saponins. *Abroma Augusta* is one of the most used plant in Homoeopathic practice in day to day life. This plant used in traditional medicine for medicinal purposes. *Abroma Augusta* contains alkaloids, abromine, choline and betaine, beta sitosterol, stigmasterol, digitonide, magnesium salts of hydroxyl acids, resin, fixed oil, gum and polysaccharide. Heartwood contains beta sitosterol, beta sitosterol, glycol and octacosane-1, 28-diol.

Key Words: *Abroma Augusta*, Medicinal Plant, Homoeopathy & Phyto Chemical Studies

1. Introduction:

Abroma Augusta commonly known as devil's cotton. This plant belongs to sterculiaceae family. In hindi called as ulatkambal. It was originated from India and carried to Africa and Australia in 16th century. It is a tropical and subtropical vine of the family sterculiaceae, widely grown in South and eastern Africa, Asia and Australia¹. It is found in both wild and cultivated throughout the hot and moister parts of India. In India can be seen mainly in Arunachal Pradesh, Punjab, Meghalaya, Uttar Pradesh, Assam, Kerala and Tripura. It is indicated for dysmenorrhoea, amenorrhoea, gonorrhoea² and diabetes mellitus. The root has showed that ability to promote insulin release, enhance cells up take of glucose and potentiate the effect of insulin^{3,4}. The leaf has been shown to increase the number of beta cells in the pancreas thereby improving the body ability to produce insulin.

Abroma Augusta root used for the treatment of various diseases like to be amenorrhoea and diabetes mellitus. It is potent hypoglycaemic agent. *Abroma Augusta* root had medicinal property such as antidiabetic, antioxidant, anti inflammatory, wound healing, hypolipidemic, antifungal, antibacterial, anti insecticidal properties. This plant leaves used for diabetes, rheumatic pain of joints, uterine disorder and sinusitis⁵. *Abroma Augusta* proving reported by Dr.D.N.Ray. A homoeopathy mother tincture is made from the leaves of the plant. Its homoeopathic proving has been done in India by the Central council of Research in Homoeopathy (CCRH).

Figure 1: Different Stages of *Abroma Augusta*



(A) Flower in Stage



(B) Fruiting Stage



(C) Mature Fruit Stage



(D) Seeds of *Abroma Augusta*

2. History and Distribution:

Devils cotton has a long history of medicinal use in Homoeopathic System of Medicine. The *Abroma Augusta* is widely grown in Asia, South Africa, Eastern Africa, Australia and India. It will be used in Bogra district of India as a traditional healer, also can be used in scabies in Indonesia. This devils cotton roots as a traditional healer in Jessore District⁶. It is also found in Arunachal Pradesh, Punjab, Meghalaya, Uttar Pradesh, Assam, Kerala and Tripura states of India^{7,8,9}.

3. Botanical Description:

Abroma Augusta is known as devils cotton of family sterculiaceae. Devil cotton flowers solitary, axillary, pendulous, peduncle up to 4 - 5 centimeters long, sepals 2.4 centimeters, lanceolate, petals scarcely exceeding the sepals, dark red. *Abroma Augusta* flowers purple, dark red or yellow in colour occurring on a few flowered cymes. The plant grows shrub or small sized tree, able to grow up to 10-11 meter tall. *Abroma Augusta* stems are two types of branches, orthotropic branches with lobed leaves and remain vegetative, plagiotropic branches with unlobed leaves where flower usually grows. The plant foliage is lobed form has longer petiole (10-40 centimetres), 3 to 5 lobed blade, cordate ovate shaped and irregularly dentate margin while unlobed form has shorter petiole (1-2 centimetres). Lance shaped blade and dentate margin. The plant roots have 0.5 to 1.0 mm thick highly fibrous brown barks.

Devils cotton fruits are a capsule, papery, five winged and angled, contains number of seeds. The plant ethnobotanical uses as a medicinal substance. The decoction of the bark and extracted juice from the fresh root of the plant are used for irregular menstruation like amenorrhoea, dysmenorrhoea. The plant mature fruit colour is brown and flower colour is red. The stems yield a fiber and are harvested during flowering between June or July and also November or December, hundred to one twenty days after sowing or after the growth of the new stems following the previous harvest. For coarse fiber, the harvesting may be done as late as six to seven months.

4. Phytochemical Studies:

Phyto is the greek word for plant. There are many families of phytochemicals and they help the human body in a variety of ways. Phytochemicals may protect human from a host of diseases. *Abroma Augusta* consists the following chemical constituents those are include choline, betaine, beta sitosterol, stigmasterol, L rhamnose, L arabinose, D xylose, D mannose, D glucose, D galactose, D galacturonic acid and D glucuronic acid. Leaves of plants are contains acetate, taraxerol, b sistosterol acetate, lupeol, aliphatic alcohol. Octacosanol and probably a mixture of long chain fatty diols. The stem bark of the *Abroma Augusta* contain b sistosterol and friedelin. The presence of beta sitosterol and octacosanol 1, 28 diol is reported in the heart wood.

Abroma Augusta seeds contains fixed oil with saponification value, 290.5; iodine value, 129.5; acid value, 1.0; hydroxyl value, 222.3 and unsaponification matter, 1.5%. This plant an oleanane derivative and stigmasterol glycoside have been isolated from the roots. Heart wood contains beta sitosterol, glycol and octacosanol 1, 28 diol also

5. Pharmacological Studies:

5.1 Anti Diabetic Activity: The effect of *Abroma Augusta*, a fruit indigenous to Africa and Australia, on glucose and insulin concentrations was studied in rats. Leaves of *Abroma Augusta* with combination of other drugs in diabetic rats for eight weeks. The results showed that *Abroma Augusta* improves glucose tolerance in diabetes. Plants barks, leaves and roots use in the treatment of Diabetes Mellitus. The methanolic extracts and decoction of the leaves of this plant are used in the treatment of alloxan (110mg per kg) induced diabetic rats¹⁰⁻¹². The experimental study shows that the methanolic extract of the roots of devils cotton also exhibit the hypoglycaemic effect in alloxan (100 mg per kg) induced diabetic rats¹³⁻¹⁵. This plant and combination of other plant used in the treatment of diabetic rats. The *Abroma Augusta* and curcuma longa are used in the treatment of STZ (60 mg per kg) induced diabetic rats at a dose of 300 mg per kg of body weight, whereas it also used in combination of coccinia indica for the treatment of diabetes^{16,17}. Profuse urination both day and night, passage of urine, very large quantity every time, passes urine every two hours, profuse quantity, desire to drink after urination, the mouth is dry and desire for drink, drink relieves thirst, drinks large quantity.

5.2 Anti Inflammatory Activity: The roots of *Abroma Augusta* are used for anti inflammatory activity. The different dose (50 mg per kg and 200 mg per kg) of the extract were evaluated for its anti inflammatory activity and 200 mg per kg dose was found to be effective against carrageenan induced inflammation¹⁸.

5.3 Wound Healing Activity: The wound healing profile of alcoholic extract of *Abroma Augusta* and its effect on dexamethasone suppressed wound healing was evaluated in wistar rats. These models were used in incision, excision and dead space wound models¹⁹.

5.4 Hypolipidemic Activity: The experimental studies carried out by the workers showed the marked decreased in lipid levels in streptozotocin induced diabetic rats. Oral administration (300 mg per kg) of the aqueous extract of combination of curcumin from curcuma longa and partially purified product from *Abroma Augusta*. The eight weeks in streptozotocin induced diabetic rats showed that total body weight reduction and cholesterol and creatinine also decreased⁶.

5.5 Gynecological Activity: *Abroma Augusta* steams and leaves used for female menstrual disorders. Irregular catamenia, blood is dark, clotted, profuse or scanty and pale amenorrhoea or dysmenorrhoea, leucorrhoea profuse, white, thin, watery, chlorosis, colicky pain in the lower abdomen 2 -3 days before menses, hysteria associated with menstrual disorder²⁰.

5.6 Phytotoxic Activity: *Abroma Augusta* seeds have phytotoxic activity. The extracted oil was tested against the *Lemna aequinoctialis* Welv²¹. Its results the phytotoxic activity of the seed oil was interpreted by analyzing the growth regulation in control and inhibit the growth of plant by 82.35% at a concentration of 500 µg ml⁻¹.

5.7 Antioxidant Activity: *Abroma Augusta* shows strongest antioxidant activity with IC₅₀ value of 51.9785 mg/ml. The combination of *Abroma Augusta* and *C. Longa* also possess antioxidant activity by inhibiting thiobarbituric acid reactive substances (TBARS) and increase in reduced glutathione (GSH), superoxide dismutase (SOD) and catalase (CAT)^{17, 22, 23}

5.8 Antifungal Activity: *Abroma Augusta* have antifungal activity of the oil was tested against *Pseudallescheria boydii*, *Trichophyton simii* (animal pathogens), *Microsporum canis*, *Fusarium solani* var, *lycopersici*, *Macrophomina phaseolina* (Plant pathogen)²¹.

5.9 Anti Bacterial Activity: The oil was also screened against various bacteria like *Escherichia coli*, *Klebsiella pneumoniae*, *Corynebacterium diphtheria*, *Proteus morganni*, *Pseudomonas aeruginosa*, *Salmonella typhi*, *shigella boydii*, *staphylococcus aureus* and *streptococcus pyogenes* for antibacterial activity²¹.

5.10 Anti Insecticidal Activity: *Abroma Augusta* has insecticidal activity against *sitophilus oxyzae*, *Trogoderma granarum*, *Tribolium castaneum* and *Sitophilus oxyzae*²¹.

6. Conclusion:

Abroma Augusta is a good source of various medicinally important biochemicals like alkaloid, choline, betaine, beta sitosterol, stigmaterol, L rhamnase, L arabinose, D xylose, D mannose, D glucose, D galactose, D galacturonic acid and D glucuronic acid, which are responsible for its biological and pharmacological activities including anti-inflammatory, wound healing, hypolipidemic, gynaecological menstrual cure and antidiabetic etc. The information collected above on the uses of *abroma augusta* across the globe having similarity with available literature. *Abroma Augusta* used for the various diseases especially diabetes mellitus.

Based on facts, this review highlights the role of *Abroma Augusta* in various treatments and recommend that further phytochemical and clinical research should be done on this traditional medicinal plant for the discovery of safer drug. Studies should also be understanding which of the phytochemicals are responsible for the observed beneficial effects and if effective, their mechanism of action²⁴.

The main reason is that the allopathy system of medicine associated with number of side effect that often cause to serious problem. This leads to increased demand utilization for homoeopathy medicines in the last decades.

This review describes the information about *Abroma Augusta* which includes Homoeopathic description, botanical description, medical action and phytochemical and pharmacological studies. *Abroma August* is one of the plant which has been used in Homoeopathic system of medicine for the treatment of Diabetes Mellitus and other female problems.

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