

A REVIEW OF THE PHYTOCHEMICAL CONSTITUENTS AND PHARMACOLOGICAL ACTIVITIES OF ABROMA AUGUSTA LINN.

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ABSTRACT

Abrama Augusta is a Folk Medicine. Almost all parts of Augusta L. is used in the treatment of various diseases. Leaves, roots, root bark, stem bark, seeds, and heartwood are useful for treating various diseases. Known for various pharmacological activities such as anti-inflammatory, wound healing, hypolipidemic, phytotoxic, gynecological disorders, antioxidant, antimicrobial, antidiabetic, anti-inflammatory, and thrombolytic. The phytochemical analysis confirmed the presence of flavonoids, phenolics, and alkaloids.

KEYWORDS: Abroma Augusta, Pharmacological activity, phytochemical constituents.

INTRODUCTION

Abroma Augusta L. (Family-Malvaceae) is known as Ulatkambal in Hindi and Devil's cotton in English. Evergreen plants, fast-growing hairy or small trees with velvety branches, are found in tropical Asia, south and eastern Africa, and Australia. It is mainly used for dysmenorrhea, amenorrhea, wound healing, incontinence, and other menstrual disorders. The powder acts as an anti-abortion agent and anti-infertility agent. The leaves are useful for treating uterine disorders, diabetes, rheumatic joint pain and sinusitis, and headache. Leaves and stems are demulcent and infusion of fresh leaves and stems in cold water is very effective in gonorrhea. The root bark is used as an emmenagogue and uterine tonic. However, this plant has not been studied for its anti-inflammatory activity. This study aims to provide a pharmacological basis for its folklore in inflammation. Based on this, an effort was made to evaluate the anti-inflammatory potency and phytoconstituents of Abroma Augusta Linn.^[1]

The whole plant contains several alkaloids and secondary metabolites, including steroids, triterpenes, flavonoids, megastigmanes, benzo-hydro furans and their glycosides and phenylethanoid glycosides.^[2] Various parts of the plant are useful for diabetes, abdominal pain, dermatitis, scabies, leucorrhoea, cough, gonorrhea, leucoderma, jaundice, nerve stimulant, debility, hypertension, uterine disorders, rheumatic joint pain and headache with sinusitis. Also used in dermatitis, as an anti-inflammatory and analgesics.^[2]

Phytochemical constituents^[3]

Plant Parts	Chemical compounds
Leaf	Taraxerol, lupeol, octacosanol
Root	Abromin, Betaine, Friedelin, Choline, Beta-sitosterol, Stigmasterol
Root bark	α -amyrin, Maslinic acid, Protocatechuric acid, Caffeic acid, vanillic acid
Stem bark	Friedelin, Beta-sitosterol
Seed	Palmitic acid, linoleic acid, stearic acid
Hot wood	Beta-sitosterol, glycol, octacosane-1, 28-diol.

Pharmacological Action of *Abroma Augusta* Linn.

Anti-inflammatory Activity

The methanolic extract of different parts of *A. Augusta* showed potent anti-inflammatory activity compared to the standard drug diclofenac sodium, due to the presence of alkaloids and flavonoids in the plant.^[1]

Wound Healing Activities

Devil's cotton is commonly used to treat wounds. The effects of alcohol extract of devil's cotton on wound healing profile of alcoholic extract of Ulatkambal and its effect on dexamethasone suppressed wound healing were evaluated in Wistar rats.^[4,5]

Hypolipidemic Activity

An experimental study by workers showed a significant decrease in lipid levels in streptozotocin-induced diabetic rats. Aqueous extract of curcumin from *C. longa* and a partially purified product from Devil's cotton. The combined effect of *Curcuma Longa* and *Abroma Augusta* not only shows a anti-hyperglycemic effect but also a hypolipidemic effect. Blood glucose and lipid peroxidation (LPO) were studied for 8 weeks in streptozotocin-induced diabetes. It results in a general reduction in body weight, cholesterol, and creatine.^[6]

Phytotoxic Activity

The oil extracted from the seeds of *A. Augusta* showed remarkable phytotoxic activity against *Lemna aequinoctialis* Welv. It was also investigated to have moderate antifungal activity against *Trichophyton schoenleinii* (56%) (Human pathogen) and *Microsporum canis* (50%) (Animal pathogen).^[5]

Gynecological Disorders

Ethanol extract from the leaves and stems of devil's cotton is used in menstrual disorders and uterine disorders (leucorrhoea). It exhibits a contractile action on the uterus and is used in the treatment of dysmenorrhea, amenorrhea, infertility and other menstrual disorders. Root powder acts as an abortifacient and anti-fertility agent, and the essential oil extract at 50 mg/kg body weight shows anti-implantation and abortifacient effects in mice. The significant abortifacient activity was also noted with alcohol and chloroform extracts. The alcoholic extract of the root showed an action similar to that of acetylcholine than that of choline in isolated smooth and skeletal muscles. The aqueous extract of the root shows oxytocic activity. It has also been reported to have a galactotrophic effect in lactating albino rats.^[7]

Antioxidant Activity

The methanolic extract of *A. Augusta* showed the strongest antioxidant activity. The combination of *A. Augustus* and *C. longa* has antioxidant activity by inhibiting thiobarbituric acid reactive substances (TBARS) and increase in reduced glutathione (GSH), superoxide dismutase (SOD), and catalase (CAT).^[6]

Antimicrobial Measures

A. augusta seeds extracted with n-hexane, acetone, chloroform, and ethyl acetate were subjected to the evaluation of antimicrobial activity and minimum inhibitory activity depending on the activity potency against selected Gram-positive and Gram-negative bacteria. That measure is very optimistic.

The n-hexane, acetone, chloroform, and ethyl acetate extracts of *A. Augusta* seeds also have antifungal activity. The extract was assessed by the agar tube dilution method. The antifungal activity of the oil was tested against *A. niger*, *P. notatum*, *Rhizopus* sp., *F. Lycopersici*, and *A. solani*.^[8]

Antidiabetic Activity

Various parts of *A. Augusta* plants such as roots, leaves, and bark are used in the treatment of diabetes. Methanolic extract and solution of the leaves of devil's cotton have been used in the treatment of alloxan-induced diabetic rats at a dose of 300 mg/kg body weight given for seven days.^[10,11,9] It is also effective in the treatment of diabetes caused by streptozotocin (STZ) in combination doses with other natural herbs such as *Curcuma longa* and *Coccinia Indica*. A combined aqueous extract of *A. Augusta* and *C. longa* was used in the treatment of streptozotocin (60 mg/kg)-induced diabetic rats at a dose of 300 mg/kg body weight. It is used in combination with *C. indica* to treat diabetes.^[12,6] A combined aqueous extract of *A. Augusta* and *Azadirachta indica* leaves (1:1) has been used to treat alloxan-induced diabetic rats when given for 8 weeks.^[12]

Thrombolytic Activity

Devil's cotton extract was evaluated for thrombolytic activity. The addition of 100 µl of Streptokinase, a positive control, showed 86.2% clot lysis with 90 minutes of incubation at 37°C. When treated with 100 µl of sterile distilled water (negative control), the clot showed only negligible clot lysis (5.2%). A significant difference in clot lysis percentage between positive and negative control was found to be statistically significant. 50.1, 42.9, and 41.6% clot lysis obtained after treatment with 100 µl *A. Augusta* extract. Among these clot lysis, Devil's cotton showed significant clot lysis (50.1%) and the difference in the average clot lysis % was significant compared to the negative control (water). However, more studies are needed to know the thrombolytic activity of the active compounds.^[13]

Other Activities

A. Augusta leaves have membrane stabilization activity.^[15] Protective effect of defatted methanol extract of devil's cotton leaves against type 2 diabetes mellitus (T2DM) and nephropathy and cardiomyopathy in experimental rats. Devil's cotton can play a preventive role against T2DM and related cardiotoxicity.^[14]

CONCLUSION

This species is found in the tropical forests of India, especially in the North-East and East coast. It is proven that *Abroma Augusta* L. has interesting pharmacological activities such as anti-inflammatory, wound healing, hypolipidemic, phytotoxic, gynecological disorders, antioxidant, antimicrobial, antidiabetic, anti-inflammatory, and thrombolytic. A number of

phytoconstituents have been isolated and identified from various parts of *Abroma Augusta* L. The form of devil's cotton shows pharmacological activity against type 2 diabetes.

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