



COUROUPITA GUGIANENSIS AUBL:- THE HERBAL MEDICINE

¹Rohit shashikant jadhav

¹M pharm

¹Dr D. Y Patil College of Pharmacy, pune

Introduction

Plants are estimated that about 80% of the population in the world depends on traditional medicines. Various countries including India, China, Thailand, and Sri Lanka use many plants as traditional medicine use to treat various diseases. Plants are the fundamental source of knowledge in current medical research. There are various medicinal plants all over the world. A practically whole part of the plant specifically leaves, flowers, fruits, roots, stem, and seeds are studied to have several medicinal properties. The current trend of using natural products has increased and active plant extracts are commonly screened for the determination of new drugs.[1] The medicinal plants mostly find the approach applied in the pharmaceutical cosmetics industry, agricultural, and food industries. Herbal drugs are advised generally because of their effectiveness, fewer side effects, and relatively low cost. Ayurveda nowadays utilizes as many as 1000 single drugs and over 8000 compound formulations recognized merit.[2]

BOTANY

Couroupita guianensis aubl. (Lecythidaceae), a medicinal plant used in popular Chinese medicines. *Couroupita guianensis* is a tall evergreen tree that can reach 20 meters in height. Leaves are obligatory and alternate up to 20 cm in length. It has a racemose inflorescence that grows out of the trunk and huge branches. Flowers are fragrant with stamens borne on an overhanging androphore and are scarlet with a yellow tinge on the outside. The fruit is a big, reddish-brown globose that measures 15-24 cm in diameter and has a woody capsule with 200-300 seeds per capsule.[3]

It is also an uncommon flower and tree in India. Containers and implements are made from hard shells. In Sri Lankan Buddhist culture, cannonball flowers have great significance. It's called as Nagalingam flower in Tamil Nadu. The shiva lingam shape is visible at the midpoint of the blossom, and this flower is known for its snake-shaped pollen and pleasant odor. Shiva Pooja can be performed using this beautiful flower. The plant is native to the Guianas amazon in northeastern South America; it is a favorite ornamental in the Caribbean and Southeast Asian botanic gardens, and it is classified as a rare tree and flower in India.[4]

Traditional use

The plant is used primarily as ornamental Fruits are edible and infrequently eaten, although the stench of white meat deters most people; fruit shells are occasionally used as utensils; various fractions of the stem, bark, and flowers indicate antibacterial activity. Antioxidants and antibacterial properties of different portions of the plant are investigated. Leaves have long been used as an antibacterial and toothache remedy. The fruit pulp, bark, and flowers contain antibacterial and fungal properties and are utilized in medicine. Antibiotic, antifungal, antiseptic, and analgesic properties are all found in the Cannonball Tree.

Colds and stomachaches are treated with the trees. The leaf juice is used to heal skin disorders, and South American shamans have even utilized tree pieces to treat malaria within the body.[5]

chemical studies of this species showed the presence of α -amirin, β -amirin, β -sitosterol, nerol, tryptanthrine, indigo, indirubin, isatin, linoleic acid, carotenoids, and sterols. In the flowers, it was possible to identify eugenol, linalool, and (E, E)-farnesol, when triterpenoid esters of fatty acids as β -amirin palmitate were characterized as Indirubin, which is a purple 3,20bisindole and is a constituent of indigo natural.6

Tab1: taxonomical classification of couroupita guianensis

Kingdom	Plantae
Sub kingdom	Tracheobionta
Division	Magnoliophyta
Class	Magnoliopsida
Order	Lecythidales
Family	Lecythidaceae
Genus	Couroupita
Species	Couroupita guianensis aubl
Synonyms	Couratori pedicellaris, Couroupita acrensis, Couroupita antillana, Couroupita froesii, Couroupita surinamensis, Couroupita idolica, Couroupita membranacea, Couroupita peruviana, Couroupita saintcroixiana, Couroupita surinamensis, Couroupita venezuelensis, Lecythis bracteata, Pekea couroupita

Tab 2: origin and growing condition of couroupita guianensis

Origin	Honduras to northern south America to Peru
Zone	10a-12b, 28 ⁰ F minimum
Growth rate	Fast
Flowering rate	March- September
Flowering month	Not identified
Leaf persistence	Briefly deciduous
Messiness	High
Salt tolerance	Low
Drought tolerance	Medium
Nutritional requirements	Medium
Typical dimensions	70×45'
Uses	Park, shade, specimen

Tab 3: description of couroupita guianensis

Part of plant	Description
Leaves	Simple, alternate, narrowly elliptic to 10 inches long and 4 inches wide.
Flowers	6 petals, orange-red with white central disk held on racemes.
Fruits	Capsules, globose, brown, 4-8 inches in diameter, contains up to 300 seed. Wight of the mature fruit is approximately 1450gm.



Figur1: couroupita guianensis Aubl

BIOLOGICAL ACTIVITIES

Anti-inflammatory properties The anti-inflammatory efficacy of couroupita guianensis ethanol extract was observed in the first and second phases, with the extract fractions substantially minimizing the speed the animal spent licking the formalin-injected paw. After carrageenan injection, only the higher dosages (30 and 100 mg/kg) were useful in preventing leukocyte migration into the peritoneal cavity. Simultaneously, the 100 mg/kg dosage virtually completely stopped cell migration. The findings reveal that Couroupita guianensis fractions exhibit anti-inflammatory properties, owing to a decrease in cell migration and suppression of the generation of cytokines and inflammatory mediators.⁸

Antimicrobial activities: The antibacterial and antifungal activity of the methanol and aqueous extracts of the C. guianensis leaf were evaluated using the good diffusion method against six human pathogenic bacteria and four fungal infections. The zone of inhibition against different kinds of harmful bacteria and fungi. Against bacterial and fungal infections, the methanol extract outperformed the aqueous extract. In the antinociceptive activity generated by CEE and butanol fraction, a zone of inhibition against bacterial pathogens was detected.⁹

Anti-ulcer properties The anti-ulcer et al action in the ethanolic extract at a dose of Couroupita guianensis 150 and 300 mg/kg exhibited considerable prevention of the stomach lesions created by pylorus ligation induced ulcer and ethanol-induced gastric ulcer, according to Elumalai in 2012. The creation of an ethanol-induced gastric lesion may be owing to a halt in stomach blood flow, which leads to the development of bleeding and narcotic elements of tissue damage.¹⁰

Immunomodulatory properties

CG has been shown to affect (suppress or activate) immune system components in both in vitro and in vivo investigations. Both investigations used sheep red blood cells as the antigen and examined methanol extract of CG leaves for hypersensitive responses. It has been discovered that it boosts phagocytosis. It improves neutrophil phagocytosis and induces both a cell-mediated and humoral-mediated immune response.¹¹

Antihelmintic properties

The anthelmintic activity of chloroform, acetone, and ethanolic floral extracts of couroupita guianensis against the adult earthworm Pheritima Posthuma was tested in vitro (Indian variety). The activity was measured using a worm motility experiment, which required timing the worms' paralysis and death. The activity of the alcoholic extract was equivalent to that of the standard medication Piperazine citrate, and it was shown to be more effective than the chloroform and acetone extracts.¹²

Activity of neuropharmacology

The effects of a methanolic extract of Couroupita guianensis on spontaneous motor activity, rota-rod performance, and Phenobarbital sleeping duration in mice were investigated in this work. The extract contained alkaloids, glycosides, tannins, and flavonoids, according to the preliminary phytochemical investigation. The extract (100, 250, and 500 mg/kg) significantly reduced spontaneous motor activity in a dose-dependent manner but had no effect on motor coordination as measured by rotarod performance. The onset and duration of pentobarbitone-induced hypnosis were likewise reduced by these extracts.

These findings imply that the extract included an agent that acted on both the central and peripheral neural systems, and the plant's neuropharmacological properties should be investigated further.

Antidiabetic and antihyperglycemic properties

The anti-diabetic efficacy of several components of CG was investigated. Alloxan-induced mice were given 100 mg/kg body weight of aqueous and ethanolic extracts prepared from flowers by Morankar et al. Controlling postprandial hyperglycemia, which may be performed by blocking gastrointestinal carbohydrate hydrolyzing enzymes such as α -amylase and α -glucosidase, is one of the treatment options for diabetes. β Cell dysfunction, insulin resistance, reduced glucose tolerance, and type 2 diabetes are all thought to be caused by reactive oxygen species. In diabetic rats, gold nanoparticles derived from CG leaves boosted lipid peroxidation and antioxidant enzyme activities such as superoxide dismutase, glutathione reductase, and catalase, relieving hyperglycemia through controlling oxidative stress. The anti-obesity potential of CG was investigated, and a favorable result was found. When compared to the standard, Atorvastatin, the methanolic extract (100, 200 mg/kg body weight) of the plant lowered total blood cholesterol, low-density lipoproteins, triglycerides, very-low-density lipoproteins, and raised high-density lipoproteins in obese rats. Furthermore, the extract was shown to reduce the production of atherosclerotic plaques.

Wound healing activity

In connective tissues, fibroblasts are one of the most common cell types. Under normal physiological conditions, these cells are in charge of tissue homeostasis. When tissues are wounded, fibroblasts become activated and develop into myofibroblasts, which produce massive contractions and actively create ECM proteins to aid wound healing. Both fibroblasts and myofibroblasts are important in wound healing because they generate traction and contractile forces, which help the wound contract. The processes of force generation in fibroblasts and myofibroblasts, as well as methodologies for measuring such cellular forces, are the subject of this article. The dual effects of fibroblasts/myofibroblasts in wound healing processes were chosen specifically because a suitable amount of force generation and matrix deposition is beneficial for wound healing; however, excessive force and matrix production results in tissue scarring and even malfunction of repaired tissues. Understanding how these cells create forces and how much force they produce may thus aid in the creation of appropriate methods for more successful tissue wound therapy in clinical situations. In another study, hydroethanolic leaf extract containing flavonoids such as 2',4'-dihydroxy-6'-methoxy-3',5'-dimethylchalcone and 7-hydroxy-5'-methoxy-6,8-dimethyl flavanone and the phenolic acid 4-hydroxybenzoic acid was reported to stimulate human skin fibroblast proliferation and promote UV absorption. Fibroblast plays an incredible role in wound healing by enhancing wound contraction.

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