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A review on a miracle fruits of *Annona muricata*

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Abstract

Annona muricata is a member of the Annonaceae family and is a fruit tree with a long history of traditional use. *A. muricata*, also known as soursop, graviola and guanabana, is an evergreen plant that is mostly distributed in tropical and subtropical regions of the world. The fruits of *A. muricata* are extensively used to prepare syrups, candies, beverages, ice creams and shakes. A wide array of ethnomedicinal activities is contributed to different parts of *A. muricata*, and indigenous communities in Africa and South America extensively use this plant in their folk medicine. This article summarizes external morphology of the plant including leaves, fruit and seeds. Numerous investigations have substantiated these activities, including anticancer, anticonvulsant, anti-arthritic, antiparasitic, antimalarial, hepatoprotective and antidiabetic, analgesic hypotensive, antiinflammatory, and immune enhancing effects. Phytochemical studies reveal that annonaceous acetogenins are the major constituents of *A. muricata*. More than 100 annonaceous acetogenins have been isolated from leaves, barks, seeds, roots and fruits of *A. muricata*. In view of the immense studies on *A. muricata*, this review strives to unite available information regarding its phytochemistry, traditional uses and biological activities.

Keywords: *Annona muricata*, Annonaceae, acetogenins, natural products, biological activity, bioactive compounds, fruit tree

1. Introduction

Natural products, especially those derived from plants, have been used to help mankind sustain its health since the dawn of medicine. Over the past century, the phytochemicals in plants have been a pivotal pipeline for pharmaceutical discovery. The importance of the active ingredients of plants in agriculture and medicine has stimulated significant scientific interest in the biological activities of these substances [1]. Despite these studies, a restricted range of plant species has experienced detailed scientific inspection, and our knowledge is comparatively insufficient concerning their potential role in nature. Hence, the attainment of a reasonable perception of natural products necessitates comprehensive investigations on the biological activities of these plants and their key phytochemicals [2]. In a pharmaceutical landscape, plants with a long history of use in ethno medicine are a rich source of active phytoconstituents that provide medicinal or health benefits against various ailments and diseases. *Annona muricata* Linn. is a lowland tropical fruit-bearing tree in the Annonaceae family. *Annona muricata* is also commonly known as Graviola or Soursop or Gunbanana. The name soursop is due to sour and sweet flavour of its large fruit. Related species include cherimoya (*A. cherimola*) and sugar-apple (*A. squamosa*); paw paw (*Asimina triloba*) is also in the family. The soursop is native to tropical Central and South America and the Caribbean, but is now widely cultivated in tropical areas worldwide, including southern Florida and Southeast Asia, from sea level to altitudes of around 1150 meters. Soursop is one of most commonly used medicinal plants in Caribbean. Pulp of the fruit is eaten and used as an ingredient in many foods and beverages. Tea is drunk daily and often mixed with other herbal decoctions. Soursop is a slender, small, and cold-intolerant tree, generally reaching heights of 4-6 meters. The soursop is adapted to areas of high humidity and relatively warm winters; temperatures below 5 °C (41°F) will cause damage to leaves and small branches, and temperatures below 3 °C (37°F) can be fatal. Plants became the basis of traditional medicine system throughout the world for thousands of years and continue to provide mankind with new remedies. Here, an attempt is made to review on medicinal plant, *Annona muricata* (soursop or graviola). It has a wide potent anticancerous agents coined as Acetogenins which play a key role towards many varieties of cancer, Acetogenins are potent inhibitors of NADH oxidase

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(nicotinamide adenine dinucleotide phosphate-oxidase) of the plasma membranes of cancer cells. The fruit is of economic value and hence cultivated and used widely as an edible food. The plant possess the major pharmacological activities includes cytotoxic, antileishmanial, wound healing, antimicrobial activity. It also has the anticarcinogenic and genotoxic effect. Phytochemical analysis of the plant revealed the presence of tannins, steroids and cardiac glycosides which are the major phytochemical compounds [3].

2. Botanical Description and Distribution

A. muricata L., commonly known as soursop, graviola, guanabana, paw-paw and sirsak, is a member of the Annonaceae family comprising approximately 130 genera and 2300 species [4, 5].

A. muricata is native to the warmest tropical areas in South and North America and is now widely distributed throughout tropical and subtropical parts of the world, including India, Malaysia and Nigeria, Australia, Africa, [6]. *A. muricata* is an

evergreen, terrestrial, erect tree reaching 5–8 m in height and features an open, roundish canopy with large, glossy, dark green leaves. The tree has larger individual yellow flowers on woody stalks (pedicels). Flowers are large and solitary, yellowish or greenish-yellow in colour. Three outer petals are broadly ovate with heart-shaped base, inner 3 also large, elliptical and rounded. The edible fruits of the tree are large, oval or heart-shaped and green in color, and frequently irregular lopsided composite soursop fruit is derived from the fusion of many fruit lets and can weigh more than 4 kg. and the diameter varies between 15 and 20 cm The fruit pulp consists of white fibrous juicy segments surrounding an elongated receptacle. In each fertile segment there is a single oval, smooth hard, black seed $\{1/2\}$ – $\{3/4\}$ in (1.25–2 cm) long. A fruit may contain as few as 5 or up to 200 or more seeds. (Figure 1) [7]. The reticulated leathery looking skin has short spines. Its inner surface is cream-colored and granular and separates easily from the mass of white, fibrous juicy segments which surround the central soft pithy core [9].

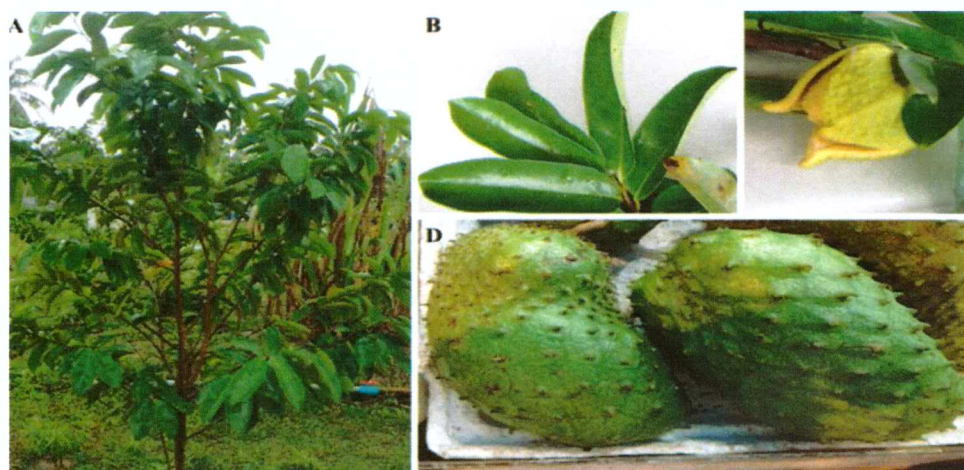


Fig 1: (A) *Annona muricata* L.; the appearance of the (B) leaves; (C) flowers and (D) fruits

3. Ethnomedicinal Uses

All portions of the *A. muricata* tree, similar to other *Annona* species, including *A. squamosa* and *A. reticulata* are

extensively used as traditional medicines against an array of human ailments and diseases, especially cancer and parasitic infections

Table 1: Worldwide Ethnomedicinal uses of *Annona muricata* [10]

Worldwide Ethnomedicinal Uses	
Brazil	for abscesses, bronchitis, chest problems, cough, diabetes, diarrhoea, dysentery, edema, fever, intestinal colic, intestinal parasites, liver problems, neuralgia, nervousness, pain, parasites, rheumatism, spasms, worms
Caribbean	for chills, fever, flu, indigestion, nervousness, palpitations, rash, spasms, skin disease, and as a sedative
Curaçao	for childbirth, gallbladder problems, nervousness, and as a sedative and tranquilizer
Haiti	for digestive sluggishness, coughs, diarrhoea, fever, flu, heart conditions, lactation aid, lice, nerves, parasites, pain, pellagra, sores, spasms, weakness, wounds, and as a sedative
Jamaica	for asthma, fevers, heart conditions, hypertension, lactation aid, nervousness, parasites, spasms, water retention, weakness, worms, and as a sedative
Malaysia	for boils, coughs, diarrhoea, dermatosis, hypertension, rheumatism, and to reduce bleeding
Mexico	for diarrhoea, dysentery, fever, chest colds, ringworm, scurvy, and to reduce bleeding
Panama	for diarrhoea, dyspepsia, kidney, stomach ulcers, worms
Peru	for diabetes, diarrhoea, dysentery, fever, hypertension, indigestion, inflammation, lice, liver disorders, parasites, spasms, tumours, ulcers (internal), and as a sedative
Trinidad	for blood cleansing, fainting, flu, high blood pressure, insomnia, lactation aid, palpitations, ringworms
U.S.A.	for cancer, depression, fungal infections, hypertension, intestinal parasites, tumours
West Indies	for asthma, childbirth, diarrhoea, hypertension, lactation aid, parasites, worms
Elsewhere	for arthritis, asthma, bile insufficiency, childbirth, cancer, diarrhoea, dysentery, fever, heart problems, kidney problems, lactation aid, lice, liver disorders, malaria, pain, ringworm, scurvy, stomach problems, and as a sedative