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A mini-review of pharmacological and economical values of *Funtumia africana*

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Abstract

Funtumia africana belongs to the family Apocynaceae. It is a fast growing tree found in green forests and forest reserves in West Africa. The plant has a long history of use in traditional medicine to treat and manage various diseases such as diabetes, cancer, burns, amoebic dysentery, urinary incontinence, bacterial infections and malaria. It is used economically for the production of furniture, match sticks and firewood. This review paper presents the botanical description, pharmacological uses and economic importance of *F. africana*.

Keywords: *Funtumia africana*, phytochemicals, medicinal plant

Introduction

Humans have relied on plants as a source of medicine throughout history, and this is especially true in developing countries, where traditional medicine plays an important role in health care and medicinal plant research [1, 2]. Plant-based therapies have significantly improved human health and well-being [3]. The healing properties of these medicinal plants are as a result of their high content of alkaloids and polyphenolic compounds and many other bioactive phytochemicals [4]. Infusions from such plants' parts (leaves, stems, barks and roots) are used in traditional healing systems in the Niger Delta region of Nigeria in the management and treatment of diseases such as diabetes, fever, malaria, abdominal diseases, etc. [5].

Botanical description of the plant

Funtumia africana (Benth) commonly known as 'Bush rubber' belongs to the family Apocynaceae, generally found in green forests and forest reserves in west Africa especially Eastern and Western part of Nigeria [6]. It is a tropical tree, usually growing up to 30 m in height (Figure. 1).

Funtumia africana and *Funtumia elastica* are the two species that make up the genus *Funtumia*. Both species have comparable leaves that are glabrous, leathery, elongated, elliptic more or less acuminate, cuneate at the base, and have short stalks [7]. Flowers and fruits of *Funtumia africana* are longer than those of *Funtumia elastica*. The latex of *F. elastica* coagulates easily while that of *F. africana* does not [8].

The bark of *F. africana* is brown to dark in color, thin and fissured, and then becomes granular as the tree matures. The leaves are elliptic or ovate in shape, with a round or cuneate base, acuminate apex measuring 20×9 cm, and wavy leaf margins. The primary lateral vein axels are not pitted. Flowers are yellowish white, fragrant in dense cymes with a corolla tube and lobes 6-10 mm, and 5-7 mm in length respectively. The ripe fruits are greyish brown, fusiform, with an acute or acuminate apex, up to 30 cm long with hairy wind-borne seeds [9].

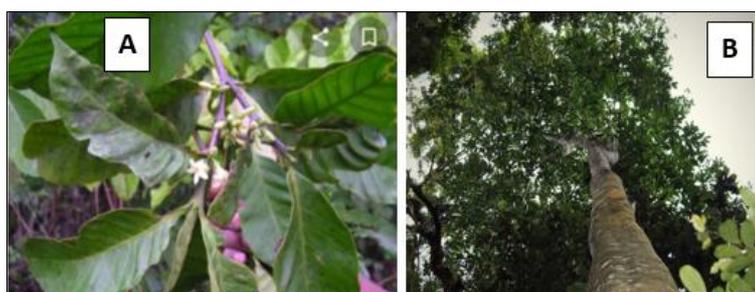


Fig 1: Leaves and flowers of *F. africana* (A); *F. africana* tree (B)

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Phytochemistry of the plant

Many pharmacologically active phytochemicals are found in *Funtumia africana*, including alkaloids, flavonoids, tannins, saponin, cardiac glycosides, terpenoids, reducing sugars, steroids, and phenolic compounds [10].

Funtumine and funtumidine are the main steroidal alkaloids in *F. africana*. They are hypotensive and are used as an anesthetic locally [9]. Methyl ursolate was isolated from the chloroform fraction of the leaves of *F. africana* [25] (Figure 2).

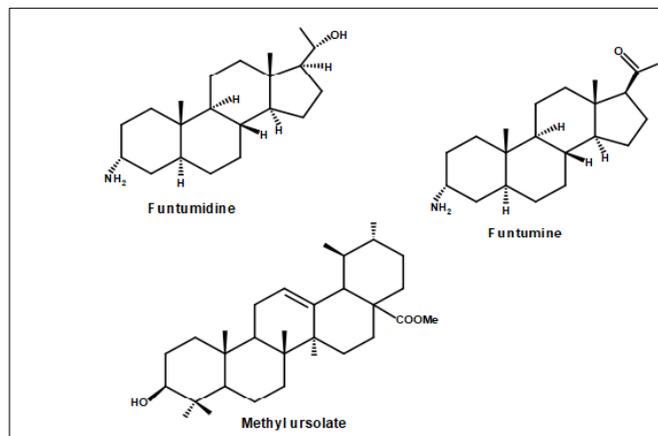


Fig 2: Compounds isolated from *F. africana*

Pharmacological uses of the plant

Funtumia africana is a common plant in African traditional medicine, with its many parts used to treat various diseases, such as inflammation, malaria, cancer, fever amoebic dysentery, diarrhea, and bacterial infections have all been treated with the plant, which has also been demonstrated to have larvicidal properties [12]. In West Africa, it has traditionally been used to treat urinary incontinence and burns [13].

People in Niger Delta region of Nigeria have used *F. africana* leaves for diabetes management and treatment. Findings revealed that the leaf extracts/fractions possess antioxidant and free-radical scavenging activities [14]. Antioxidants such as saponins, flavonoids, polyterpenes, polyphenols and vitamin E contains blood boosting or replenishing activities that effectively prevent excessive oxidative stress caused by certain medications and external sources. The leaf extract also inhibits lipid peroxidation and restores hematological indices to a normal level [15]. Many local traditional medicine practitioners claimed the leaves of *F. africana* have hepatoprotective activities when they were used for the treatment of hepatic diseases such as hepatitis infection [6]. The bark extract possesses broad antibiotic, antimalarial, anticancer, anti-inflammatory, and antifungal activities [25]. The root decoction is drunk for amoebic dysentery, and it can also be pounded and mixed with palm wine and water which have been used in the Benin area of Nigeria for incontinence of urine [8].

Current Research

Over the past five years *F. africana* has been widely investigated possibly due to its phenolic content. The root extract inhibited formation of advanced glycation end-products, and lipid peroxidation [16]. These findings align with the antioxidant studies of the methanol leaf extracts which showed decrease in glutathione-peroxidase, superoxide dismutase, and catalase activities [17]. Recently, these antioxidant properties were rationalized in terms of the total

phenolic, flavonoid, and tannins contents [18]. The ethanol leaf extracts restored normal liver function in rats; regulated minerals, prostate enzymes and prostate gland morphology in rats [19, 20]. The leaf extracts also showed positive impact on rat prostatic hyperplasia indicators such as levels of testosterone, dihydrotestosterone, and estradiol and also showed bactericidal activity against strains of methicillin resistant *Staphylococcus aureus* [21, 22]. The observed moderation of triacylglycerol and high-density lipoproteins suggest that the combined *F. africana* extract possesses antilipidaemic properties [23]. Therefore, there has been escalating medicinal interest in *F. africana*.

Economic Importance

Latex has been used as a bird lime in the past. The wood is white and even textured which can be used to make cheap joinery and furniture; it burns well and might be suitable for match sticks manufactures. The wood is also said to be utilized for crafting chairs, doors, and other household necessities [24].

The branches and trunk can be used as fuel wood. In West Africa, seed floss is used to stuff cushions. In the forest, the root system of *F. africana* protects moist soil from erosion. The littered leaves improve soil fertility in the surrounding while the fragrant yellow white flowers are visited by bees for nectar and pollen [9].

Conclusion

F. africana is rich in phytochemicals, especially steroidal alkaloids and polyphenolic compounds. Extracts of this plant are utilized in the treatment and management of several diseases such as amoebic dysentery, incontinence of urine, severe burns, diabetes and malaria. *F. africana* is economically important because apart from its medicinal benefits, its branches and trunk are sources of wood used for making furniture, match sticks, and firewood.

F. africana has the potential of being a raw material for drug discovery which will lead to economic growth of the local communities. Further investigation of the plant is necessary to fully understand its chemical constituents and to ensure that the plant extracts are safe for consumption.

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