Artocarpus altilis: Over View of a Plant which is referred to as Bread Fruit
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ABSTRACT
Artocarpus altilis is an important medicinal plant. It is commonly called as bread fruit. The present review article gives an account of updated information on its cultivation, phytochemistry, pharmacological actions and its traditional uses. The review reveals that the various activities like antioxidant activity, anti-inflammatory, anti cancer, antimicrobial, hypotensive activity etc exhibited by the plants have been attributed to the several phytoconstituents isolated from the different parts of the plant.

Introduction
Plants are known to possess therapeutic properties and have been used since ancient times to treat various human diseases/disorders effectively. One such fruit is Artocarpus altilis belonging to the family, Moraceae. It is commonly referred to as bread fruit as it is similar to freshly baked bread. Breadfruit is a traditional starch-rich crop. The genus Artocarpus (Moraceae) comprises approximately 50 species and is widely distributed in tropical and subtropical regions [1, 2].


Geographical distribution and cultivation:
Breadfruit is found in Indonesia, Malaysia, coral island and saline soils. It is grown throughout Southeast Asia and most Pacific Ocean islands. In Africa bread fruits are found in Senegal, Ghana and Liberia. In India it is mainly grown in the coastal regions of Karnataka and Kerala. It is a crop for the hot, humid, tropical lowlands. Breadfruit is an equatorial lowland species, grows best below elevations of 2,130 ft, but is also found at elevations of 5,090 ft. Productivity of the plant varies between wet and dry areas. Rain stimulates extension growth, flowering and rate of growth of the fruit. Ideal rainfall requirement is 1,500–3,000 millimeters per year. The soil conditions required are sand, sandy loam or loam. This plant grows best at Temp-21-32˚C. Soil required is neutral to alkaline-PH 7.4-6.1 [3,4].

Key words: Artocarpus altilis, medicinal plant, bread fruit, Phytochemistry
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green and yellow when mature, flesh creamy white, surface varies from smooth to slightly bumpy or spiny, with individual hexagonal disks ranging from areolate to slightly raised and flattened, up to 3 mm high and 5 mm at the base, and conical up to 5 mm long. Seeds have a thin, dark-brown outer skin and an inner, fragile, paper like membrane that surrounds the fleshy, white portion of the seed which is edible[8,9].

History:
The trees were found growing in the northwest New Guinea area around 3,500 years ago by the ancestors of Polynesians and raised breadfruit wherever they went in the Pacific except in cold regions like Ester Island and New Zealand. Later their ancient eastern Indonesian cousins spread the plant towards the west, north and coastal Southeast Asia [10,11].

Parts used:
Latex is taken internally to treat diarrhea, stomach ache, dysentery and to treat ear infections. The root is astringent, purgative and is also used as poultice for skin ailments. The bark is reported to be used to treat headaches and to reduce high blood pressure. Leaf is used to control diabetes, to treat liver disease and fevers. Flowers extract is used in treating ear edema. Roots exhibited antimicrobial activity [12-16].

Phytoconstituents:
Steroids, phytosterols, gums and resins have been reported to be present in methanolic, ethyl acetate and petroleum ether leaf. Literature review has revealed that plants belonging to this species produce a variety of isoprenylated flavonoids with a unique feature of an isoprenyl side chain at C-3, and 2', 4'-dioxygenation or 2', 4', 5'-trioxigenation patterns in ring B of the flavone skeleton. The other constituents reported are amino acids, fatty acids, carbohydrates and starch which are 72.5%, 68.2%, 81.4%, 15.52 g/100 g fresh weight respectively. Geranyl Flavonoids that have been reported from this plant are geranyl dihydrochalcones, 1-(2,4-dihydroxyphenyl)-3-[3,4-dihydro-3,8-dihydroxy-2-methyl-2-(4-methyl-3-pentenyl)-2H-1-benzyopyran-5-yl]-1-propanone, 1-(2,4-dihydroxyphenyl)-3-(4-hydroxy-6,6,9-trimethyl-6a,7,8,10a-tetrahydro-6H-dibenzo[b,d] pyran-5-yl]-1-propanone. 2-[6-hydroxy-3,7-dimethylocta-2(E),7-dienyl]-2',3,4,4'-tetrahydroxydihydrochalcone, 1-(2,4-dihydroxyphenyl)-3-[8-hydroxy-2-methyl-2-(3,4-epoxy-4-methyl-1-penteny1)-2H-1-benzopyran-5-yl]-1-propanone (5), 1-(2,4-dihydroxyphenyl)-3-[8-hydroxy-2-methyl-2-(4-hydroxy-4-methyl-2-pentenyl)-2H-1-benzopyran-5-yl]-1-propanone.

The other compounds isolated and reported are Artocarpaurone, Cycloartocarpin, and Chaplashin were isolated from root stems, while Morusin, Artonin E, Cudraflavone B, Cudraflavone C, Cycloartobiloxanthone, and Arto biloxanthone from the root barks. Terpenoids, saponins, phenolic group, flavonoids, glycoside, steroids and tannins were reported from the extract of the twigs. The minerals reported were Calcium, iron, sodium and iron. This - species also contains broussochalcone A, kazinol A, broussoaurone A, Cycloartocarpin A, cycloheterophyllin and broussoflavonol F [17-26].

Structures of some isolated compounds:

- Cycloartocarpin
- Cycloartobiloxanthone
- Cudraflavone B
- Morusin
- Cudraflavone C
- Broussoaurone A
- Broussochalcone A
- kazinol A
- Cycloheterophyllin

Pharmacological uses:
The plant has been reported to possess a number of pharmacological activities like strong inhibition of arachidonic acid (AA)-induced platelet aggregation [27], flavonoids isolated from the heart wood posses antioxidant activity[28], it also has anti-inflammatory [29], antimicrobial [30-33].
They also show activity as inhibitor of tyrosinase 5α-reductase [34-37]. It has also been reported that extract has also been shown to alleviate the symptoms of diabetes mellitus and urinary problems [38]. The different parts of the plant have been reported to be useful in the treatment of cancer, benign prostate hyperplasia and prostate cancer. Ethyl acetate extract of the leaves has been reported to possess cytotoxic effects on some human cancer cell lines which includes human lung adenocarcinoma, human colon carcinoma and human hepatocellular carcinoma and human breast cancer [39-40]. The methanol extract from bud covers has been reported to have activity in a cathespin K inhibition. It has been reported that cathepsin K inhibitors are very effective in preventing bone resorption, and hence this plant may have potential for treatment of osteoporosis [41]. Review of literature has also revealed that the plant possesses hypotensive activity [42,43], anti tubercular and antiplasmodial activity [24], artocarpin, a prenylated flavonoid compound has been reported to have inhibition of 5-reductase, melanin biosynthesis in B16 melanoma cells and melanogenesis-inhibitoryactivity [44]. It has also been revealed that the plant possesses anticestodal activity [45].

Traditional Uses:

It is traditionally used in the treatment of tongue thrush, sciatica, diarrhea, skin infections, low blood pressure and asthma in countries like Trinidad and Bahamas. A powder of roasted leaves is used as a remedy for enlarged spleen. The leaves of Sukun as it is called in Indonesia are used for the treatment of various kinds of diseases such as liver cirrhosis, hypertension and diabetes. It is also used as laxative, in rheumatism, dysentery. Latex is massaged onto skin, for broken bones and sprains. Juice from stems is used for ear infections. In the West Indies, decoction of yellowing leaf is used for high blood pressure and asthma. It is also used to treat taeniasis, sore eyes, enlarged spleen, boils, burns, fractures, gout, oliguria, rheumatism, and as an anodyne [46,47].

CONCLUSION:

This review provides inside and gives valuable information of the plant. It is seen from the literature that the plant is very important for its large number of phytoconstituents with medicinal value. This review may be a guide to further investigations of its phytoconstituents and screening of other activities of the plant which are yet to be explored.

REFERENCES:


