



REVIEW ON BAOBAB: A TREE OF LIFE

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ABSTRACT

Mandu ki Imli, local parlance for Baobab seeds, is a special kind of tamarind used by the people of Mandu in the State of Madhya Pradesh, India. The fruit which looks like papaya is originally the fruit of Baobab tree and Mandu is the only place in the whole of Asia where one can find Baobab trees. Mandu in the Malwa region of Madhya Pradesh has many unusual plants. One of them is the Mandu-ki-Imli tree which is better known as Baobab tree. The Baobab tree must have been brought to this region from Africa in antiquity, as it is not a native of India. People of the region have made good use of the highly nutritious fruit of the tree, Scientifically known as *Adansonia*. The Baobab Tree is also known as the tree of life, with good reason too. It is capable of providing shelter, clothing, food, and water for the animal as well as human inhabitants of the African Savannah regions. The cork-like bark or huge stem is fire resistant and is used for making cloth and rope. The leaves are used as condiments and medicines. The fruit, called "monkey bread", is rich in vitamin C and is eaten. The tree is capable of storing hundreds of liters of water, which is tapped in dry periods. Mature trees are frequently hollow, providing living space for numerous animals and humans alike. Trees are even used as bars, barns, wine and beer shops and more. Radio-carbon dating has measured that age of some Baobab trees at over 2,000 years old. For most of the year, the tree is leafless, and looks very much like it has its roots sticking up in the air.

Key words: Baobab, *Adansonia digitata*, Mandu ki imli.

INTRODUCTION

Adansonia digitata belonging to family Malvaceae is the most widespread of the *Adansonia* species on the African continent, found in the hot, dry savannahs of sub-Saharan Africa. It also grows, having spread secondary to cultivation, in populated areas. English common names include baobab, dead-rat tree (from the appearance of the fruits), monkey-bread tree (the soft, dry fruit is edible), upside-down tree (the sparse branches resemble roots) and cream of tartar tree. The northern limit of its distribution in Africa is associated with rainfall patterns; only on the Atlantic coast and in the Sudan does its occurrence venture naturally into the Sahel. On the Atlantic coast, this may be due to spreading after cultivation. Its occurrence is very limited in Central Africa, and it is found only in the very north of Southern Africa. In Eastern Africa, the trees grow also in shrublands and on the coast. In Angola and Namibia, the baobabs grow in woodlands, and in coastal regions, in addition to savannahs. It is also found in Dhofar region of Oman and Yemen in the Arabian Peninsula, Asia. This tree is also

found in India, particularly in the dry regions of the country. In whole Asia it is only grown in Mandav, Madhya Pradesh India [1-4].

MYTHS AND LEGEND

For most of the year, the tree is leafless, and looks very much like it has its roots sticking up in the air. There are numerous legends offering explanations of how the tree came to be stuffed in the ground upside down, so it could no longer complain. There are also numerous superstitions amongst native African people regarding the powers of the tree. Anyone who dares to pick a flower, for instance, will be eaten by a lion. On the other hand, if you drank water in which the seeds have been soaked, you'd be safe from a crocodile attack [5].

PROPOGATION AND CULTIVATION

In Sudan propagation is basically accomplished by seeds. Seeds can be collected from picked or fallen fruit.

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After crushing the hard woody shell of the fruit, the seeds can be extracted from the dry acidic pulp. Baobab seeds have very hard seed coats and germination is usually less than .In nature, dormancy is broken by passage through the digestive system of large mammals. In cultivation, dormancy may be broken by immersing the seed in hot water for several minutes or by chopping the seed coat. According to acid scarification for 6 or 12 hours is the optimal pretreatment method for breaking the baobab seed coat inhibition. Vegetative propagation by root cuttings or by grafting or budding can also be practiced .Seedlings have big, flat and paired cotyledons, and the first leaves are petiolate (with a leaf stalk), generally narrow, simple and linear. Effective protection against livestock is essential after planting the seedlings. Under good conditions, rapid growth in diameter and height is possible, reaching 2m in two years and up to 15 m in twelve years. Time required to produce fruits varies from 8 to 23 years. Each matured plant produces more than an average of 250 capsules which may provide at least 30 kg of the fruit. Although the trees seem to be protected by those who know its value, a major factor in Central Sudan which contributes to low numbers in the field is uncontrolled bush burning, common in dry seasons, which destroys the seedlings. Other factors include cattle grazing on seedlings and diseases which render the seeds nonviable after planting .The tree is often planted near villages, but there is limited information on local tree husbandry practices [4].

CHEMICAL COMPOSITION

The pulp is acidic, due to the presence of the organic acids citric, tartaric, malic, succinic and ascorbic, with pH 3.3 . The latter source also shows that the pulp is rich in pectin (average 56.2%). The pectin is mainly water soluble and has a low degree of esterification and a low intrinsic viscosity. This suggests that it will probably not yield a high quality jelly of high solids content, because it tends to precipitate rapidly.

The alkaloid ‘adansonin’ in the bark is thought to be the active principle for treatment of malaria and other fevers. Baobab bark which is often given to infants to promote weight gain was found to be high in fat, calcium, copper, iron, and zinc. Friedelin, lupeol and baurenol (all three terpenoids) were identified in the leaf bark of baobab. In addition, betulinic acid was isolated from the bark whereas the leaf exclusively yielded taraxerone and acetate of lupeol and baurenol.[6]

BAOBAB NUTRITIONAL VALUE

Energetic Value (Kcal) – 175 / 100g
Energetic Value (Kj) – 750 / 100g
Proteins – 2.9g / 100g
Fats – 0.4g / 100g
Total Carbohydrates – 39.0g / 100g
Dietary Fibre – 45.9g / 100g
Sodium – 0.2mg / 100g

VITAMINS

Vitamin C – 295mg / 100g
Vitamin A – 200mcg / 100g
Vitamin B1 (thiamin) – 0.04mg / 100g
Vitamin B2 (riboflavin) – 0.06mg / 100g
Vitamin B6 (piridoxin) – 2.13mg / 100g
Vitamin PP (niacin) – 2.16mg / 100g

BIOLOGICAL ACTIVITY

Anti-oxidant: Dietary antioxidants, including polyphenolic compounds, vitamins E and C, and carotenoids, are believed to be effective nutrients in the prevention of oxidative stress related diseases, such as inflammation, cardiovascular disease, cancer and aging related disorders. The high antioxidant capacity of products deriving from *Adansonia digitata* show their therapeutical, nutraceutical and cosmoceutical potential. Moreover, in view of the very high antioxidant capacity, some authors have proposed the red fiber as a new value-added ingredient for food preparation and/ or nutraceutical application in the promotion of health. Research studies have compared the overall antioxidant capacity (IAC), corresponding to the sum of the corresponding water- and lipid-soluble antioxidants capacity, of baobab plant products with those of orange and kiwi. The IAC value for the examined products resulted as follows: baobab red fibre (1617.3) >>> baobab fruit pulp (240.5) >>baobab fresh leaves (89.0) >> baobab seeds (51.4) > orange fresh fruit pulp (24.3) > kiwi fruit pulp (2.4).

Anti-viral: *Adansonia digitata* root-bark and leaf methanol extracts have shown high antiviral activity against Herpes simplex, Sindbis and Polio, together with viricidal (direct inactivation of virus particles) and also intracellular antiviral activity, which could indicate the presence of multiple antiviral compounds, or a single compound with multiple actions. Whether such studies will show as effective results in humans is unknown but these couple of preliminary reports may provide rationale behind some of the medicinal uses of this plant.

Anti-inflammatory and Anti-pyretic Activity: The aqueous extract of the baobab fruit pulp produced a marked anti-inflammation activity. This effect could be due to the presence of sterols, saponins and triterpenes in the fruit pulp. The extract also shows a marked antipyretic activity. The antipyretic activity of the extract resembles that normally induced by standard dose of administered acetylsalicylic acid (ASA) in hyperthermic rats. Analgesic and antipyretic activities were also mentioned by, probably due to the presence of sterols, saponins and triterpenes in the fruit pulp. Leaves are applied locally for a variety of inflammatory conditions, insect bites and guinea worm sores.

Anti-microbial Activity: An acid medium, as created by the addition of baobab pulp powder to tempe fermentation could prevent the growth of pathogenic bacteria such as *Salmonella* sp., *Bacillus* sp. and *Streptococcus* sp..

Moreover, increasing concentrations of baobab pulp powder led to an increase in the population of lactic acid bacteria. This is beneficial to consumers since most of the lactic acid bacteria species are nontoxic and have been reported to produce an enzyme that breaks the oligosaccharides in soybean (main component of tempe) down to their mono- and disaccharide constituents. The presence of lactic acid bacteria in tempe prepared as it is being done locally in Nigeria will not only improve the digestibility of tempe, but will also extend the shelf life of the product because of the preservative attributes of lactic acid bacteria. There was some antibacterial activity against *Staphylococcus aureus*, *Streptococcus faecalis*, *Bacillus subtilis*, *Escherichia coli* and *Mycobacterium*. Stem and root barks of baobab contain bioactive constituents which are responsible for antimicrobial activity of the crude aqueous and ethanolic extracts. This explains the scientific basis for the use of crude stem and/or root bark extracts in traditional medicine e.g. for treatment of fever caused by malaria.

Anti-trypanosoma Activity: Extracts of baobab roots eliminate the motility in *Trypanosoma congolense* within 60 minutes and drastically reduce motility in *T. brucei*. *T. brucei* and *T. congolense* are unicellular parasites transmitted by the bites of tsetse fly and is the causative agent of sleeping sickness in humans and related diseases in animals.

USES IN TRADITIONAL MEDICINE

Baobab leaves, bark, pulp and seeds are used as food and for multiple medicinal purposes in many parts of Africa. Ethnomedicine has been an intensive area of research, with several authors discussing the main ethnomedicinal uses of baobab products.

Fruit: Baobab is used in folk medicine as an antipyretic or febrifuge to overcome fevers. Both leaves and fruit pulp are used for this purpose. Fruit pulp and powdered seeds are used in cases of dysentery and to promote perspiration (i.e. a diaphoretic). Baobab fruit pulp has traditionally been used as an immunostimulant, anti-inflammatory, analgesic, antipyretic, febrifuge, and astringent in the treatment of diarrhoea and dysentery. The fruit pulp has been evaluated as a substitute for improved western drugs. The aqueous extract of baobab fruit pulp exhibited significant hepatoprotective activity and, as a consequence, consumption of the pulp may play an important part in human resistance to liver damage in areas where baobab is consumed. Medicinally, baobab fruit pulp is used as a febrifuge and as an anti-dysenteric, and in the treatment of smallpox and measles as an eye instillation. In Indian medicine, baobab pulp is used internally with buttermilk in cases of diarrhoea and dysentery. Externally, use is made of young baobab leaves, crushed into a poultice, for painful swellings.

Seeds: Seeds are used in cases of diarrhoea, and hiccough. Oil extracted from seeds is used for inflamed gums and to ease diseased teeth. Since seed oil is used to also treat skin

complaints, it can be considered to have cosmetic applications as well.

Leaves: Powdered leaves are used as an anti-asthmatic and known to have antihistamine and anti-tension properties. The leaves are also used to treat a wide variety of conditions including fatigue, as a tonic and for insect bites, Guinea worm and internal pains, and dysentery (Sidibe & Williams, 2002); and diseases of the urinary tract, ophthalmia and otitis. In Indian medicine, powdered leaves are similarly used to check excessive perspiration (Sidibe & Williams, 2002). Baobab leaves are used medicinally as a diaphoretic, an expectorant, and as a prophylactic against fever, to check excessive perspiration, and as an astringent. The leaves also have hyposensitive and antihistamine properties. Leaves are used to treat kidney and bladder diseases, asthma, general fatigue, diarrhoea, inflammations, insect bites and guinea worm .[4]

Bark: The widest use in traditional medicine comes from the baobab bark as a substitute for quinine in case of fever or as a prophylactic. A decoction of the bark deteriorates rapidly due to the mucilaginous substances present. This process can be prevented by adding alcohol or a small quantity of sulphuric acid to the decoction. Baobab bark is used in Europe as a febrifuge (antipyretic). In the Gold Coast (Ghana), the bark is used instead of quinine for curing fever. In Indian medicine, baobab bark is used internally as a refrigerant, antipyretic and antiperiodic. It is used as a decoction, 30 g/l of water, boiled down to two thirds. The activity of baobab bark as a febrifuge, however, has not been detected in experimental malaria treatments, although it is both diaphoretic and antiperiodic. The bark, however, is certainly used for the treatment of fever in Nigeria. Moreover, the bark contains a white, semi-fluid gum that can be obtained from bark wounds and is used for cleansing sores. There are no alkaloids present in the bark, and accounts from Nigeria are inconclusive. The bark contains the alkaloid 'adansonin', which has a strophanthus-like action. In East Africa, the bark is used as an antidote to strophanthus poisoning. In Congo Brazzaville, a bark decoction is used to bathe rickety children and in Tanzania as a mouthwash for toothache. Furthermore, a new flavanonol glycoside was reported in the root bark. Baobab bark, fruit pulp and seeds appear to contain an antidote to poisoning by a number of *Strophanthus* species. The juice of these species has been widely used as an arrow poison especially in East Africa. In Malawi, a baobab extract is poured onto the wound of an animal killed in this way to neutralize the poison before the meat is eaten. An infusion of roots is used in Zimbabwe to bathe babies to promote smooth skin.[4]

CONCLUSION

Nature has provided a complete store house of remedies to cure all ailments of mankind. The knowledge of drugs has accumulated over thousand of years as a result of man's inquisitive nature so that today we possess

many effective means of ensuring health care.[9] The Baobab tree, and the many parts of it, have been used for Baobab grew, scientist have done several clinical studies on the various parts of the tree to prove it's worth. Baobab fruit (Mandav ki Imli) is highly nutritious and full of naturally occurring vitamins, antioxidants and minerals. Baobab can be used as part of a calorie controlled diet, as a

hundreds of years for a whole multitude of things materials. Over the years, as the interest in all things daily supplement, and as a natural medicine. It can help suffers with conditions such as, Multiple Sclerosis, Diabetes, Gout, Constipation, Kidney Disease, Osteoporosis, IBS and ME (Myalgic Encephalopathy).

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