

**BOTANY, PHYTOCHEMISTRY AND MEDICINAL BENEFITS OF OMANI BAOBAB: A  
SHORT REVIEW****Fatima Salim Al-Mamari and Sivamani Selvaraju\***College of Engineering and Technology, Engineering Department, University of Technology and Applied Sciences,  
Salalah, Oman.**\*Corresponding Author: Sivamani Selvaraju**College of Engineering and Technology, Engineering Department, University of Technology and Applied Sciences, Salalah,  
Oman.

Article Received on 14/09/2024

Article Revised on 05/10/2024

Article Accepted on 25/10/2024

**ABSTRACT**

*Adansonia digitata*, commonly known as baobab, is a tree native to tropical countries renowned for its nutritional and medicinal properties. This review explores the phytochemistry of baobab, highlighting its rich profile of bioactive compounds. The fruit, rich in vitamin C, dietary fiber, and essential minerals, exhibits significant antioxidant and anti-inflammatory properties due to its polyphenolic content, including flavonoids and tannins. Additionally, the presence of carotenoids and saponins contributes to its potential health benefits, such as immune support and antimicrobial effects. Baobab oil, derived from its seeds, is notable for its unsaturated fatty acids, which promote skin health. The diverse phytochemicals present in *A. digitata* underscore its traditional uses and potential applications in modern medicine and nutrition. Further research is needed to fully elucidate the therapeutic potential of this remarkable tree.

**KEYWORDS:** *Adansonia digitata*, baobab, anti-inflammatory, vitamins.**INTRODUCTION**

Dhofar, a region in Oman, is renowned for its rich biodiversity, particularly in terms of medicinal plants. The unique climatic conditions, influenced by the monsoon, support a variety of flora that has been utilized for centuries in traditional medicine.<sup>[1]</sup> Local communities have long relied on these plants for their healing properties, which are deeply integrated into cultural practices and herbal remedies.

Among the prominent medicinal plants found in Dhofar is Frankincense (*Boswellia sacra*), known for its anti-inflammatory and antiseptic properties. This resin has been a staple in both traditional medicine and modern therapeutic practices.<sup>[2]</sup> Another important plant is myrrh (*Commiphora molmol*), celebrated for its analgesic and wound-healing abilities. These plants not only serve medicinal purposes but also play a significant role in the region's economy, particularly through the trade of resin.

Other notable species include *Hibiscus* and various *Aloe* genus, which are used for their soothing effects on skin ailments and digestive issues. Additionally, the indigenous knowledge surrounding these plants emphasizes sustainable harvesting practices, ensuring that the ecological balance is maintained.<sup>[3]</sup> The ongoing interest in ethnobotany has led to increased research into the pharmacological potential of these plants, aiming to

validate traditional uses and explore new applications in modern medicine.

While the existing literature highlights the nutritional and medicinal properties of *A. digitata* (baobab), there remains a significant gap in comprehensive studies that systematically analyze the phytochemical constituents and their specific mechanisms of action. Additionally, there is limited understanding of the synergistic effects of the various bioactive compounds found in baobab and their potential applications in modern therapeutic contexts. This review uniquely synthesizes current knowledge on the phytochemistry of baobab. By bridging traditional knowledge with contemporary research, this paper aims to highlight the multifaceted health benefits of baobab and propose avenues for future research.

The primary aim of this review is to provide a comprehensive analysis of the phytochemical profile of *A. digitata* and to evaluate its potential health benefits and applications in nutrition and medicine. The objectives are to: (i) analyze the phytochemical constituents of baobab and their implications for health; and (ii) investigate the traditional medicinal uses of baobab.

## BOTANY OF BAOBAB

*A. digitata*, commonly known as the baobab, belongs to the family Malvaceae (Figure 1). It is one of the eight species of the genus *Adansonia*, which are native to tropical countries.<sup>[4]</sup> The specific epithet *digitata* refers to the shape of its leaves, which are divided into finger-like lobes.

## MORPHOLOGY

Baobab trees are characterized by their distinctive, swollen trunk, which store large amounts of water, allowing them to survive in arid environments. The trunk reaches diameter of up to 10 meters and grow to heights of 5 to 30 meters. The bark is smooth and greyish, and the tree has a unique, almost upside-down appearance, especially when leafless, with its branches resembling roots reaching skyward.<sup>[5]</sup>



Figure 1: Baobab tree in Dhalkut Wilayat of Dhofar Governorate, Oman.

The leaves are palmate, typically 5 to 7 lobed, and are bright green in color, emerging after the rainy season. The flowers are large and white or cream-colored, with long, slender petals that bloom at night and are often pollinated by bats and other nocturnal creatures. The fruit is a large, hard-shelled capsule that contains a sweet, powdery pulp and numerous seeds.<sup>[6]</sup> The fruit, often referred to as monkey bread, is rich in vitamin C and other nutrients.

### Habitat and Distribution

*A. digitata* is primarily found in tropical and subtropical regions of World, particularly in savanna and dry woodland ecosystems. It thrives in well-drained soils and is often found in areas with seasonal rainfall, where it endures long dry periods.<sup>[7]</sup> The tree is also cultivated in other parts of the world for its ornamental value and nutritional benefits.

### Ecological Importance

Baobab trees play a vital role in their ecosystems. They provide food and shelter for various wildlife species, including birds, insects, and mammals. The leaves, fruits, and seeds are consumed by many animals, while the tree

itself offers nesting sites.<sup>[8]</sup> Additionally, the baobab's ability to store water helps stabilize the surrounding environment, promoting biodiversity in arid regions.

### Cultural and Economic Significance

*A. digitata* holds great cultural significance in many countries, often regarded as a symbol of life and resilience. The tree is used in traditional medicine, and its leaves, fruit, and seeds are utilized for nutritional and medicinal purposes.<sup>[9]</sup> The pulp from the fruit is made into beverages, while the seeds are used for oil extraction. The bark is sometimes harvested for ropemaking and weaving.

### Conservation Status

While *A. digitata* is not currently considered endangered, habitat loss and climate change pose threats to its populations.<sup>[10]</sup> Conservation efforts are essential to ensure the survival of this iconic species, particularly in areas facing deforestation and environmental degradation.

## PHYTOCHEMISTRY OF BAOBAB

*A. digitata*, commonly known as the baobab tree, is celebrated for its rich nutritional and medicinal properties. Below is a detailed exploration of its phytochemical constituents and their implications.<sup>[11,12]</sup>

### Terpenoids and Sterols

$\beta$ -sitosterol and other phytosterols are found in the seeds and leaves, contributing to potential cholesterol-lowering properties.

### Alkaloids and Saponins

Alkaloids and saponins are found in the bark and leaves, which are thought to have anti-inflammatory and antimicrobial properties.

### Antioxidants

The high content of polyphenols, vitamin C, and carotenoids in various parts of the tree contribute to strong antioxidant activity, making it a valuable plant for managing oxidative stress.

### Phenolic Compounds

The tree contains flavonoids such as quercetin, kaempferol, and myricetin, known for their strong antioxidant activities. These compounds help mitigate oxidative stress and inflammation. Tannins are present in various parts of the plant, possess astringent properties and contribute to antimicrobial effects, potentially aiding in wound healing and gastrointestinal health.

### Vitamins and Minerals

The fruit pulp is exceptionally rich in vitamin C, containing up to ten times more than oranges. This antioxidant plays a crucial role in immune function, collagen synthesis, and reducing oxidative stress. Baobab is a source of essential minerals: (i) Calcium: Important for bone health and muscle function. (ii) Potassium: Aids in maintaining healthy blood pressure and electrolyte balance. (iii) Magnesium: Involved in over 300 biochemical reactions in the body. (iv) Iron: Crucial for the formation of hemoglobin and overall energy levels.

### Dietary Fiber

Baobab is rich in both soluble and insoluble fiber: (i) Soluble Fiber: Helps regulate blood sugar levels and improves gut health by promoting beneficial bacteria. (ii) Insoluble Fiber: Aids in digestion and promotes regular bowel movements.

### Fatty Acids

The seeds are high in healthy fats, primarily unsaturated fatty acids: (i) Oleic Acid: Associated with heart health. (ii) Linoleic Acid: An essential fatty acid that supports skin health and reduces inflammation.

### Polysaccharides

The fruit pulp contains high amounts of dietary fibers, including pectin, which play a role in gastrointestinal health. Soluble fibers contribute to the viscous

consistency of the baobab fruit pulp when mixed with water and have prebiotic properties.

### Amino Acids and Proteins

The leaves are rich in amino acids like lysine, threonine, and leucine, making them valuable for nutrition, particularly in regions where protein intake might be low.

## MEDICINAL BENEFITS OF BAOBAB

*A. digitata*, commonly known as baobab, is a tree native to Dhofar and has various medicinal benefits. The fruit pulp is valued for its high antioxidant, anti-inflammatory, and immunomodulatory properties, as well as its use in traditional medicine to treat fever, diarrhea, and dysentery.<sup>[13]</sup> The leaves are rich in nutrients and used as a leafy vegetable in some countries. They also have applications in traditional medicine for treating diseases like malaria and inflammation. The seed oil is used both in cosmetics and in traditional remedies due to its emollient properties. Here are some notable ones.<sup>[14,15]</sup>

### Rich in Nutrients

Baobab fruit is high in vitamin C, antioxidants, and dietary fiber, contributing to overall health.

### Antioxidant Properties

The fruit contains antioxidants that help combat oxidative stress, potentially reducing the risk of chronic diseases.

### Anti-Inflammatory Effects

Baobab has compounds that may help reduce inflammation, benefiting conditions like arthritis and other inflammatory disorders.

### Digestive Health

Its high fiber content aids digestion, promotes gut health, and help manage conditions like constipation.

### Immune Support

The vitamin C content supports the immune system, enhancing the body's ability to fend off infections.

### Blood Sugar Regulation

Baobab may help regulate blood sugar levels, which could be beneficial for people with diabetes.

### Skin Health

Baobab oil is used in cosmetics for its moisturizing properties and may help improve skin elasticity and reduce signs of aging.

**Antimicrobial Properties:** Baobab extracts may possess antimicrobial effects, which help in fighting infections.

## CONCLUSION

*A. digitata*, or baobab, stands out as a significant source of nutrition and medicinal benefits, driven by its diverse

phytochemical profile. The high levels of vitamins, particularly vitamin C, along with essential minerals, dietary fiber, and a range of bioactive compounds such as polyphenols and saponins, highlight its potential in promoting health and preventing disease. Its antioxidant and anti-inflammatory properties make baobab a valuable addition to both traditional and modern medicinal practices. Furthermore, the applications of baobab oil in skin care reinforce its versatility. As interest in natural remedies continues to grow, further research is essential to explore and validate the therapeutic potential of *A. digitata*, paving the way for its broader use in health and wellness industries.

## REFERENCES

1. Sidibe, M., & Williams, J. T. *Baobab, Adansonia Digitata L.* Crops for the Future., 2002; 4.
2. Omondi, M. A. *Morphological and Physicochemical Characteristics of Baobab (Adansonia digitata L.) from Kilifi and Kitui Counties in Kenya* (Doctoral dissertation, JKUAT-AGRICULTURE), 2020.
3. Thompson, P. T., Boamah, V. E., & Badu, M. In-vitro antioxidant, antimicrobial and phytochemical properties of extracts from the pulp and seeds of the African baobab fruit (*Adansonia digitata L.*). *Heliyon*, 2024; 10(8).
4. Rashford, J. A Historically Contextualized Account of the Baobab Trees (*Adansonia digitata L.*) of Tobago. *Economic Botany*, 2022; 76(2): 127-157.
5. Geppert, B. Development of a fibre-rich snack made from baobab fruit pulp.hju
6. Audia, C., Kaboret, B., Kent, R., Hill, T., & Poole, N. The contribution of tree crop products to smallholder households: A case study of baobab, shea, and néré in Burkina Faso. *FAO Commodity and Trade Policy Research Working Papers*, 2015; 49: III.
7. Kaboré, D., Sawadogo-Lingani, H., Diawara, B., Compaoré, C. S., Dicko, M. H., & Jakobsen, M. A review of baobab (*Adansonia digitata*) products: effect of processing techniques, medicinal properties and uses. *African Journal of Food Science*, 2011; 5(16): 833-844.
8. De Caluwé, E., Halamouá, K., & Van Damme, P. *Adansonia digitata L.*—A review of traditional uses, phytochemistry and pharmacology. *Afrika focus*, 2010; 23(1): 11-51.
9. Zahra'u, B., Mohammed, A. S., Ghazali, H. M., & Karim, R. Baobab tree (*Adansonia digitata L.*) parts: nutrition, applications in food and uses in ethno-medicine—a review. *Ann*, 2014.
10. Kamatou, G. P. P., Vermaak, I., & Viljoen, A. M. An updated review of *Adansonia digitata*: A commercially important African tree. *South African Journal of Botany*, 2011; 77(4): 908-919.
11. Gahane, R. N., & Kogje, K. K. Antibacterial, antioxidant and phytochemical analysis of edible parts of potent nutraceutical plant-*adansonia digitata*. In *II International Symposium on Medicinal and Nutraceutical Plants.*, November 2009; 972: 55-60.
12. Eltahir, M. E., & Elsayed, M. E. *Adansonia digitata*: phytochemical constituents, bioactive compounds, traditional and medicinal uses. *Wild Fruits: Composition, Nutritional Value and Products*, 2019; 133-142.
13. Sundarambal, M., Muthusamy, P., & Radha, R. A review on *Adansonia digitata Linn.* *Journal of Pharmacognosy and Phytochemistry*, 2015; 4(4): 12-16.
14. Vertuani, S., Braccioli, E., Buzzoni, V., & Manfredini, S. Antioxidant capacity of *Adansonia digitata* fruit pulp and leaves. *Acta phytotherapeutica*, 2002; 2(5): 2-7.
15. Rahul, J., Jain, M. K., Singh, S. P., Kamal, R. K., Naz, A., Gupta, A. K., & Mrityunjay, S. K. *Adansonia digitata L.* (baobab): a review of traditional information and taxonomic description. *Asian Pacific Journal of Tropical Biomedicine*, 2015; 5(1): 79-84.