

BAOBAB: THE UNTAPPED POTENTIAL OF AFRICAN FOREST RESOURCES IN ANIMAL NUTRITION

Ochigbo, E.S.¹ and *Salihu, E.A.²

¹Department of Forestry and Wildlife Management, Ahmadu Bello University, Zaria

²Department of Animal Science, Ahmadu Bello University, Zaria

*Correspondence: estherochigbo97@gmail.com, salihuezekiel@gmail.com, +2348137601912

ABSTRACT

Baobab (*Adansonia digitata* L.) is a vital non-timber forest product with immense potential in both forestry and animal nutrition. Native to the African savanna, this multipurpose tree contributes to ecological stability, rural livelihoods, and sustainable feed production. The leaves, fruit pulp, and seeds are rich in nutrients, bioactive compounds, and minerals that support animal growth and health. Despite its abundance, baobab remains underutilized in livestock and monogastric feed formulation. This review combines current knowledge on its botanical characteristics, nutritional composition and applications in monogastric animal nutrition. Available evidence reveals the significance of baobab plant in forest ecosystems and its potential to enhance sustainable feed systems in livestock production. The review concludes with recommendations and strategies to promote the integration of baobab into forestry and feed management practices, as feed resource and phyto-genic additives.

Keywords: Baobab, forestry, non-timber forest product, animal nutrition, monogastric animals, sustainability

DESCRIPTION OF PROBLEM

Forests play a significant role in providing non-timber resources that support human and animal livelihoods. Among these, the baobab (*Adansonia digitata*), often referred to as the “tree of life,” stands out for its ecological, nutritional, and economic importance in sub-Saharan Africa [1]. As deforestation and climate change threaten conventional feed sources, interest in indigenous forest species as sustainable feed alternatives has grown significantly [2]. Baobab, with its deep roots and drought tolerance, is a resilient forest species that supports biodiversity, soil fertility, and carbon sequestration, and offer nutritionally rich biomass suitable for livestock feeding [1,2]. The integration of baobab into animal nutrition especially for monogastric animals such as poultry and pigs presents an opportunity to improve feed efficiency, reduce feed costs, and promote sustainable forestry practices [3,4]. This review explores baobab’s role as a forest resource with nutritional, ecological, and economic value.

Botanical and Compositional Overview

Baobab (*Adansonia digitata* L.) is a long-lived deciduous tree native to semi-arid and dryland regions of Africa. It belongs to the family Malvaceae and is characterized by a massive trunk, palmate leaves, large white flowers, and hard-shelled fruit pods [1,5]. The tree thrives in well-drained soils and can live for thousands of years, making it a key component of African forest ecosystems [6]. Nutritionally, baobab leaves contain high levels of protein (13–16%), calcium (200–300 mg/100 g), iron (4–6 mg/100 g), and vitamin C, while the fruit pulp is rich in carbohydrates (70–80%), fibre, and antioxidants [1,5]. The seeds provide oil (8–12%) and protein (25–30%), suitable for feed formulation. However, anti-nutritional factors such as tannins, phytates, and oxalates may reduce nutrient bioavailability if not properly processed [4,6]. In a more recent study, Reuben et al. [7], observed its usefulness as phyto-genic feed additives.

Baobab in Ruminant Nutrition

Although the current focus is on monogastric animals, ruminant studies provide insight into the feed value of baobab. In cattle, goats, and sheep, baobab leaves and fruit pulp have been shown to improve rumen fermentation, nutrient digestibility, and milk yield when used as supplements [1]. Its high mineral content supports animal health, while its palatability makes it suitable for dry-season feeding. Such applications also reduce grazing pressure on forest ecosystems, supporting sustainable forest use [1, 8].

Baobab in Monogastric Nutrition

Baobab leaves and fruit pulp have been evaluated as partial replacements for conventional feed ingredients such as maize and soybean meal in poultry diets. Studies indicate that up to 10% inclusion of baobab leaf meal can enhance growth performance, feed conversion ratio, and meat quality without adverse effects [8]. The leaf meal provides essential amino acids, vitamins, and minerals, while the antioxidant compounds improve immune response and reduce oxidative stress in birds [7].

Nutritional Emphasis on the Leaf

The baobab leaf is particularly promising for monogastric feeding due to its high protein content, essential minerals, and bioactive compounds such as flavonoids and polyphenols [8]. These contribute to gut health, immune modulation, and improved nutrient utilization [7]. Incorporating leaf meal into poultry and pig feed could significantly reduce feed costs while maintaining performance standards.

Animal Health and Functional Effects

Beyond its nutritional role, baobab exhibits functional properties beneficial to animal health. Its antioxidant and antimicrobial activities enhance gut integrity, reduce disease incidence, and improve general performance in monogastric animals [2]. The leaves and fruit pulp contain bioactive compounds that may serve as natural growth promoters, potentially replacing synthetic additives [7]. These properties make baobab a valuable candidate for sustainable animal

production systems aligned with the “One Health” approach.

Economic and Sustainability Considerations

Baobab’s multipurpose use contributes significantly to forest-based economies. The tree provides income through fruit collection, seed oil extraction, and leaf meal production while requiring minimal management input [7,8]. Promoting baobab utilization in animal feed aligns with sustainable forestry objectives [10,11] and encourage tree preservation, biodiversity conservation, and circular resource use.

Integrating baobab into feed value chains could also reduce pressure on conventional feed crops like maize and soybeans, whose cultivation often drives deforestation [9,11]. Thus, using baobab as a feed ingredient simultaneously supports food security, forest conservation, and rural livelihoods.

Conclusions and Application

Baobab offers diverse application from conservation agriculture to efficient livestock feed supply. Its ecological resilience, nutritional richness, and adaptability make it a promising resource for sustainable monogastric feeding systems in Africa. Hence, expanding the use of baobab within forestry frameworks can enhance biodiversity conservation while contributing to cost-effective and eco-friendly livestock production.

References

- [1]. Ibrahim, A., Arekemase, S. O., Batari, M. L., Oshodin, J. O., Mustapha, R. A., Ibrahim, D., Ekere, A. T., & Olusina, O. S. (2024). Nutritional and pharmacological attributes of baobab fruit pulp. *Food Production, Processing and Nutrition*, 6(98). <https://doi.org/10.1186/s43014-024-00283-z>
- [2]. Muthai, K. U., Karori, M. S., Muchugi, A., Indieka, A. S., Dembele, C., Mng’omba, S., & Jamnadass, R. (2017). Nutritional variation in baobab (*Adansonia digitata* L.) fruit pulp and seeds based on Africa geographical regions. *Food*

Science & Nutrition, 5(6), 1116–1129.
<https://doi.org/10.1002/fsn3.502>

[3]. Chisoro, P., Mazizi, B., Jaja, I. F., Assan, N., & Nkukwana, T. (2025). Sustainable utilization of wild fruits and respective tree byproducts as partial feed ingredients or supplements in livestock rations. *Frontiers in Animal Science*, 6, 1501412.
<https://doi.org/10.3389/fanim.2025.1501412>.

[4]. Akintunde, A. R., Saidu, I. H., Oguntoye, M. A., Mohammed, H. K., Mustapha, A., Jibrin, J., Haruna, I., Adeoye, S. O. B., Mafindi, U. M., Sani, U. M., & Olusiyi, J. A. (2021). Growth performance of starter broiler chicks fed soaked and fermented baobab (*Adansonia digitata*) seed meal-based diets. *Nigerian Journal of Animal Production*, 48(1), 69–75.
<https://doi.org/10.51791/njap.v48i1.2892>.

[5]. Owolodun, B., & Merten, S. (2023). Food security from the forest: The case of the commodification of baobab fruit (*Adansonia digitata* L.) in Boundou Region, Senegal. *Land*, 12(7), 1423.
<https://doi.org/10.3390/land12071423>

[6]. Cuni-Sanchez, A., Osborne, P., & Haq, N. (2010). Identifying the global potential for baobab tree cultivation using ecological niche modelling. *Agroforestry Systems*, 80(2), 191–201. <https://doi.org/10.1007/s10457-010-9282-2>

[7]. Reuben, R. S., Onimisi, P. A., Sekoni, A. A., & Salihu, E. A. (2021). Growth performance, carcass characteristics and villi morphometry of broiler chickens fed diets containing *Mentha piperita* and *Adansonia digitata* leaves meals as phytobiotics. *Nigerian Journal of Animal Production*, 48(6), 217–228.

[8]. Kamanula, M., Munthali, C. R., Dziwapo, A., & Kamanula, J. F. (2018). Mineral and phytochemical composition of baobab (*Adansonia digitata* L.) root tubers from selected natural populations of Malawi. *Malawi Medical Journal*, 30(4), 250–255.
<https://doi.org/10.4314/mmj.v30i4.7>

[9]. Wudil, A. A., Tamburawa, M. S., Hassan, A. M., Abubakar, Z. A., Nasir, M., Abdullahi, A. Y., & Zango, M. H. (2020). Nutritional utilization of

baobab (*Adansonia digitata*) leaf meal on growth performance and carcass characteristics of broiler chickens in Sudan savannah of Nigeria. *Nigerian Journal of Animal Production*, 47(3).
<https://doi.org/10.51791/njap.v47i3.157>

[10]. Ogbuewu, I., Alagma, H., Mabelebele, M., & Mbajorgu, C. (2024). Effects of dietary *Adansonia digitata* L. (baobab) seed meal on growth performance and carcass characteristics of broiler chickens: A systematic review and meta-analysis. *Open Agriculture*, 9(1), 20220316. <https://doi.org/10.1515/opag-2022-0316>

[11]. Shehu, F. N., Onimisi, P. A., Yaqoob, R., Aliyu, A. M., Inuwa, I., & Muhammad, H. (2021). Growth performance and nutrient digestibility of broiler chickens fed three seed cake-based diets. *Nigerian Journal of Animal Science and Technology*, 4, 20–28.