

Scientific Substantiation of the Health Benefits of Baobab Fruit Powder

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SECTION 1: What's in Baobab Fruit Powder?

The Baobab fruit (*Adansonia digitata*) is officially recognised as a “Superfruit” for its high nutrient and polyphenol content. Its slightly tart and refreshing taste makes it a good flavour enhancer, and it combines well with both sweet and savoury recipes. Its high pectin content (around 25%), giving it a thick and creamy mouth-feel, makes it an ideal and functional ingredient in many applications from smoothies, juices, ice-creams, yoghurts and sauces to nutrition bars, baked goods and cereals.

Nutrient content

B’Ayoba’s baobab powder has been analysed for its nutritional content as follows:

	Per 100g	% RI	10 g serving	% RI*
Energy (KJ)*	1025 KJ	12.20%	102.5 KJ	1.20%
Protein	3.3 g	6.60%	0.3 g	0.66%
Carbohydrate	36.3 g	13.94%	3.6 g	1.39%
of which sugars	22.0 g	24.41%	2.2 g	2.44%
Fat	0.3 g	0.43%	0.003 g	0.04%
Saturates	0.1 g	0.70%	0.001 g	0.07%
Dietary Fibre	43.3 g	113.95%	4.3 g	11.39%
Sodium	<0.001 g	0.00%	0 g	0.00%
	Per 100g	% NRV	10 g serving	% NRV**
Riboflavin	0.13 mg	9.29%	0.013 mg	0.93%
Vitamin C	180 mg	300.00%	18 mg	30.00%
Calcium	340 mg	42.50%	34 mg	4.25%
Iron	7.2 mg	51.43%	0.72 mg	5.14%
Potassium	1860 mg	93.00%	186 mg	9.30%
Magnesium	155 mg	51.57%	15.5 mg	5.17%
Phosphorous	36 mg	4.50%	3.6 mg	0.45%
Zinc	0.375 mg	2.50%	0.0375 mg	0.25%

*Based on EU-approved Reference Intakes

** Based on EU-approved Nutrient Reference Values

Comparisons with other superfoods

Baobab		
	Per 100g	10 g serving
Dietary Fibre	43.3 g	4.3 g
	Per 100g	10 g serving
Vitamin C	180 mg	18 mg
Calcium	340 mg	34 mg
Iron	7.2 mg	0.72 mg
Potassium	1860 mg	186 mg
Magnesium	155 mg	15.5 mg

Comparison				
	Compared with	Per 100 g	Serving size	Per serving
Dietary Fibre	Broccoli	2.6 g	1 cup chopped (91g)	2.4 g
Vitamin C	Orange	50 mg	Medium orange 70 g	35 mg
Calcium	Eggs	50 mg	Medium egg (35 g)	17 mg
Iron	Spinach	2.7 mg	Cup (30 g)	0.8 mg
Potassium	Dried apricots	1162 mg	2 dried apricots (15 g)	174 mg
Magnesium	Bananas	27 mg	1 medium banana (110g)	32 mg

Based on the above comparisons, a 10g serving of baobab powder is the equivalent to eating:

- As much fibre as nearly 2 cups of broccoli
- As much Vitamin C as half an orange
- As much calcium as 2 eggs
- As much iron as nearly a cup of spinach
- As much potassium as 2 dried apricots
- As much magnesium as half a banana

Why is Baobab a Superfruit?

A superfruit is considered to be a fruit that is high in at least three different key nutrients. The nutritional content of baobab allows for claims in six different nutrients within the European Union as follows::

- High in Magnesium (>112.4 mg/100g)
- High in Vitamin C (> 24mg/100g)
- High In Potassium (> 600mg/100g)
- High in Calcium (> 240mg/100g)
- High in Iron (>4.4mg/100g)
- High Fibre (>6g/100g)

Antioxidants

Baobab has exceptionally high antioxidant levels, more than double those of its nearest competitor the Açai berry from Brazil:

Baobab Antioxidant Capacity	ORAC values (μ mol TE/100g)	
	Per 100 g	Per 10 g serving
Baobab	140,000	14,000
Acai (freeze dried powder)	70,000	7,000
Goji berries (dried)	22,500	2,250
Blueberries (dried)	10,630	1,063
Chia seed (dried)	6,500	650
Pomegranate (fresh)	1,870	187
Bananas (fresh)	830	83

Source: Brunswick Laboratory, New Jersey, USA

SECTION 2: What are the Health Benefits of Consuming Baobab?

2.1 Prebiotic activity

Baobab has a notably high dietary fibre content¹. Roughly half of this fibre content is soluble fibres, and it is this soluble fibre that has been found in studies to have a good pre-biotic effect. It has been shown that the growth of intestinal microflora necessary for good digestion, in particular lactobacilli and bifidobacteria, is stimulated in the presence of soluble fibre. This means that digestion is improved, allowing us to absorb more of the nutrients from our foods. The insoluble portion of the Baobab powder is also important, as this provides the roughage necessary for facilitating the movement through our gastrointestinal tracts.

As our understanding of the importance of a healthy microbiome (the community of bacteria we carry in our bodies that help with, amongst other things, digestion) has increased, researchers have recently been investigating the gut microbiome of a traditional hunter-gatherer tribe, the Hadza, in Tanzania. The Hadza have 40% more diversity in their gut microbiomes than the average Westerner diet, and baobab fruit are one of the staples in their diet².

2.2 Blood Sugar levels

Studies³ have been conducted on the rich polyphenol content⁴ of Baobab Powder, with a specific focus on the effect that this has on reducing the glycaemic response when consuming high-starch foods. The study found a significant reduction in the conversion of rapidly digestible starches from white bread into sugars in our blood when consuming this together with Baobab. This stabilising

¹ Aluko, A et al. Nutritional Quality and Functional Properties of Baobab (*Adansonia digitata*) Pulp From Tanzania. *Journal of Food Research*; Vol. 5, No. 5; 2016.

² Schnorr, S et al. Gut Microbiome of the Hadza Hunter-Gatherers. *Nature Communications*, 2014.

³ Coe, S et al. The Polyphenol-Rich Baobab Fruit (*Adansonia digitata*) Reduces Starch Digestion and Glycemic Response in Humans. *Journal of Nutrition Research* 33. 2013.

⁴ Xing Nuo Li. Profiling hydroxycinnamic acid glycosides, iridoid glycosides, and phenylethanoid glycosides in baobab fruit pulp (*Adansonia digitata*). *Food Research International* 2016.

effect is of much interest as a potential for managing blood sugar levels.

2.3 Immune-Boosting

Baobab is rich in Vitamin C, an essential vitamin that our body is unable to produce for itself. Vitamin C is known for its ability to support the immune system, keeping you strong, healthy and boosting your defences against disease and infection.

2.4 Iron Absorption

Iron-deficiency is one of the world's most common nutritional disorders. Iron-deficiency causes anemia, which occurs when the body has decreased levels of haemoglobin in its red blood cells. This hinders the body's ability to access oxygen, leading to fatigue, weakness and shortness of breath. Iron deficiency anemia is especially common in women of childbearing age.

Although there are many natural sources of iron, including baobab, our body is unfortunately not always able to absorb it. Vitamin C is known to enhance the absorption of iron, and the presence of Vitamin C and iron in baobab makes this an exceptionally rich source of bio-available iron.

2.5 Slow Release Energy

Baobab powder is highly valued by long distance endurance athletes. Not only does the Vitamin C help boost their immunity, it also helps to slow the release of energy from their food, reducing tiredness and fatigue and supporting a healthy metabolism.

2.6 Liver protection

A healthy liver is essential to human wellness. Baobab fruit has been found to have a very strong hepatoprotective activity in rats⁵, and the evidence suggests that regular consumption of baobab fruit will do much to protect liver functioning in humans.

2.7 Satiety

Recent research at the Oxford Brookes University functional Foods Centre in the UK⁶ has found that adding baobab to certain foods can help reduce feelings of hunger, leading consumers to feel that they are fuller quicker. This has obvious implications for weight loss diets.

2.8 Cardio protection

Research has shown that baobab fruit has a very strong cardio-protective effect against ISP-induced oxidative stress in rats⁷. Specifically the rats treated with baobab fruit powder were found to have no infiltration of their hearts' inflammatory cells and no congestion in the blood cells. This would

⁵ Hanafy, A et al. Evaluation of Hepatoprotective Activity of Adansonia digitata Extract on Acetaminophen-Induced Hepatotoxicity in Rats. Evidence Based Complementary and Alternative Medicine, 10: 1155. 2016.

⁶ Garvey, R et al. The Acute Effects of Baobab Fruit (Adansonia digitata) on Satiety. Journal of Nutrition and Health, 2017.

⁷ Gonheim, M et al, Protective Effect of Adansonia digitata against Isoproterenol-Induced Myocardial Injury in Rats. Journal of Animal Biotechnology 2016.

imply that baobab fruit have an important role to play in promoting healthy hearts.

2.9 LOX Inhibition

The lipoxygenase (LOX) products have been identified as mediators of a series of inflammatory diseases, namely rheumatoid arthritis, asthma, inflammatory bowel disease, psoriasis, allergic rhinitis, atherosclerosis, kidney, skin and allergic diseases, neurodegenerative disorders, cancer and metabolic syndrome and certain types of cancer. Research on baobab fruit have found that they are exceptionally good at inhibiting the activity of 15-LOX⁸.

⁸ Dzoyem, J.P., et al. The 15-lipoxygenase inhibitory, antioxidant, antimycobacterial activity and cytotoxicity of fourteen ethnomedicinally used African spices and culinary herbs. *Journal of Ethnopharmacology* **156**:1-8. 2014.