



SCHEDA TECNICA

PRODOTTO: BAOBAB - POLPA DEL FRUTTO POLVERE

INTRODUCTION

Baobab (*Adansonia digitata L.*) is a deciduous tree and belongs to the plant family called *Bombacaceae*, it is originary from Central Africa, and it's well distributed throughout the Sahelian and Sudanian zones of Mali. It grows spontaneously in the tropical regions of Africa, and some species were exported and cultivated in Florida, named "bottle tree", and in Oceania (*Adansonia gregorii*).i The trunk could reach a circumference of 40 meters, an height of 20 meters and a foliage diameter of 20 meters.

Baobab definition is probably derived from the Arabic "bu hibab" or "fruit with several seeds"; the Latin name was taken from the French botanic Michael Adanson, one of the first scientists that studied the plant characteristics, and from the typical fingered shape of the leaves.

Leaves, bark and fruits are conventionally employed in several African regions as foodstuffs and for medicinal purposes. Baobab contains a number of substances usually employed for the treatment of numerous diseases in the African traditional medicine and for that reason it is also named "the small pharmacy".

Plant	Adansonia Digitata
Botanical family	Bombacacea
Botanical informations	Plant with a very large trunk, originary from Africa and Madagascar.
Used parts	Fruit pulp
Extraction technique:	Mechanical separation of the pulp from fruit shell and filaments.

Specifica	Lim.inf. - Lim.sup.	u.m.
Umidità	<= 15	%
Conta Batterica Totale	<= 1000	UFC/g
Lieviti e Muffe	<= 100	UFC/g
Enterobatteriaceae	<= 10	UFC/g
Salmonella	Assente	
Indice di revisione specifica di vendita	N° 1	
Data revisione	17/03/2008	

ALTRI DATI

Composition	Adansonia Digitata fruit
Appearance	Hydrosoluble powder
Colour	White, pinkish-white
Odour	Odorless
Taste	Acidulous
pH (sol 10%)	2.7-3.7
Heavy metals	<0.3 ppm
Pesticides	<0.2 ppm
Aflatoxines B1/B2/G1/G2 (HPLC)	<1.00 mcg/Kg

Gli eventuali metodi d'analisi non riportati sono metodi interni del produttore ottenibili su specifica richiesta

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Dietary fibers	44.0	%
Constituents:		
Soluble dietary fibers	22.00	%
Insoluble dietary fibers	22.00	%
Cellulose	1.5	%
Ashes	1.98	%
Energetic value	200 Kcal/100g - 836 Kj/100g	

ADANSONIA DIGITATA

Adansonia digitata is a deciduous tree from Central Africa, it is considered from the native people the symbol of the continent. In the people tradition it is also named "chemist tree" or "magic tree" for the therapeutic properties of fruit pulp, leaves, seeds, bark, fruit shell and root.

PHYTOCHEMICAL COMPONENTS

Amino acids and essential fatty acids

Minerals: Calcium, Phosphorus, Iron, Potassium, Sodium, Magnesium, Zinc, Manganese

Vitamins: Vit. C, Vit A, Vit B1-B2-B6, Vit PP

Carbohydrates: glucose, fructose, saccarose, maltose, soluble polysaccharides, starch
Dietary soluble and insoluble fibers.

Nutritional properties

- High amount of nutrients and vitamins.
- Supplement of dietary soluble and insoluble fibers.

Nutriceutical properties

- Analgesic, antipyretic and anti-inflammatory activity, antioxidant.
- Treatment of dysentery and diarrhea

Mode of employ

Powdered fruit pulp dissolved in water, fruit juice, yogurt or milk Suggested dosages From 5 to 25 gram of fruit pulp

Toxicity and side effects

No evidence of side effects or toxicity related to baobab fruit pulp ingestion. For precautionary purposes, medical advice is suggested during pregnancy and lactation

THE FRUIT

The Baobab fruit has a very resistant, capsule named epicarp and an internal portion, the fruit pulp, named endocarp. The ripe fruit pulp appears as naturally dehydrated, powdery, whitish colored and with a slightly acidulous taste.v

It is split in small floury agglomerates that enclose multiple seeds, it contains filaments (red fibers) that subdivide the fruit in segments, and its separation only needs of a single mechanical process without any extraction, concentration or chemical treatment.5

This ensure to the product the characteristic of a slightly processed food. The native African populations commonly use the Baobab fruit as famine food to prepare decoctions, sauces and natural refreshing drink, due to its nutritional properties.vi,vii,viii

The pulp is therapeutically employed as febrifuge, analgesic, anti-diarrhea / anti-dysentery and for treatment of smallpox and measles.2,4

Moreover, it also contain adansonin, an alkaloid substance used as antidote against strophanthine poisoning.4

The presence of pectin and carbohydrates in the Baobab pulp confer it lubricating, binder and diluting properties. In these regards a recent application is as hydrophilic matrix to prepare paracetamol and theophyllin controlled-release tablets.ix,x

NUTRITIONAL PROPERTIES

100 g of Baobab fruit pulp contain 75.6 % of total carbohydrates, 2.3 % of proteins and a very low content of lipids (0.27% of total lipids).7,xi

Baobab fruit is known for its high content of ascorbic acid (Vitamin C); in particular, 100 grams of pulp contain up to 300 mg of vitamin C, approximately six times more than the ascorbic acid content of one orange.¹¹

Ascorbic acid is extremely important as nutritional element and as supplement, it is the factor able to cure the variety of clinical symptoms known as scurvy, a syndrome occurring in humans whose diet is deficient in fresh fruit and vegetables. Vitamin C protects the organism against free radicals, because it is the most effective antioxidant in hydrophilic compartments; moreover, it participates to several metabolic processes, as collagen biosynthesis in connective tissue, as neurotransmitter and in the steroidal hormones synthesis. It also increases the calcium

absorption and iron bioavailability,^{xii} and it is related to the prevention of many degenerative diseases (cataract formation, cardiovascular risks, arteriosclerosis).^{xiii,xiv}

The Recommended Daily Allowance (RDA) for ascorbic acid is 75 mg for women and 90 mg for men;^{xv} if we consider that Baobab's ascorbic acid content is 300 mg per 100 grams of pulp, the oral intake of 25 and 30 grams respectively is able to provide to the vitamin C daily allowance for humans.^{1,xvi}

The fruit contains also other essential vitamins, such are riboflavin (vitamin B2), necessary for the organism growth and to maintain the integrity of nervous fibers, skin and eyes, and niacin (vitamin PP or B3), important for the regulation of several metabolic processes.^{xvii}

The fruit can contribute to the supply of others important dietary nutrients, as minerals and essential fatty acids. 100 grams of pulp contains 293 mg of calcium, 2.31 mg of potassium, 96-118 mg of phosphorus, and α -linolenic acid (27 μ g of acid per gram of product expressed in dry weight).^{xviii,xix}

The characteristic acidulous taste is due to the presence of organic acids, as citric acid, tartaric acid, malic acid and succinic acid.¹¹

DIETARY FIBERS

Today, the dietary fiber has gained increased importance as a component of the diet, for their capability to influence multiple aspects of the digestive physiology. The frequent consumption of dietary fiber associated to a diet rich in vegetables, cereals and fruits has been found in relation with the reduction of the risk of cancer involving the digestive tract, and in particular, the rectal colon tract.^{xx}

The dietary fiber levels are in average of 21 g/die (of which approximately 1/3 soluble) with variations that go from 18 g/die in the northern regions to the 22 g/die in the southern regions of Europe.

The optimal level of dietary fiber consumption has not yet been defined, but it is generally accepted that the fibers must be fundamental in the composition of an healthy and balanced diet.

Consumption through the diet of fiber rich foods is also in relation with the prevention of constipation and overweight.

Baobab fruit pulp provides soluble and insoluble fibers, with an amount of about 50 grams/100 grams of product.^{xxi}

The insoluble fibers are not adsorbed by the intestine and are useful against constipation and to induce satiety, due to their ability to increase the fecal mass and to stimulate peristalsis. This latter aspect may be useful in case of hipocaloric diet.^{xxii}

DIETARY EMPLOY

The Baobab fruit pulp can be used as powder, or it can be dissolved in water in order to prepare a drink. In the traditional use, the Baobab drink is used by women in pregnancy and in some cases for the babies nourishment.^{6,xxiii}

The powder can be diluted directly with milk or fruit juices. In some African regions, this suspension is mixed to a type of beer, derived from fermented sorghum, called "mérissa", to prepare a refreshing drink.⁴

It is also employed as substitute of cream of tartar (potassium bitartrate) for the preparation of the bread dough, due to its high content of tartaric acid and potassium bitartrate.⁴

NUTRICEUTICAL PROPERTIES

Analgesic, antipyretic and anti-inflammatory activity

Experiments lead on rats showed that dosages between 400 and 800 mg/kg determine a marked anti-inflammatory effect, and reduce a formalin-induced oedema in the animal.^{xxiv} These effects are comparable with those produced by 15 mg/kg of phenylbutazone, a common anti-inflammatory drug used as internal standard. This activity may be due to the presence of sterols, saponins and triterpenes. The pulp also produced a marked analgesic and antipyretic activity in mice at the oral dose of 800 mg/kg. This effect is similar to that induced by 50 mg/kg of acetylsalicylic acid.²⁴ These results may explain the large employ of *Adansonia digitata* as antipyretic and febrifuge in the folk medicine.⁴ *Treatment of dysentery and diarrhea*

The typical feeding of the native African populations, and in particular of the children, essentially consists of vegetables and flour, and is poor of milk, hypocaloric and hypoproteinic. This potentially lead to development of rickets and cause organic dysfunctions as diarrhea and/or dysentery.⁸

The Baobab fruit pulp is used in the African countries as an effective anti-diarrhea product. A study conducted on 160 children, of the medium age of eight months, demonstrated that an aqueous solution of the Baobab fruit pulp, is significantly more effective than the traditional "WHO solution" for rehydration of children affected with diarrhea.^{7,xxv} The main constituents responsible of this activity is believed to be tannins (astringent effect), mucilage's (absorbents), cellulose, citric acid and other typical constituent of the fruit pulp.^{xxvi} Decoctions or milk suspensions have been used for oral treatment of diarrhea and dysentery.^{2, xxvii}

The Baobab fruit pulp shows interesting properties, in the stimulation of the intestinal microflora growth. Studies carried out in qualified Research Centers evidence that the hydrosoluble fraction of the fruit pulp has stimulating effects on the proliferation of Bifidobacteria in *in vitro* assays. In fact, soluble dietary fibers, as those contained in the pulp (about 25%), are known to have prebiotics effects stimulating the growth and/or the metabolic activity of beneficial organisms.

DOSAGE

Antioxidant effects may be obtained at concentration as low as 5 grams per day. To ensure an high nutritional contribution of fibers, vitamins, proteins and carbohydrates, the suggested intake goes from 5 to 25 grams of pulp diluted in water, fruit juices or milk depending on the effects pursued.

TOXICITY AND SIDE EFFECTS

At present, no significant side effects or toxicity related to baobab fruit pulp ingestion has been reported. However, for precautionary purposes, medical advice is suggested during pregnancy and lactation.

APPLICATIONS

Fruit juices, preparations for dairy farming, confectionery farming, ice-creams, Nutraceutical Products

Microbiological analysis:

Total microbial	<100ufc/g
Clostridium SR-spores	<10ufc/g
Bacillus cereus	<10ufc/g
Total Coli	<0.3ufc/g
Escherichia Coli	<0.3ufc/g
Fecal Coli	<0.3ufc/g
Yeasts and moulds	<1000ufc/g
Preservatives	Not present

Principal constituents:

Values of aminoacids per 100 g of Protein

Proline 2.35g	Histidine 2.71g	Leucine 8.41mg	Lysine 14.62g
Arginine 6.04g	Isoleucine 10.73g	Methionine 4.92g	Cysteine 11.23g
Glutamic acid 4.02g	Valine 1.62g	Tyrosine 4.21g	Tryptophan 1.49g
Threonine 2.96g			

Values of carbohydrates per 100 g of Fruit Pulp:

Glucose 8.47mg	Fructose 17.93mg	Saccharose 10.21mg	Maltose N.D.
Soluble polysaccharides 10.21mg		Starch 48.10mg	

Values minerals per 100g of Fruit Pulp

Calcium 293-300mg	Phosphorus 96-210mg	Iron 7 mg	Potassium 2.31g
Sodium 1.86mg	Magnesium 0.10mg	Zinc 0.064mg	Manganese 2.07mg

Mean values vitamins per 100g:

Total carotenes (Vit.A) 200mcg	Vit.B1 (thiamin) 0.038mg	Vit.B2 (riboflavin) 0.06mg
Vit.B6 (piridoxin) 2.13µg	Vit.PP (niacin) 2.16mg	Vit.C 200-250mg

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ALLERGENS FORM		
Customer's name:	BFCS BAOBAB FRUIT COMPANY SENEGAL	
Product(s) name:	Baobab (Adansonia digitata) FRUIT PULP	
Composition (complete formulation of our products including additives, adjuvants and carriers):	Baobab (Adansonia digitata) FRUIT PULP	
Extraction solvent and residual solvent:	MECHANICAL	
MAIN ALLERGENS	PRESENCE (YES / NO)	QUANTITY (ppm) in case of presence
Sulphur dioxide and sulfites (specify quantity if higher than 10 ppm or 10 mg / kg)	NO	
Peanut seed and derived products (including oil)	NO	
Cashew - nut (including oil)	NO	
Walnut (including oil)	NO	
Hazelnut (including oil)	NO	
Brazil walnut (including oil)	NO	
Pecan nut (including oil)	NO	
Macadamia nut (including oil)	NO	
Pistachio - nut (including oil)	NO	
Pine kernel (including oil)	NO	
Almond (including oil)	NO	
Eggs and derived products	NO	
Fishes – crustaceans and derived products (including gelatin...)	NO	
Soya and derived products (including lecithin..)	NO	
Gluten (specify quantity) of following origin	NO	
▪ Wheat	NO	
▪ Rye	NO	
▪ Barley	NO	
▪ rustic wheat (lat. spelta)	NO	
▪ oat	NO	
▪ hybrid species and derived products from gluten	NO	
Milk	NO	
Dairy products including lactose (specify quantity)	NO	
Sesame seed and derived products (including oil)	NO	
Lupin (lat. lupinus) and derived products	NO	
Celery and derived products	NO	
Mustard and derived products	NO	

THERE IS NO RISK OF CROSS-CONTAMINATION WITH OTHER PLANTS

In case the formula is subjected to modifications or any of the conditions we have guaranteed are changed, we oblige ourselves to inform you immediately

IRRADATION: The product it's not irradiated
 GLUTEN The product it's gluten free