

Market Brief in the European Union
for selected natural ingredients derived from native species

Adansonia digitata L.

Baobab



Exemplar of *Adansonia digitata L.* in the dry season (picture: courtesy of PhytoTrade Africa)



UNITED NATIONS

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This publication was developed in the context of the **UNCTAD / BioTrade Facilitation Programme**, funded by the Governments of the Netherlands and Switzerland.

Compiled for:

The United Nations Conference on Trade and Development (UNCTAD)
BioTrade Initiative / BioTrade Facilitation Programme (BTFP)

by



Written by Dr. Joerg Gruenwald and Dipl. Ing.- agr. Mathias Galizia

March 2005

UNCTAD /DITC/TED/2005/

PREFACE

The **BioTrade Initiative** is UNCTAD's programme that supports sustainable development through trade and investment in biological resources in line with the Convention on Biological Diversity. The specific objectives of the BioTrade Initiative are: (i) To assist developing countries in the formulation and implementation of National BioTrade Programmes; (ii) To assist Inter-Governmental Organizations in the formulation and implementation of Regional BioTrade Programmes; (iii) To provide inputs to international policy making processes related to trade and biodiversity; (iv) To carry out technical assistance on issues related to trade and investment related to BioTrade.



The **BioTrade Facilitation Programme (BTFF)** for biodiversity products and services aims at assisting partners in developing countries on issues related to trade promotion of specific sectors, which have high value-adding potential and can generate local income by involving local and indigenous communities, while contributing to the biodiversity conservation. Priority product groups include edible plant products (e.g. fruits and nuts); food ingredients (e.g. natural colouring and flavouring materials); cosmetic and pharmaceutical ingredients (e.g. medicinal plants, essential, fatty and vegetable oils), fibres, latex, resins, gums and gum by-products.

The **BTFF** addresses specific developing countries' needs such as market information, market access strategies, development of methodological approaches, best-practices, as well as advocacy and participation in policy making processes (e.g. trade barriers, certifications, sustainable use, etc.). Selected countries from Latin America (the Andean and Amazonian regions), Africa (the eastern and southern regions) and Asia are currently part of the BTFF. The BTFF is an official partnership of the World Summit on Sustainable Development (WSSD), and counts with the financial support of the Governments of Switzerland and the Netherlands. The International Trade Centre (ITC), serves as the Programme's technical advisor. Other current BTFF partners include: BioTrade National programmes, PhytoTrade Africa, Programme Bolsa Amazonia, the Dutch Centre for the Promotion of Imports from Developing Countries (CBI), and the Swiss Import Promotion Programme (SIPPO).

This document is part of a series of market briefs on selected natural ingredients derived from native species in beneficiary countries and regions of the **BTFF**. It is addressed to corporate executives, partners of the **BTFF**, officials of international and trade promotion agencies, representatives of nongovernmental organizations and researchers. The market brief seeks to provide balanced information and analysis of trade opportunities. Each study may be read by itself, independently of the others.

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**This publication was financed by the UNCTAD BioTrade Facilitation Programme (BTFF),
funded by the governments of the Netherlands and Switzerland.**



Abstract

The market brief on *Adansonia digitata* L, profiles the EU market for this native South American species and its derivatives, used as natural ingredients in the phyto-pharmaceutical, pharmaceutical and herbal industries. This document was developed within a series of market briefs on selected natural ingredients derived from native species in beneficiary countries of the BTFFP.

The underlying market brief, on *Adansonia digitata* L, is divided in eight sections. Sections 1 to 5 profile the EU market for *Adansonia digitata* L. The brief starts with providing a description of the species including, botanical name, common names, trade names, HS codes, countries and regions of origin, methods of cultivation/harvesting, importance to the native biodiversity of the country of origin and traditional use. The major national markets within the EU for these products are highlighted and current trends are described. Furthermore, (statistical) market information on consumption, production and trade, and information on trade structure and opportunities for exporters is provided

Section 6 describes the requirements, which have to be fulfilled in order to get market access. It is of vital importance that exporters meet the requirements of the EU market in terms of product quality, packaging, labeling and social, health & safety and environmental standards. Section 7 provides indicative prices and price developments for the selected products differentiated by trade channel and value added as well prices of substitutes. It also provides sources of price information.

The final Section, describes marketing and sales promotion strategies as well as recommendations on different levels: supply chain management, promotion strategies and business-to-business opportunities. This chapter was validated through interviews with buyers, consumers, market experts and other relevant actors in the EU market

Keywords: *Adansonia digitata* L, baobab, umkhomo, muuju, mowana, dovuyu, ibozu, mbuyu and mobuyu; mnambe and mbuye; muuyu, mbuyu, mkulukumba, mlambe, fruit pulp, natural ingredients, biodiversity, sustainable use, export, BioTrade Facilitation Programme, trade, market, information

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1 Species description and product definition

1.1 Species

Adansonia digitata L. (Bombacaceae family) is a native deciduous tree from the African savannas. The English common name is baobab, probably derived from the Arabic *bu hibab*, which means “fruit with several seeds”. There are many different local names used in southern Africa: Umkhomo and Muuju in Zimbabwe; Mowana, Moana, Dovuyu, Ibozu, Mbuyu and Mobuyu in Botswana; Mnambe and Mbuye in Malawi; Muuyu, Mbuyu, Mkulukumba, Mlambe in Zambia (Kurebgaseka, 2005).

It is characterized by an unusual, swollen, relatively short, bottle shaped trunk (about 15 m in height) in which spongy fibers store water for the dry season. For this reason, it is also called “bottle tree”. The mature circumference can exceed 20 m; the diameter at chest height is about 10 m. The crown is rounded and shows a stiff branching habit. The tree has an extensive lateral root system, which produces tubers at the end. African baobab is a very long-living tree. It normally lives for about 500 years, but it is believed that some trees are up to 5000 years old.

The tree sheds its leaves during the dry season, which can last most of the year depending on the climate zone. Leaves are digitate, normally having 5 leaflets when mature. The leaflets have entire margins and are elliptic to obovate-elliptic, with acuminate apex and a decurrent base. Mature leaf size may reach a diameter of 20 cm. The flowers bloom during the wet season and the dry season as well. They are very large and suspended on long peduncles. The fruit is bottle or cucumber shaped and develops 5-6 months after florescence. It has a woody outer shell, 7.5-54 cm long x 7.5-20 cm wide, covered by velvety yellowish, sometimes greenish hairs. The internal fruit pulp is split into mealy agglomerates that enclose several reniform seeds (approximately 10 mm long) (Sidibe and Williams, 2002).

Because of its great size and diffusion, *Adansonia digitata* is an extremely impressive tree. It symbolizes the African savanna better than any other plant. Its spongy wood does not burn; therefore the plant is protected from fire. Hollowed out baobab trunks in the vicinity of villages are used for water storage.

In areas where the baobab tree grows, there are traditions that prohibit communities from cutting down the baobab tree and any other fruit bearing trees. Where there has been extensive deforestation, this has resulted in a situation whereby the baobab and other fruit trees are the only trees to remain standing (Kurebgaseka, 2005).

The baobab tree is also a good fodder tree especially for game. Cattle eat the leaves and flowers that would otherwise fall to the ground. Baobab roots can be tapped where water is a problem. On the other hand, where domestic plants are cultivated and/or domestic animals are raised, the natural reproduction cycle of the baobab is often threatened. Above all, in areas with high elephant densities baobab is endangered, because in the dry periods, they chew the wood for its stored water and thereby severely damage the tree.

1.2 Cultivation

Adansonia digitata is widely spread over the African savanna through natural reproduction. Wild animals open the fruits to eat the pulp. The seeds pass through the digestive tract of the animals, which breaks the dormancy.

The species has not commonly been cultivated, partly because of the reputation for growing slowly. Harvesting the fruit does not affect the species. Near villages, transplanting naturally germinated seedlings has traditionally propagated baobab.

Cultivation requires that the seeds be treated before sowing, in order to break dormancy. To do this, the Forest Research Institute in Mali uses sulfuric acid for 6 to 12 hours, followed by rinsing in water for 24 hours. With this method, they achieve a germination rate of over 90%. Direct sowing has not been very successful. The seedlings should be at least 3 to 4 months old before they are transplanted with 10 x 10 meter spacing.

Genetic selection makes it possible to select plants with particularly good characteristics. It has been shown that the Vitamin C content is variable depending on the origin. Agronomical studies by the Forest Research Institute in Mali have shown that baobab can be easily grafted. The advantage is that the plants will be smaller, which facilitates collection of the fruits. Furthermore, grafting shortens the time until flowering. While plants grown from seed start flowering after 8-23 years, grafted plants will start flowering in only 3 years (Sidibe and Williams, 2002). However, grafted plants give 30% less fruit (Ottaviani, 2004).

1.3 Product Definition, Uses and Properties

The baobab tree is extremely important for humans and animals in the dry areas of Africa. It offers protection and provides food, clothing and medicine as well as raw material for many useful items. The tree has been known to be used for shelter. The mucilaginous pulp that fills the trunk can be scooped out from the thick tree trunk. Enough space for a door is cut in the trunk.

Old living trees that are naturally hollow or have been hollowed out are used for water storage. The empty space is filled with water and then tightly sealed. This will hold water and keep it potable for many years and serve as a reserve during drought (Schütt and Wolf, 1996). The hollowed tree will continue to thrive, bearing fruit every season. The bark yields a strong fiber for rope and cloth. Beautiful bags, baskets and mats are made from it.

The fruit pulp, seeds, leaves, bark and root tubers have been studied by scientists for their useful properties. They all have interesting possibilities for use in pharmaceutical, nutritional, cosmetic and veterinary items. This market brief focuses on the fruit pulp.

The ripe fruit pulp is naturally dehydrated and ivory coloured. It appears as a dry, mealy powder. Baobab is a popular food source. The fruit pulp is commonly sucked, chewed or made into a drink when mixed with water or milk, either with or without sugar, or as a supplement to mix with staple food such as corn meal and cassava. Other uses for baobab pulp include sauces for food, hair rinse, milk curdling agent and a substitute for cream of tartar, among other things. When burned, it is a good repellent for cattle flies (Kurebgaseka, 2005).

The pulp is very nutritious. Arnold et al. (1985) reported that with an average of 8.7% moisture, the pulp contains about 74% carbohydrates, 3% proteins, 9% fibers, 6% ash and only 0.2% fat. The content of pectin is approximately 56% (Nour et al., 1980), which is why the pulp is traditionally used as a base for jam making. It is also characterized by a high vitamin C (ascorbic acid), calcium, phosphorus and potassium content. The acidulous taste is attributed to the presence of organic acids, such as citric acid, tartaric acid, malic acid and succinic acid.

Baobab fruit pulp has a particularly high antioxidant capability mainly because of its high natural vitamin C content, which is equivalent to 6 oranges per 100 g. Anti-oxidants protect the cells of organisms from damage by free radicals. A deficiency of vitamin C weakens the immune system and promotes the susceptibility to disease. Deficiency of vitamin C also results in scurvy. The recommended daily allowance (RDA) for ascorbic acid is 75 mg for women and 90 mg for men. If we consider that baobab has an ascorbic acid content of 300 mg per 100 g pulp, the oral intake of 25 and 30 g respectively is able to provide to the daily vitamin C allowance required by humans. Additionally, vitamin C aids the bodily uptake of iron and calcium, of which the fruit pulp contains more than double than the same amount of milk. Therefore, in some areas, it is used as a milk substitute for babies.

Table 1 Analysis of Baobab Fruit Pulp (mg/100 g)*

Protein	2.3
Lipids	0.27
Soluble and insoluble Fibers	52.0
Carbohydrates	75.6
Ascorbic acid (Vitamin C)	280-300 (to compare: 51 in oranges**)
Calcium	293 (to compare: 125 in milk**)
Potassium	2.31
Phosphorus	96-118

Source: Manfredini *et al.*, 2002; ** Täufel *et al.*, 1993.

It is traditionally used in the treatment of fever, diarrhoea, dysentery, haemoptysis, small pox and measles. Mixed with honey it is used as a cough mixture. Because of its high vitamin C content, the fruits were used by Arabic sailors to prevent scurvy.

Experiments performed on rats showed that dosages between 400 and 800 mg/kg had a marked anti-inflammatory effect, and reduce formalin-induced oedemas in the animals. These effects are comparable with those produced by 15 mg/kg of phenylbutazone, a common anti-inflammatory drug used as an internal standard. It also shows analgesic (pain killing) and antipyretic (temperature reducing) activities. This activity may be due to the presence of sterols, saponins and triterpenes (Ramadan *et al.*, 1994).

Tests carried out by Adesanya *et al.* (1988) showed that the pulp could be used to treat sickle cell anaemia, as it showed considerable antisickling activity.

Tannins, mucilage, cellulose, citric acid and other typical constituents of the fruit pulp may be responsible for its effect against diarrhoea. A study conducted on 160 children demonstrated that an aqueous solution of the baobab fruit pulp is almost as significant as the traditional “WHO solution” for rehydration of children affected with diarrhoea (Tal-Dia *et al.*, 1997).

Studies show that the water-soluble fraction of the fruit pulp has stimulating effects on the proliferation of Bifido bacteria *in vitro*. In fact, soluble dietary fibers, such as those in the pulp (about 25%), are known to have prebiotic effects, which means they stimulate the growth and/or the metabolic activity of beneficial organisms (Milza, 2002).

Extracts from the fruit, seeds and leaves are antimicrobial against: *Bacillus subtilis*, *Escherichia coli*, *Mycobacterium leprae*, and antifungal against *Penicillium crusto-sum*, *Candida albicans*, and *Saccharomyces cerevisiae* (Le Grand, 1989).

Baobab leaves are a good source of protein for groups that may not have access to animal protein due, to its high cost. They contain all the essential amino acids, as well as most of the non-essential amino acids and have a high content of minerals as well as vitamins A and C. Young leaves are eaten as a vegetable in soups and sauces as spinach.

Leaf infusions are used as treatment for diarrhea, fever, inflammation, kidney and bladder diseases, blood clearing and asthma (van Wick and Gericke, 2000). The roots may also be cooked and eaten. Shoots and roots of germinating seeds are also edible. The bark has been sold commercially in Europe for the treatment of fever, especially that caused by malaria (Brendler, Gruenwald, Jaenicke, 2003).

Baobab seeds may be eaten raw or roasted. They have a pleasant nutty flavour and are a good coffee substitute, when roasted and ground. The seeds have a very high oil content, tough husk and soft kernel, devoid of starch.



Open fruit with the dried fruit pulp
(picture: courtesy of PhytoTrade Africa)



Powdered dried fruit pulp
(picture: courtesy of PhytoTrade Africa)

2 Market characteristics

2.1 Customs/statistical product classification

There is not a specific HS-Code for baobab fruit pulp (HS stands for Harmonized Commodity Description System). This system of coding is used worldwide. After the six-digit code, countries are free to use further subheadings. The statistical office of the European Union (EU), Eurostat, uses an 8-digit system. Under <http://europa.eu.int/comm/eurostat>, it is possible to have free access to all the statistical data and publications of Eurostat.

In Europe baobab fruit pulp is currently imported under the HS Code 0813 40 95, which allows the following: dried fruit, edible (excl. nuts, bananas, dates, figs, pine-apples, avocados, guavas, mangoes, mango steens, papaws „papayas“, tamarinds, cashew apples, lychees, jack fruit, sapodillo plums, passion fruit, carambola, pitahaya, citrus fruit, grapes, apricot, plums, apples, pears and peaches, unmixed). This is possible because the ripe fruit pulp has a natural powdery consistency, otherwise baobab fruit powder should be traded under the HS-Code 1106 30 90: for flour, meal and powder of produce of chapter 8 „edible fruit and nuts: peel of citrus fruits or melons (other than bananas)“.

As of 1st May 2004, there are 10 new EU countries. These are the Baltic countries of Estonia, Latvia and Lithuania, the eastern European countries of Poland, Slovakia, Slovenia, the Czech Republic and Hungary, as well as the Mediterranean islands of Malta and Cyprus. For exporters, this expansion of the EU to a total of 25 countries means another 100 million potential customers. Although the market in these countries is not as strong as in Western Europe, the buying potential is less and the potential for growth is greater.

This also applies to the market segments interested in baobab, which are food, botanical remedies and cosmetics.

2.2 Market segmentation

The current and potential market for baobab fruit pulp can be divided into the following segments:

- Food and beverages
- Botanical remedies and nutraceuticals
- Natural cosmetics.

Due to the increased demand for health and natural products, in all three market segments, the demand for organically certified and fair trade products will grow. Until recently, customers for these types of products were limited to small, specialized shops, now almost every large food retailer offers a selection of these products.

The three market segments will be described more closely below.

The Food and Beverages Market

Despite increased prosperity within the EU, the food market is highly competitive, since consumers are not willing to eat more. Although, the overall food market is stagnant, for some individual products and product groups there is good growth.

Baobab fruit pulp is included, as a natural dried fruit pulp, in the product class of rare edible dried fruits. In the EU, the import value of this commodity grew by 13% in 2003 (Eurostat, 2004). Dried fruits are often used as an ingredient in breakfast cereals, cereal bars, granola or crunches. Because of its simplicity and high health value, granola is a breakfast that is enjoyed throughout all of

Europe. It is often enriched with vitamins, minerals and other ingredients with specific health claims. New variations are continually being introduced throughout the European market. This is an example of how the eating habits of the population change, because new factors gain importance: in this case convenience and health.

Due to its particular mealy consistency, it is also important to consider the market-ing of fruit powders, which are used for similar purposes as dried fruits, but also to develop other food products, such as ice cream or beverages.

The most important EU importers of fruit powders are Germany, France and The Netherlands, while the most important exporters are France, Germany and the United Kingdom. The importation of this commodity was stable in 2003; in the same year, the export grew by 11% (Eurostat, 2004).

In recent years in Europe, a market has developed for food and beverages prod-ucts that provide a specific positive impact on health. These products are called functional foods and functional drinks.

There is, at this time, no special legal guidelines concerning these products within the EU and therefore no official definition. Different sources vary greatly in their market evaluation of these products. This market is growing rapidly and will par-tially take over the herbal medicines sales that the pharmaceutical companies have now. According to Kiefer et al. (2002) there will be an increase of 20% in product offerings by 2010. The UK, together with Germany, has the highest spending func-tional food consumers in Europe (spending nearly € 175.00 per person annually), while Italy, the Netherlands and Sweden have the lowest (Gruenwald and Mueller, 2004).

Probiotic yogurts and yogurt drinks have been an enormously success in Europe. Today they are found in almost 60% of all German households. They are enriched with gastrointestinal bacteria, which have a positive effect on the health. Prebiotic substances have a similar function; they are nutrients for the health promoting bac-teria in the intestines and aid in their reproduction. Food and beverages with a pre-biotic function has always been around, but the claim was not previously promoted. Due to new clinical studies, which show positive health effects from these sub-stances, and the consumer interest that followed, today these health claims have a strong influence on marketing.

Another important health claim for functional food is anti-oxidation. According to a survey, 73% of the German public would buy enriched foods and drinks with anti-oxidation properties (Anonymous, 2004). A marketing example of this trend is the new antioxidant wellness drink from Coca-cola Ipsei, with an extract of the South African rooibos plant (*Asphalathus linearis*).

Baobab fruit pulp, due to the combination of health claims (such as prebiotic and antioxidant functions, the high calcium content, and the inflammation limiting func-tion) and food-technological functions (because of its high pectin and fiber content, baobab fruit pulp gives beverages a thicker consistency and can be also used as filler), is a very interesting candidate for a new generation of functional foods and drinks.

Baobab fruit pulp can be particularly interesting as an ingredient for smoothies, which are a kind of thick fruit juice with a high content of fruit pulp. PhytoTrade Af-rica is currently researching this area, in order to launch functional baobab smooth-ies.

In Europe, the concept of smoothies first became popular in UK, where this market was estimated to be 18.7 million liters by volume and £69.4 million retail value in 2003. Smoothies sales are dominated by smaller, specialist businesses. The major UK companies are Innocent, Pete & Johnny's and the Juice Company (Lucas, 2004). Smoothies are also becoming popular in other European countries, such as the Netherlands, the Scandinavian countries and Switzerland, where the company Traktor (www.traktorgetraenke.ch) won the Swiss marketing silver medal 2005 for its innovative organically certified smoothies.

Botanical Remedies and Nutraceuticals

Baobab fruit pulp is traditionally used against diarrhea, scurvy, cough, dysentery, small pox and measles. Several scientific studies have been performed such as on its anti-diarrheic properties (Tal-Dia et al., 1997); demonstrating its anti-inflammatory, analgesic (pain killing) and antipyretic (temperature reducing) properties (Ramadan et al., 1993); its effect against sickle cell anemia (Adesanya, Id-owu, Elujoba, 1988). Studies on the prebiotic effect of the fruit pulp were performed by the University of Piacenza (Milza, 2002).

The market for botanical remedies is plant products registered as medicine, on the one hand and foods on the other (nutraceuticals). This also depends on the regulatory situation. Botanical medicines can either be sold over-the-counter (OTC), or by prescription.

The market for health products has grown dramatically, due to an increased preference by consumers for natural products. World-wide, the total turnover of botanical remedies and dietary supplements increased sharply, especially in the 90s, and almost doubled, from U.S. \$12.4 billion in 1994 to U.S. \$20.3 billion in 2003.

After years of double-digit growth, the leading European markets, Germany and France, began to stagnate in 1999, while smaller markets such as Spain, Poland and Scandinavia continue to grow. This is not due to a decrease in acceptance by consumers, but rather to an excess of very similar products offered by various companies. Innovative new products are in great demand. This is shown by the success that traditional Chinese and Indian medicine systems have had in Europe.

The search for new botanical products for the health market is of particular prominence today and has developed into its own scientific discipline, ethnobotany. All plants, which were traditionally used by native peoples for medicines are being studied.

A successful example is the product Unkaloabo, which is made from the South African plants *Pelargonium sidoides* and *Pelargonium reniforme*, and is used against respiratory diseases. This product is made by the company Spitzner, which has invested in clinical research and in public relations to their customers and physicians, and obtained a good market position by exploiting a „natural antibiotic“. Umkaloabo has gained such a strong market position in recent years that today it has the third highest turnover of any plant mono-preparation in Germany.

The health promoting effects of many medicinal plants are not only beneficial to humans but also to animals. To reduce the use of antibiotics in veterinary medicine, herbal remedies are gaining increased importance (Galizia and Gruenwald, 2003).

Natural Cosmetics

The EU is the most important market for cosmetic products, followed by the USA and Japan. Most participants in this field are multinational companies such as Unilever (Netherlands), L'Oreal and Sanofi (France), Wella and Beiersdorf (Germany). Many of them are also involved in other areas, such as the pharmaceutical and food sectors.

In Western Europe, an ever-increasing number of customers do not see cosmetic products as luxuries and therefore demand cheaper products. Today, more and more cosmetic products are sold very cheaply in discount houses. In countries such as Germany and Italy, the market is stagnant, whereas in 2003, the market rose by about 5% in France and the UK and by 5.6% in Spain.

The cosmetic market has particularly strong growth in the eastern European countries of Hungary (7.6%) and the Czech Republic (for skin care 29%) (Euromonitor, 2004).

When this market loses in the luxury segment, it also grows for cosmetic products with added value. According to the experts, the market for natural cosmetics will grow by 10-20% yearly. For

these customers, the biologically certified origin of the plant material is an important factor. Natural cosmetics are sold in health food and natural product stores.

A current trend in cosmetics is toward health and wellness products. Consumers are prepared to pay more for cosmetic products with health claims. Substances that are added to health food and botanical remedies are also often used as additives in the cosmetic sector. Cosmetic products that carry health claims are called cosmeceuticals.

Because the European population is becoming increasingly older, antioxidant substances, due to their anti-aging function, are particularly in demand for cosmetics.

The baobab fruit pulp, because of its antioxidant effect, is a good raw material for cosmeceuticals to inhibit aging of the skin.

2.3 Current and Potential Market for Baobab Fruit Pulp

The first western processor of the usable parts of *Adansonia digitata* was the Baobab Fruit Company, formed in 2001, in Verona (Italy). This company manufactures unpatented dietary supplements and cosmeceuticals from the fruit pulp.

As a dietary supplement, the fruit pulp is offered in its naturally dehydrated, mealy consistency, or pressed into tablets. As cosmeceuticals, the company offers various products, such as skin creams and skin tonics.

These products are marketed in Italy, mainly in herbal specialty stores, but also in pharmacies that have a selection of natural products. Since 2004, the company has been selling its products internationally, for example in Spain.

As well as a selection of finished products, this company offers intermediate products to manufacture of finished products locally and internationally. They also sell 1:3 fruit pulp concentrate without fiber and vitamin A, frozen fiber concentration in a watery solution, natural fruit pulp flavoring, and for the cosmetic industry, a glycolic extract from fruit pulp 1:1.

Baobab Fruit Company is a successful family firm, which markets the finished products expensively with specific health claims. It imports the raw material from Senegal, where it has a subsidiary company, the Baobab Fruit Company Senegal. This firm mainly sells raw material to the parent company but also to other companies in smaller amounts.

The growth of the company is observable through its increased demand for raw materials. The company imported 70 tons of raw material in 2003 and 140 tons in 2004, which correspond to 44 tons of fruit pulp and 83,000 € income. In Italy there is a growing interest for this product in the media, which indicates that this market will continue to develop in the future.

Another Italian company that uses the baobab fruit pulp is Specchiasol (Italy), which manufactures a symbiotic health product (symbiotics are products which combine the two biotic claims).

The target group for the Baobab Fruit Company is primarily the Italian niche market.

The market for baobab fruit pulp is not saturated and has possibilities that the Baobab Fruit Company have not exploited, such as a natural ingredient for the food industry.

2.4 Competitive Products

With regard to the nutritional and health claims for the baobab fruit pulp, other natural sources of vitamin C could be competition, such as the vitamin C rich fruit *Myrciaria dubia* (camu camu) and *Malighia glabra* (acerola), and in reference to the prebiotic claims, other prebiotic ingredients such as fructooligosaccharide (FOS, BeFlora), short chain fructooligosaccharides (scFOS/NutraFlora), inulin (Raftiline, Frutafit, Inuflora) and oligofructose (Raftilose).

The strength of baobab fruit pulp is in the combination of these two claims, in connection with further positive characteristics, such as high calcium content and the inflammation inhibiting effect. In the food area, concerning flavor claims, there are many other fruit powders with the same substitution potential as baobab fruit pulp, however they can be combined with baobab fruit pulp, in which case they would not be competition.

In 2003, the EU imported €53 million of fruit powder under the HS commodity number 1106 30 90 (18,341 tons) and exported €46 million (13,299 tons) (Euro-stat, 2004).

3 Consumption patterns and trends

The European population has high gross national product (GNP) per person (for example US \$25,120.00 per person in the United Kingdom, US \$480.00 per person in Zimbabwe). Demographically, the European population is growing older. The average EU woman has 1.5 children, compared to 4.8 children per woman in southern Africa*. The average number of persons per household is decreasing.

Despite this general situation, the market for basic products is strongly competitive, since the supply is greater than the demand. Food can be used to illustrate this example; the population will not consume more food due to marketing pressure, merely switch products.

The consumer's wishes and requirements can be influenced by added value. The success or failure of a product, even industrial requirements for various ingredients, ultimately depends upon the consumer. To create a successful marketing concept, all business and consumer trends affecting the target market must be considered.

Because of the increasing number of single households, and the fact that not only men, but also working women in the EU spend less time at home, full meals are prepared much less often. In this scenario, modern consumers are not limited to the three traditional meal times, breakfast, lunch and dinner, instead they nibble between meals. Small between-meal-snacks are popular. Therefore there is an increasing demand for convenience food, which is food already prepared or semi-prepared for the consumer.

This eating pattern rarely gives a balanced diet, containing all the important nutrients. One answer to this problem is functional foods, which are foods containing added ingredients, with the goal of promoting good health, another is dietary supplements, which can compensate for nutritional deficiencies.

In recent years, the interest in probiotic, prebiotic and symbiotic functional foods has grown enormously. Probiotic products are living microbial food supplements, which beneficially affect the host animal by improving its intestinal microbial balance. The soluble fibers of baobab fruit pulp are prebiotics: non-digestible food ingredients that beneficially affect the host by selectively stimulating the growth and/or activity of beneficial microflora (Gipson and Roberfroid, 1995). Symbiotic products combine the prebiotic and probiotic aspects in a single product.

Prebiotic and symbiotic products are not as well known as probiotics, but strong market growth is predicted for them.

Baobab fruit pulp is used, for example, in the manufacture of Ferzym fast, an Italian symbiotic product from the company Specchiasol.

In the medical field, there is also a growing demand for natural healthcare products. According to a long-term study performed by the Allensbacher Institut in Germany, the number of consumers who prefers natural healthcare products has increased from 52% in 1970 to 73% in 2002.

The trend for consumers to prefer natural healthcare products has led, in some countries such as Germany and France, to almost identical products being offered everywhere. This caused a temporary stagnation, despite the growing interest of the population in natural medicines. But this does not affect new and exotic innovative products, such as the Unkaloabo, for example (see 2.2). Due to its nutritional and health claims, baobab fruit pulp has a good chance to become another such innovative healthcare product.

Cosmetic products do not cover any primary needs; this market is therefore less competitive. The trend towards better skincare is no longer limited to women. Cosmetic products for men show

strong growth numbers. The German company Börlind (www.boerlind.com) has developed an aftershave with hydrolyzed *Adansonia digitata* extract.

Cosmetic products, which contain ingredients aimed at beauty enhancement and skin health, are called cosmeceuticals. This market segment is reporting strong growth. Due to the ever-increasing age of the population, anti-aging creams are in great demand. Here, the antioxidant effect of baobab fruit pulp can be successfully used.

There is a general trend toward a healthier lifestyle. This is the primary reason that consumers search for organically certified products. In the EU, they are no longer niche products, sold in specialized shops, but now even appear in discount houses at competitive prices. After a short market depression in 2002 the market recovered and continued to grow in 2003, because the products are now marketed also at lower prices. In 2004, the market for organically certified products grew in Great Britain and Germany by more than 10% (Biofach, 2005).

Ethical reasons are also being considered by a growing section of consumers. Fair trade aspects play an increasingly important role in shopping decisions. As an example, the market for fair trade sweeteners has risen by 30% in 2004 (www.gepa3.de). Some consumers prefer organic products, because the production process is more environmentally friendly.

In a survey of German healthcare product consumers, a great majority stated they were prepared to pay up to 10% more for products that cater to ecological and social issues (Galizia, Schade, Barsch, 2004).

The certification of the raw material as organic and/or fair trade could be an important added value feature. The major part of *Adansonia digitata* is already grown organically, although it is not certified as such (organic by default).

There is a thorough market survey on "Organic Food Products", made by the Dutch Centre for the Promotion of Imports from developing countries (CBI), downloadable under www.cbi.nl. An example of a European inspection organization for organic products is the Dutch foundation SKAL (www.skal.nl).

For more information about fair trade and fair trade labeling, useful Internet home-pages are www.ifat.org (the homepage of the International Fair Trade Association) and (www.fairtrade.net), the homepage of the The Fairtrade Labelling Organization.

Scandals in the food industry, such as bovine spongiform encephalopathy (BSE) in meat, have led to tightening institutional quality control parameters. Consumers are demanding honest, informative labeling. According to customer surveys, information about the origin of the raw material is an important indication of transparency.

When the product is of good quality, then naming the origin can also be an important success factor. This is particularly true for products such as baobab fruit pulp, because it comes from a tree that is a strong symbol for an entire continent. On the other hand, poor quality can be a disaster for a particular product, and thereby damage the reputation of the source region.

4 Production

In southern Africa, baobab fruit pulp is traded by PhytoTrade Africa, a trade association representing producers of natural products derived from plants indigenous to the region. The association is a member of the International Fair Trade Association (IFAT), whose members have signed an environmental and fair trade charter, in which they have agreed inter alia to ensure:

- Harvesting methods that minimize adverse environmental impact
- On site management where appropriate
- Domestication and cultivation
- That description and justification of harvesting techniques and equipment used are maintained
- Production activities that minimize the waste associated with harvesting

On the ground, members also work with local authorities and institutions to educate the rural communities in methods of sustainable harvesting.

PhytoTrade Africa has two locations, one in Africa (Harare, Zimbabwe) and one in Europe (London), to successfully bring these products onto the European market (the addresses are to be found in appendix 1.1). Currently, PhytoTrade Africa has two members that can process and supply baobab fruit pulp, one in Zimbabwe and one in Malawi.

PhytoTrade Africa aims for continuous development in its marketing strategy. If there is sufficient market demand, the trade association can supply baobab from 9 producers in 5 countries.

The fruits are harvested during the dry season. Harvesting the fruit gives a needed additional income to the population. They can be harvested from the wild and are surplus to local requirements. Baobab fruit pulp has no direct global competition and has only limited local competition.

In southern Africa, the harvesting season extends from May until September and the production period is from June to December.

The fruits are harvested by a large number of rural communities (Rushinga, Gu-ruve, Mutoko, Chipinge, Chimanimani). The communities sort and grade the fruits and then sell them to the processors.

A mature tree (over 60 years old) will produce 160 to 250 fruits. Fruit from short trees can be harvested from the ground or by climbing a ladder. The most common method of harvesting fruits from tall trees is by climbing the trunk and plucking the fruit from the crown. During the rainy season the fruit should not be harvested, as this leads to rotting.

The processors organize the fruit collection and act as agent for the harvesters. The fruit crop is transported to the processing center in a 10-ton truck.

The processing center has a warehouse for receiving the raw material, an area for cracking the fruits (this is done manually or on a small manually operated machine) and the main processing area, where the fruit pulping and the final classifying and bagging takes place.

The ripe fruit contains the pulp in a naturally dehydrated form (the fresh pulp has only 10%-12% moisture), protected by a thick shell. The percentage of fruit pulp varies according to the origin. In southern Africa, the shell constitutes about 45.5% of the weight of the fruit and the seeds compose another 38%, so the harvest of baobab fruit pulp is only 16.5% of the total fruit weight (Kurebgaseka, 2005). In Senegal, the percentage of baobab fruit pulp is even smaller (12%) because the shell constitutes 48% of the fruit and the seeds are other 40% (Ottaviani, 2004).

The fruit pulping is performed mechanically on a locally designed and built, electrically powered, machine. The product is packed in woven polyethylene bags and dispatched to various customers. No preservatives are added.

Aside from baobab fruit pulp, PhytoTrade Africa also offers baobab seeds oil, baobab seed/press cake and baobab briquettes (a firewood substitute made from the fruit shells).

Considering that the fruit pulp makes up only 12% to 16.5% of the weight, additional uses give a great increase in productivity.

In North Africa, baobab fruit pulp is processed by the Baobab Fruit Company Senegal, a subsidiary of the Italian Baobab Fruit Company. The fruits are primarily collected wild from the Tambacounda region of Senegal. This occurs in the dry season from December to April.

For mechanical extraction, the Baobab Fruit Company uses a machine that was developed for this purpose, in Italy.

The Baobab Fruit Company Senegal is specialized in *Adansonia digitata*. To remain competitive, they have not limited themselves to only baobab fruit pulp; they offer a wide selection of raw materials from the plant. Among them are the leaves and the seeds, both of which are processed into cosmetic products by the mother company, in Italy.

The leaves have properties that nourish the skin and leave it tender and elastic. The seeds are rich in nutritious amino acids, which regenerate the skin and are beneficial for sunburn.

The fruit must be harvested in the dry season, but the leaves can only be harvested during the rainy season, as there are no leaves during the dry season. This gives the seasonal workers an additional income during the wet season.

The Baobab Fruit Company is also considering using the tubers. They can be eaten raw, like carrots. To protect the *Adansonia digitata* species, tubers should only be harvested from cultivated trees. For this reason, the Baobab Fruit Company has started a cultivation project with 4000 plants. Research on the potential use of the baobab roots has been performed by the Rural Industries Research and Development Corporation (Australia). A report on this project can be downloaded under www.rirdc.gov.au/reports/NPP/02-020.pdf.

5 Trade Structure

Natural ingredients arrive at the processing industry by various trade channels. The more direct the trade channel is, the more beneficial return is possible for a producer in the country of origin. Long-term contracts with the growers, give the producer the possibility of a secure basic income. This is one aspect that characterizes fair trade.

Some companies have decided to purchase the raw material directly from the producers, to be able to better maintain quality control from plant production through to the finished product. This trade channel is particularly preferred when large amounts of a specific raw material are needed regularly. As an example, the company Spitzner Arzneimittel grows *Pelargonium reniforme* in South Africa.

However, the raw material normally passes through many hands before it finally reaches the consumer.

Companies, whose need for raw materials fluctuates from year to year, are not interested in long-term contracts for business reasons. They prefer to buy from agents or importers in their own country.

The largest company in the EU importing and processing herbs and raw plant material, as well as selling them to the end-product industry is the German Martin Bauer GmbH & Co. KG (www.martin-bauer.com). This firm is represented by subsidiaries in many countries. They obtain the raw plant material through various channels, either from their own cultivation/harvesting, contracted from the growers or indirectly through agents and brokers. The company invests in the development of sustainable raw material delivery and has its own department for cultivation and breeding, which has succeeded in cultivating the southern African medical plant *Harpagophytum procumbens*.

Another important direct importer of plant products is the German company Alfred Galke GmbH (www.galke.com).

For producers in developing countries, it is advisable to do as much processing as possible. Thereby the benefit return is increased and the trade channel is shortened.

Baobab fruit pulp that has been mechanically processed in the country of origin can be sold directly in Europe and be represented by a European trading company. A German company that represents foreign manufacturers of natural raw materials is Denk (www.denkpharma.de).

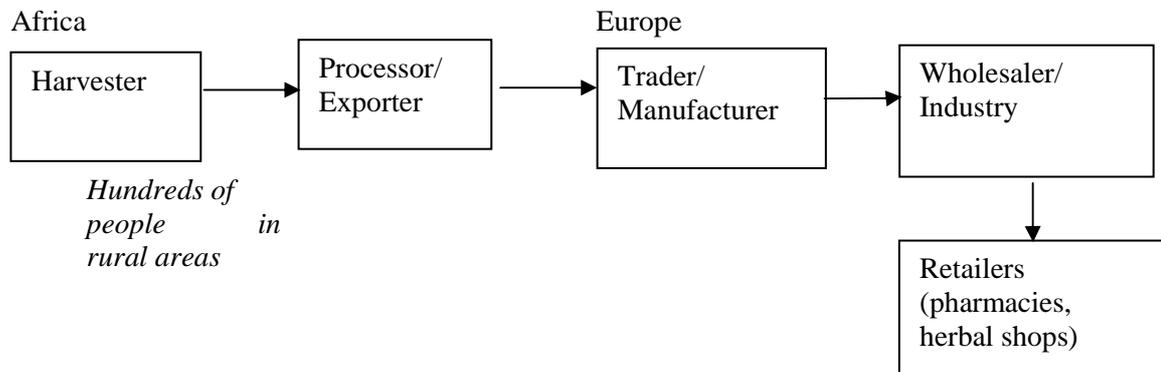
Companies that powder, mix and trade in fruit and vegetables are potential customers for baobab fruit pulp. The Swiss company Obipektin (www.obipektin.ch) is specialized in this area. The German company, Molda, is one of the world's leading companies in the drying sector (www.molda.de). Rabeler Fruchtchips GmbH (www.rabeler-fruchtchips.de) processes, packages and trades dried fruits as well as fruit and vegetable powders.

Companies that produce ingredients for the pharmaceutical, food and cosmetic industries, often process fruit powder. Among these would be Wild (www.wild.de) in Germany, New Food Industry S.P.A. (www.newfoods.it) and Industria Alimentare Igea (www.brisighello-igea.com) in Italy, KUK (www.kuk.com) in Austria and Flavodor in the Netherlands (www.flavodor.nl).

PhytoTrade Africa represents producers of baobab fruit pulp in southern Africa. Hundreds of people harvest and grade the baobab fruit in rural areas, mainly in Malawi and Zimbabwe. The harvest is collected by an intermediary that brings it to a central point for further processing. Processing involves separation of seed from pulp, classifying the pulp according to consistency and packaging it to customer specifications. The raw material is then sent to cities such as Harare (Zimbabwe) and Blantyre (Malawi) for dispatching to various destinations.

Processors retain the seed and the pods, which are further processed into other marketable products. Oil is pressed from the seeds, which is exported to cosmetic manufacturers (Europe, South Africa). The press-cake is sold for livestock food. The pods are used for making curios or as briquettes (firewood substitute). Phyto-Trade Africa has trained its members in quality control and supply-chain management and monitors the quality of products sent to customers. The homepage www.phytotradeafrica.com has information about the association and online order-ing.

Figure 5-1 Supply Chain for Baobab Fruit Pulp



6 Market Access

This chapter gives an overview of important market access requirements for baobab fruit pulp, used for medicines, foods or cosmetics. Although it is the goal of the EU to harmonize regulations across Europe, they are still different. Therefore, national regulations must be observed in marketing. The AccessGuide of CBI gives an important source for further information on European non-tariff trade barriers. For more information, please refer to www.cbi.nl/accessguide. Because of the complexity of the regulatory issues, it can be useful to consult a specialist.

6.1 Requirements as Medicinal Products

With the council directive **2001/83/EC**, the basic criteria for medicinal products were defined. Preparations are not considered to be a medicinal product if they are intended to be used as food, cosmetics or for other uses and are not sold for treating, preventing or diagnosing diseases. To bring it onto the market, a medical product must be authorized by the European Agency for the Evaluation of Medicines (EMA) or the national authority of a EU member country. For this, the necessary procedure consists of tests, clinical trials and detailed documentation showing quality, safety and efficacy. The product must also be pure and contain defined ingredients. This is particularly difficult, due to the complex matrix of plant substances, as well as extremely expensive and time consuming, and would prevent the legal distribution of most traditional herbal remedies within the EU. For this reason, an additional directive (2004/24/EC) created a simplified procedure for traditional herbal medicinal products.

One precondition is that the product has been used for at least 30 years and at least 15 of those within the EU or its current territories. In the past, the bark of baobab has been sold commercially in Europe as a substitute for chinchona bark for the treatment of fever, especially that caused by malaria. No information could be found about the use of baobab fruit pulp, within Europe, for at least 15 years.

On the other hand, extraterritorial regions must be considered part of the EU. If it can be proven that baobab fruit pulp has been used for pharmaceutical purposes in such a region (such as Reunion island, a French territory in the Indian Ocean where Arabic traders imported baobab centuries ago), then a simplified registration is possible, as a traditional herbal medicine within the EU.

The Committee for Herbal Medicine Products (CHMP), as part of EMA, is preparing a positive list of plants, which should receive simplified registration. This simplified registration will then apply to all products made from the listed herbs.

6.2 Requirements as Food Products

For a company, the complexity of the regulations increases as claims are made regarding the medicinal status. Therefore, many companies are declaring health-care products as foods.

In July 2002, the Directive 2002/46/EC concerning Food Supplements was published (food law). It is currently limited to vitamins and minerals, but is expected to include more natural products such as plant and herbal extracts in the near future. According to this directive there are no medicinal indications possible, only nutritional claims. Furthermore, only very low, non-pharmaceutically active dosages of herbs are allowed.

EU directives must be ratified by the member nations. Because of this, the individual countries interpret and apply the directives differently. This is why, in Italy, vegetable ingredients with nutritional or physiological functions fall under the food supplements directives.

In Italy, there was no special legal guideline for food supplements before ratification of the directive. Food supplements (including herbal supplements) came under the Italian law, Nr. 109 from 27 January 1992, for simple food products. In practice, food supplements (including herbals)

were often registered and authorized as dietary supplements for particular nutritional uses; in which case, the Italian law Nr. 111 from 27 January 1992 applies (that was implemented by the EU Directive 89/398/EC concerning food for particular nutritional uses). This is the authorization that the Baobab Fruit Company received for baobab fruit pulp.

A non-tariff barrier created the regulation 1997/258/EC concerning Novel Foods. To market a food product within the EU, it must have been sold in at least one member state prior to 15 May 1997 to a significant degree. If this is not the case, the product will be considered a “novel food” and must normally go through an expensive process to prove its safety. Each company that wants to bring a novel food onto the EU market must submit its proposal to the food and safety authority of a EU country. As an example, in the UK this is the Advisory Committee on Novel Food and Processes (ACNFP) (address in appendix 1.4). This request will then be sent to all the other EU countries for their endorsement. Should one state disapprove the proposal, the case will then be given to the Scientific Committee on Food (SCF).

Novel food or novel food ingredients may follow a simplified procedure if they are to be considered as “substantially equivalent” to foods or food ingredients which already exist in the EU by a national food assessment (as regard to their composition, nutritional value, metabolism, intended use and the level of undesirable substances contained therein).

Smaller companies often use novel foods and, if necessary, reformulate their products later. For bigger companies, this strategy is not desirable. Therefore Phy-toTrade Africa is attempting to get a simplified procedure decision from the UK competent authority in early 2005. This will be extremely important for the further commercialization of baobab fruit pulp in the EU. At the time of publication of this market survey, this decision has not been made. It is suggested to contact Phyto-Trade Africa for further information (the address is to be found in the appendix).

The following two legislation proposals could have a substantial impact on the development and marketing of functional foods in the near future.

The European Commission adopted the proposal on Nutrition and Health Claims in July 2003. The regulatory framework covers nutritional claims (such as rich in vitamin C) and specific health claims, stating a benefit to the consumer by defining their meaning and setting of thresholds. Also, reduction of disease claims will be allowed, provided they have been proven. The proposal contains a positive list of generic nutrition claims, which may be made like “rich in dietary fiber” provided the product contains at least 6 g of fiber in 100 g.

The second proposal has been adopted in November 2003. It concerns a new regulation for the addition of vitamins, minerals and other substances to food products. To date, the positive list covers only vitamins and minerals, being the same as those in the food supplements directive. Like the health claims proposal, it includes the concept of “good” and “bad” food. The latter comprise nutrient-poor foods, which are high in fat, sugar or salt such as snacks and candies that should not be fortified. Critical voices are concerned that fortified foods could be misleading and don't help people in choosing a balanced diet. Claims about specific fortification are good for marketing purposes, for example “added iron, extra vitamin C”, but do not address the overall healthiness of food products. For example, yogurts aimed at children may be marked 'added calcium' but may contain high levels of sugar or fat.

6.3 Requirements as Cosmetic Products

The leading legislation determining access to the EU for cosmetic products and their ingredients is the Cosmetics Directive 76/768/EC. This includes an appendix with the International Nomenclature Cosmetic Ingredients (INCI) that lists products in the Inventory of Cosmetic Ingredients. Manufacturers of cosmetic products are responsible for the safety of non-regulated novel ingredients. Since 1997, cosmetic manufacturers must detail the qualitative and quantitative

composition of their product in a dossier, as well as the chemical and microbiological specifications of the raw material.

Cosmetic ingredients must be registered with their INCI name. The terms *Adansonia digitata* fruit extract, *Adansonia digitata* leaf extract, *Adansonia digitata* seed extract and *Adansonia digitata* seed oil are registered. Assignment of an INCI name serves to identify the ingredient, but is no guarantee of the safety of the product. For details on how to register an ingredient on INCI, please visit the homepage www.ctfa.org.

6.4 Quality Management

The quality of the finished product is dependant upon the quality of the raw material. Therefore, the World Health Organization (WHO) has developed the Guidelines for Good Agriculture and Collecting Practice of Medicinal and Aromatic Plants (GACP). They provide quality standards in order to assure that the microbiological load is reduced to a minimum and that negative effects on the plants are limited during cultivation, processing and storage. They also play an important role in assuring sustainable production. The publication “WHO guidelines on good agricultural and collection practice (GACP) for medicinal plants” can be obtained from the WHO. More information can be found at its Internet sites www.who.int and www.who.int/medicines/library/trm/medicinalplants/agricultural.pdf.

The World Health Organization (WHO) has also established the Good Manufacturing Practice (GMP) guidelines, which were harmonized by the EU with the directive 2003/94/EC (for pharmaceuticals). The aim of this guideline is to set standards that minimize the risks that cannot be eliminated through testing of the final product. They concern the preparation of the processed raw materials.

The International Organization for Standardization (ISO) (www.iso.org) sets a voluntary quality control system applicable for companies that process, treat, pack, transport, distribute or trade commodities, called ISO 9000. Another quality control system is the Hazard Analysis Critical Control Point (HACCP) (pronounced has-sip). Exporters can set up their own HACCP system and allow it to be audited by the buyer, or have their own system certified by an internationally recognized certifying body. Control systems help the manufacturer to produce safe, high quality products and an ever-increasing number of importers require them to be followed.

The origin is a guarantee of quality for many consumers. In Europe, the origin of quality products, such as wine and cheese, is normally certified, for example, D.O.C. (Domination d’origine contrôlée) by a government-private sector consortium. Increasingly, high value edible non-wood forest products, such as wild mushrooms, are also certified through such documentation of origin systems.

6.5 Packaging and Labeling

The GACP guidelines for medicinal and aromatic plants also include requirements for packaging, marking and labeling. The raw material, after it has been tested for quality and foreign matter, should be clean and packaged in air and lightproof containers. Labels for raw materials should specify the material and the batch it comes from. Furthermore, it is recommended to include the name and address of the producer/exporter, the net weight and the recommended storage conditions. The EU-Directive on packaging and packaging waste (94/62/EC) gives the minimum standards for packaging materials.

Due to environmental objectives, the EU facilitates the reuse and recycling of packaging through incentives. For re-using packaging materials, it must be guaranteed that no contamination may occur.

This requires the packaging material to be cleaned well and dried completely, prior to the next use.

6.6 Environmental and Social Issues

The EU has fully implemented the provisions of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). They forbid the trade in endangered species and regulate the trade of species, which are threatened. Endangered species are listed in appendix I, while appendix II list the species, which may become endangered. These lists are available at www.cites.org.

Adansonia digitata does not appear on either index.

Industry and consumers give increasing value to environmental and social aspects and requires the raw plant material to be produced in a sustainable manner.

The GACP mentioned in 6.4 also gives guidelines for sustainable wildcrafting.

In addition to the quality management system, the International Organization for Standardization has developed a management system for environmental issues, the ISO 14000.

Social aspects also play an important role. An internationally recognized management system for social responsibility in business offers the SA 8000 (www.sa-intl.org).

For the consumer, there is a trend toward organically produced products and for fair trade products. In the EU, organic production and labeling is covered by Council Regulation 2092/91/EEC. This should guarantee that the product is produced with reduced impact on the environment and also provides information about the origin, preparation, processing, and packaging of the product. Organic production systems mainly deal with the production of cultivated plants, but they also include wildcrafting. Wildcrafted plants and plant products can apply for organic certification, when they are gathered in areas free from chemical treatment (for more information on the European organic food market, its standards and requirements, please consult the CBI market survey on organic food products, which can be download under www.cbi.nl).

Forest management certification programs can be taken into account for the certification of the sustainability of wildcrafting of plants and plant parts. Some programs such as the Forest Stewardship Council (FSC), the SmartWood Programme of the Rainforest Alliance and the Soil Association have developed specific guidelines for the management of non-wood forest plants (Vantomme and Walter, 2002).

Fair trade includes trading partnerships, which provide sustainable development and better conditions for workers. PhytoTrade Africa represent producers of natural products derived from plants indigenous to southern Africa, such as *Adansonia digitata* L., and is committed to the principles of fair trade but is not a fair trade labeling organization and cannot certify its members products as fair trade products. In the EU, 14 national fair trade organizations are under the umbrella of the Fair Trade Labeling Organization International (FLO) (www.fairtrade.net).

6.7 Tariffs and Quota

In general, all goods entering the EU are subject to import duties. The level of tariffs depends on the country of origin and the product. Because of its natural powdered consistency, baobab fruit

pulp (powder) can be imported as “dried fruit” under the HS-Code 0813 4095; the general import duty is 2.4%. Otherwise, for further processed dried fruits there is a separate HS-Code 1106 3090, which has an import duty of 8.3%. For some producing countries, the import duties are less or no duty is required (Vinke, 2005).

Binding customs information is issued on request by the customs authorities of the member states. They are valid throughout the community and give the exporter legal security. More information is to be found under: http://europa.eu.int/comm/taxation_customs/dds/en/ebticau.htm.

Harmonization of value added taxes (VAT) has not been achieved so far. The Baobab Fruit Company imports baobab fruit pulp s dried fruit and pays a valued added tax of 4%.

7 Prices

The current price schedule for baobab fruit pulp (December 2004) is as follows:

Box 7-1 References of prices for Baobab fruit pulp

Retail: Approximately 50€ per 250 g.

Wholesale: Approximately 35€ per kg.

Supplier: Approximately US \$ 3 to US \$ 20 per kg (FOB*) in average quality, depending upon the quantity, quality and other trade terms and organic and Fair Trade other factors, with certification costs, this price may rise to around US \$ 5 per kg FOB.

* Source: different companies. *Freight On Board (price covers all costs up to and including delivery of goods aboard a vessel at a named port of export).

From an economic standpoint the price is dependent upon supply and demand. The customers are prepared to pay as much for a product as they estimate its use to be worth.

The demand for baobab fruit pulp has not been exploited, however, the product is not very well known and its use must first be communicated to the customers.

Currently, retail and wholesale prices are relatively high. With growing competition among producers, it is expected that the price will go down.

The recommended price for wholesale baobab fruit pulp given above, as well as that from a supplier, is always variable. They are negotiated between the buyer and the seller. The price is dependent upon the amount required, the contractually agreed time period for delivery, the quality and the cost of the desired certification (such as certified organic).

The final price must include the production cost and guarantee a profit for each step along the supply chain. As opposed to most natural ingredients, the processing of baobab fruit pulp is simple. Because the fruit pulp is in a naturally dehydrated state, drying costs are saved. Processing baobab fruit pulp does not require expensive technology and can be performed in the country of origin. In this way, the return benefit for the producers and collectors is high. The correct machine is necessary to mechanically separate the pulp from the seeds and shell. The raw material can be obtained by wildcrafting, because baobab is naturally wide spread and is surplus to local requirements. Harvesting the wild fruit is more cost effective than cultivation.

When calculating production costs, it is important to remember that the return of fruit pulp is about 8% - 12%. The seeds, which make up 38% - 40% of the fruit by weight, can also be processed, thereby greatly increasing the return. Oil can be pressed from the seeds, which is nutritious as well as useful for the production of cosmetic products. To produce oil from the seeds, a press is another necessary investment.

To obtain and maintain a good price position in the growing competition, the various needs of the consumers must be met. By, for example, offering various product quality classes and exploiting additional value features such as organic and/or fair-trade certification. In a survey of natural health-care product consumers, the majority were prepared to pay up to 10% more for products that consider these aspects (Galizia, Schade, Barsch, 2004).

According to PhytoTrade Africa, the income of individuals harvesting baobab has increased by 250% per month, during the harvest season, in parts of Zimbabwe.

7.1 Prices of Substitutes

Due to a lack of competition, the retail price of acerola fruit powder is only slightly less than that of baobab fruit pulp as offered by the Baobab Fruit Company. The production cost of acerola is much higher (particularly because the product must be spray-dried or freeze-dried for extraction), the wholesale price, at € 67 (plus 10% for bio-quality), is considerably higher than that of baobab. The cost of the extraction process is expensive because it requires energy for spray drying and freeze-drying. Because of rising fuel prices, this has become 30% more expensive in 2004.

An example of the price of some other fruit powders follows (prices for organic certified products are usually about 10% higher)*:

Pineapple:	7 - 8 €/kg
Apple:	6 - 7.50 €/kg
Pear:	8 - 9.50 €/kg
Mango:	9 - 10.50 €/kg

7.2 Price Information Sources

Currently, the market for baobab fruit pulp is still not established, the price information for this product is available from other sources than only the buyer and seller. To gain information over the natural ingredients market, the Internet plays an increasingly important role. The homepage of the Herb Growing and Marketing Network offers an "herb crop shop", where growers and buyers can come together (www.herbworld.com/cropshop).

Many wholesalers publish an annual catalog (for example: Galke, www.galke.com), when this is not the case, the prices must be requested.

The Public Ledger publishes the latest trading prices for over 700 commodities worldwide, weekly, including several raw materials (www.public-ledger.com).

The International Trade Centre (ITC) published a market news service on medicinal plants and extracts which every quarter provides prices and market information for these products. For subscription, please refer to www.intracen.org.

For agricultural products, several countries have specialized institutions for market and price information, such as the German ZentraleMarkt- und Preisberichtsstelle für Erzeugnisse der Land-, Forst und Ernährungswirtschaft (ZMP) (www.zmp.de).