



# ADC Commercialisation Bulletin #11

## Dried fruits

### Marketing

#### 1 Markets

Dried tropical fruits such as mangoes, papayas, and bananas are becoming a more common item in European health food stores and supermarkets, where they are sold pre-packed in cellophane bags as well as in bulk (by weight). Usually, these products are sold with sugar added for sweetness and sulphur added for color retention, although “all natural” product is preferred by the health food stores. Other major developed markets, such as Japan, purchase dried tropical fruits, but in much smaller quantities.

#### 2 Customers

The major customers of dried tropical fruits are (a) the dried fruit and nut industry (selling mixed retail packs consisting of dried tropical fruits and other dried fruits and nut, also selling retail packs consisting solely of one dried tropical fruit); (2) breakfast cereal industry (mostly in musli); and (3) the confectionary industry (in fruit and health bars, ingredients to chocolate bars). In most countries, importers or agents act as intermediaries, although some of the packers and food processors also import directly.

Small packs for retail sale are appearing in more supermarkets in both Europe and the United States. Table 1 lists product seen in selected UK retail stores during March 1998.

**Table 1: Dried Tropical Fruit Products Available in Selected UK Retail Stores, March 1998**

Outlet	Product	Source	Unit Size
J. Sainsbury's	Papaya, Mango & Banana		250 g
	Mango	Thailand	125 g
	Pineapple & 'Exotic Mix'	Various	50 g
	Honey Coated Banana Chips	Philippines	150 g
Holland & Barrett	Whole Sundried Banana	Vietnam	240 g
	Pineapple & Papaya	Thailand	125 g
	Pineapple	Thailand	100 g
	'Fruit Surprise' (Pineapple, Papaya, Dates, Apricot, Raisins & Banana)	Various	500 g
Marks & Spencer	Mango		4 dried fruit

*Source: Food Surveys Ltd., March 1998*

Surveys of European and US dried tropical fruit importers, conducted in March 1998, found that importers are less interested in sun-dried product and very competitive overall. The perception is that the product will have too many foreign products (insect fragments, defects, spoilage, microbiological problems, bacteria) and will not pass food safety regulations. Some would be willing to look at the sun dried product and see whether it meets specifications however, all stressed that the market is well supplied and that new entrants must have some comparative advantage in terms of price or presentation.

There is a growing demand for organically certified product that is also low in sugar (natural levels). Organic products can reportedly sell for several times the price of regular product.

Overall, the importers contacted did not see dried tropical fruit as a market with strong growth and potential for Uganda.

### 3

#### Volumes

Import statistics are either unavailable or unreliable for dried tropical fruit in the US and Europe; it is therefore difficult to estimate the actual market size. Based on other studies and industry sources, ADC believes the market to be about US\$60 million per year, broken down between dried bananas (7,000 MTs), banana chips (14,000 MTs), dried papaya (4,000 MTs), dried pineapple (5,000 MTs), and other dried tropicals including mangoes (3,000 MTs). According to industry sources in the major markets in the US and Europe, the market has been expanding and is expected to show continued expansion as many consumers are still unfamiliar with the products.

#### Estimated Import Market Size of Dried/Dehydrated Tropical Fruits in Europe and the US

Market	Total Imports (MTs)	Comments
Belgium	300	principal items are banana chips, pineapples, and papayas
France	1,800-2,800	banana chips (600-800), papayas (500-800), pineapple (500-800), other (200-400)
Germany	3,500	banana chips (1,500), other (2,000)
Netherlands	1,600-1,800	banana chips (600-800), other (1,000)
Switzerland	150	
UK	3,500	banana chips (1,500), other (2,000)
USA	4,500-6,000	banana chips (3,000-4,000), other (1,500-2,000)

Source: ITC/UNCTAD/GATT, 1994

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#### Prices

One importer surveyed in the UK in March 1998 reported paying US\$2,290 per ton for dried papaya and US\$1,850 per ton for dried pineapple. A UK wholesaler reported a wholesale price of £11.32 for a 2 kilogram

pack of either dried pineapple or dried mango. However, diced and heavily sugared pineapple and papaya are wholesaling for under £1 per kilogram. UK retail prices for various dried tropical packs are given in Table 2.

**Table 2: Selected Retail Prices for Dried Tropical Fruit Packs in UK Retail Stores, March 1998**

Retail Store	Product and Pack	Price
Marks and Spencer	equivalent to 4 dried mangos	£1.79
Essential Trading Cooperative	150 g of Thai pineapple, papaya, and mixes	£1.39
Holland & Barrett	125 g of Thai pineapple, papaya and mixes	£0.69
	100 g of Thai diced pineapple	£0.59
	240 g of Vietnamese sundried bananas	£0.99
	500 g of 'Fruit Surprise'	£2.69
J. Sainsbury's	250 g of Thai papaya, mango, and pineapple	£1.49
	50 g of pineapple & "Exotic Mix"	£0.35
	125 g of Thai mango	£1.29
	150 g of Filipino honey coated banana chips	£0.79

*Source: Food Surveys Ltd., March 1998*

US importers surveyed in March 1998 purchase product at various prices depending on their sales volume. For the most part, US importers purchased product at the following CIF prices (mostly New York or New Jersey): papaya (US\$1,200-US\$1,700 per MT), mango (US\$3,100-US\$4,100 per MT), pineapple (US\$1,400-US\$2,000 per MT). Dried banana is bought for approximately US\$1,250 per MT, while banana chips (fried) earn only US\$900 per MT. All preferred mixed container loads of various fruits.

## 5 Competition

Thailand is the primary supplier of dried pineapple, dried papaya, and dried mango. The Philippines and Taiwan are also key suppliers of dried pineapple, papaya and mango. Dried mango suppliers also include the Philippines and Malaysia. Ecuador is the major supplier of dried bananas, along with the Philippines and Thailand. Other suppliers of dried tropical fruits include Australia, Kenya, South Africa, Sri Lanka, Peru, and Vietnam.

## Production

## 6 Method

The most common method for drying is to place the fruit in a cabinet as a single stage drying process. A two-stage process may also be used, whereby the fruit is initially immersed in a highly concentrated sugar solution and water is removed by osmosis before being placed in the dryer for the second and final stage. This second stage may not be allowed by buyers who want “all natural” (no sugar added) product -- generally for the health food sector.

Typical steps in the production process:

- (1) Selection and purchase
- (2) Sorting
- (3) Washing (1%-10% salt water solution; 0.1%-5% soda water solution, or hot water)
- (4) Peeling
- (5) Coring, removal of stone/seed
- (6) Cutting of fruit (according to buyer specifications)
- (7) Blanching (using a method that meets buyer specifications - boiling in acidified water or steam, placing fruit over burning sulphur, or immersing in sulphited water solution)
- (8) Drying either through solar or conventional means
- (9) Cooling
- (10) Sorting and Export Grading/Packing
- (11) Storage and Transportation (if the product has a high moisture content and a preservative has not been used, cold storage may be required)

Depending on buyer specifications, sugar may be added to the dried product to stabilize it (increase its shelf life) and sulphur dioxide may also be added for lightening and to help preserve color.

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### Varieties

Varieties of ndiizi, pineapple, papaya and mango suitable for drying are already being grown in Uganda. The main criteria is to send good samples of each variety to prospective buyers and obtain their feedback before any investment is contemplated.

## 8

### Yield

In 1997, the Kawanda Agricultural Research Institute estimated yields of dried product from fresh fruit as follows:

#### Fresh Product

3 fresh large pineapples 3.2 kg each (9.6 kg total)  
 4.5 medium pineapples 2.2 kg each (9.9 kg total)  
 7 small pineapples 1.4 kg each (9.8 kg total)  
 7 clusters of medium apple bananas at 800 g each (5.6 kg)

#### Dried Product

1 kg  
 1 kg  
 1 kg  
 1 kg

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### Product Specifications

Dried bananas are sold whole, in slices, or cubes (diced). Bananas are also sold as chip (sliced and deep fried). Dried pineapples are sold diced (mostly 10 mm, but may vary depending on the buyer -- 4-6 mm, 8-10 mm, etc), in granules (2-4 mm), or as rings/slices. Color should be light yellow or gold. Dried papayas are sold diced (mostly 8-10 mm, but again may vary depending on the buyer), in granules, as chunks, or as spears. A spear is generally 4 to 6 inches long. Color should be natural red, although white and lighter colors may also be accepted occasionally. Dried mango is sold in dices (varying sizes depending on buyer specifications), granules, chunks, slices, spears (usually 1/8 of a fruit). Color is generally yellowish orange. Slices for most fruits are generally 3/4 or 4/5 mm thick.

Product specifications for product exported to the major markets will depend on the product and the importer. Typical specifications include:

- # Packing (eg. 4 5-kg polybags contained in a cardboard carton)
- # Best before date (eg. 18 months after manufacture)
- # Dimensions (eg. 10 mm diced/cubed, whole, slices, granules, spears, rings, etc.; uniformity of product is very important)
- # Moisture content (eg. 15% moisture maximum)
- # Chemical and microbiological specifications
- # Sugar and sulphite content (buyers will specify whether they want sugar and/or SO<sub>2</sub> added to the product to aid preservation; note that "natural" product does not use added sugar -- in these cases, product is usually not supplied as cubes as they will stick together)
- # Color, flavour, odor, texture, and other physical properties (eg. natural yellow/gold color, free from foreign matter, firm and free flowing, etc.)
- # Nutritional information
- # Labeling

Ugandan exporters should clearly understand buyers' specifications before shipping. In addition, special care should be taken so that Ugandan product is "clean"; Codex Alimentarius publishes a recommended international code of hygienic practice for dried fruits.

Some importers surveyed were upbeat on the prospects of sales of organic dried tropical fruits and believed that suppliers of these products could receive a price premium.

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### Packaging

Typical export packaging is a 20-kg cardboard carton containing four 5-kg polythene bags. Carton and bag size can vary, however, depending on buyer specifications; for example, carton sizes can vary from 5 to 20 kilograms and bags may also range in size and be aluminum foil instead of polythene.

Product for the retail market (generally for health food stores and in some supermarkets) is packed in polythene or cellophane bags in a range of sizes (100 grams and up). Some retailers are selling product in vacuum packs.

### Investment

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### Cost of Production

The main variable costs of production include: purchase of raw material; labor (for washing, cutting, and placing in and removing from solar drying); packaging; and transport. Producers should also budget for solar dryer maintenance costs and replacement of cutting tools. Exporters may have further costs in meeting buyer specifications, including application of sugar and/or sulphur dioxide, repackaging, and other items.

## 16 Profitability

In 1997, the Kawanda Agricultural Research Institute assessed the profitability of fruit drying using a standard small scale solar dryer in Mukono district. The results for dried pineapples and bananas are provided below.

### Profitability of Drying Pineapples and Apple Bananas Using a Standard Small Scale Solar Dryer per Two Week Drying Cycle

	Pineapple		Apple Bananas	
	Large Size (3.2 kg)	Small Size (1.4 kg)	Medium Size (8 cluster bunch)	Small Size (6 cluster bunch)
<b>A. COSTS</b>				
<b>1. Cost of Fruit</b>				
a. Price of fruit/bunch (Ushs)	300	100	400	300
b. Number of fruits/bunches that fill solar dryer with 12 trays	30	56	12	18
c. Cost of filling the dryer (Ushs)	9,000	5,600	4,800	5,400
d. Cost of fruit per two week drying cycle (Ushs)	36,000	22,400	19,200	21,600
<b>2. Cost of Transport</b>				
a. Return trip to Kampala (Ushs)	5,000	5,000	5,000	5,000
<b>3. Cost of repairs and maintenance</b>				
a. Repair and cleaning of solar dryer (Ushs)	5,000	5,000	5,000	5,000
<b>TOTAL COSTS (Ushs)</b>	<b>46,000</b>	<b>32,400</b>	<b>29,200</b>	<b>31,600</b>
<b>B. REVENUE</b>				
a. Quantity of dried fruit per drying cycle (kg)	10	8	14.4	9.6
b. Quantity of dried fruit per two week drying cycle (kg)	40	32	57.6	38.4
c. Price received per kg dried fruit (Ushs)	2,700	2,700	1,500	1,500
d. Revenue per two week cycle (Ushs)	<b>108,000</b>	<b>86,400</b>	<b>86,400</b>	<b>57,600</b>
<b>GROSS MARGIN</b>	<b>62,000</b>	<b>54,000</b>	<b>57,200</b>	<b>26,000</b>

Source: Kawanda Agricultural Research Institute

Assumptions: (1) Fruit is dried 2 times per week which is equivalent to four times in a 2 week operating period. (2) Dried fruit is sold to Fruits of the Nile company at the end of each two week period. (3) Labour is provided by the family and is not paid for. (4) 3 fresh large sized pineapples of 3.2 kg each yield 1 kg of dried pineapples; 4.5 medium sized pineapples of 2.2 kg each yield 1 kg of dried pineapples; 7 small sized pineapples of 1.4 kg each yield 1 kg of dried pineapple. (5) Seven clusters each of approximately 800 g (3/4 bunch) of medium sized banana yield 1 kg of dried bananas.

These figures refer to small-scale processors but clearly the return of less than \$200 per month is very low. Figures are not available for large scale operations, but unless there are dramatic economies of scale to be achieved, the products do not appear to be attractive as export investments.

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### Investment Requirements

Many types of design are available for solar and oven drying equipment, ranging in price from less than \$5,000 to more than \$100,000. These are currently being evaluated by the post-harvest team at Kawanda Agricultural Research Institute and data should become available during 1998.

### More Information

Additional information is available from ADC on the production, handling, and marketing of dried tropical fruits, including:

International Consultation on Tropical Fruits: Processed Tropical Fruits. FAO, Rome. 1996. 11 pages. *Provides good introductory information on the world market for canned and dried tropical fruits as well as tropical fruit juices.*

Dried/Dehydrated Tropical Fruit: A Survey of World Markets. International Trade Centre UNCTAD/GATT, Geneva. 1994. 108 pages. *Surveys the market in Belgium, France, Germany, the Netherlands, Switzerland, the UK, and the US, providing information of market characteristics, competition, prices, and distribution channels. Contact information for dried tropical fruit importers in each country is also given.*

The EC Market for Dried Tropical Fruits. EPADU/ANEPP, Kampala. 1995. 32 pages.

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