

# A GUIDE FOR A CANE JUICE PRODUCTION UNIT

## 1 - PRESENTATION

### 1-1 Nature of the Activity

This activity consists of producing juice, from recently harvested sugar cane, which is stabilized by pasteurisation or sterilization. Production depends on the nature of the product in demand and on the prospective markets.

This is a new means of valorization of sugar cane, which leads to a higher added value than was possible in the classic sugar chain, and that is adaptable to small production units. Two methods of commercialization are :

- sale as is in local markets as a drink
- as a base for the manufacturing of new products in industrial markets.

### 1-2 Alternatives

#### \* Finished Products :

There are different levels of quality, ranges of products, and destinations :

- pasteurized, pure, cloudy cane juice : a product with a limited shelf life, stored at a temperature of + 4°C; it conserves all the organoleptic qualities of fresh cane juice
- sterilized, pure, cloudy cane juice : a product with a long shelf life, stored at room temperature
- acidified and pasteurized, cloudy cane juice : a product with a long shelf life, stored at room temperature
- cloudy cane juice mixed with concentrates of other tropical fruits (passion fruit, mango, guava) and pasteurized : long shelf life, stored at room temperature.
- pure, cloudy cane juice concentrated at 70°C brix
- clarified cane juice, possibly concentrated.

#### \* Technology

The technology choices are tied to the finished products and to the size of the plant :

- peeling
- blanching
- centrifugation
- thermal treatment : metal cans  
metal sacks
- possible clarification and concentration.

### 1-3 Types of Possible Units

Two types of units will be presented :

- Unit A. A medium-sized unit 1T/h of treatment of raw cane.

- Unit B. A small unit, 0.2 T/h of treatment of raw cane.

## 2 - TECHNICAL AND ECONOMIC GUIDE

### 2 - 1 Description of Unit

#### 2.1.1. Finished Products

LINE	A	B
Capacity	1 T/h	0,2 T/h
Product	- sterilized, pure cane juice - acidified and mixed cane juice	- pasteurized, pure cane juice
Type of packaging	a. metal can b. sachet	a. metal can b. sachet
Size of packaging	a. 1/2 l b. 20 cl	a. 1/2 l b. 20 cl
Production		
- daily	3500 l	700 l
- annual	875 000 l	175 000 l

2-1-2 Technological Choices

OPERATIONS	TECHNOLOGICAL OPTIONS	SOLUTIONS	
		LINE A : 1 t/hr	LINE B : 0,2 t/hr
Reception Sorting/pre-cutting	- Manual operation - Manual paring - Mecanical pre-cutting	Mechanical pre-cutting	Manual operation
Peeling	- Manual - Automatic abrasion by sand blasting	Peeling by sand blasting	Manual peeling
Blanching	- Discontinuous blanching - High pressure steam set - Continuous blanching in tunnel	Tunnel blanching	Discontinuous blanching
Pressing	- Mill with cylinder : extraction by compression with regulated spreading and pressure . 3 cylinders . 5 cylinders	5 cylinders	3 cylinders
Filtration	- Vibrating sifter - Rotating sifter	Rotating sifter	vibrating sifter
Centrifugation	Optional operation (centrifuge with horizontal axe)	yes	no
Treatment and packaging	- Pasteurized : plate heat exchanger and packaging with heat - Sterilized : cold filling and sterilization in autoclave.	Pasterized and sterilized 50/50	sterilized

## 2-2 Economic Analysis

### 2-2-1 Investment

Equipment	OPTION A		OPTION B	
	Description	Price FOB in \$ US	Description	Price FOB in \$ US
Peeling	Peeler	\$ 150 000		\$ 22 500
Blanching	Blancher			
Pressing	Mill	\$ 400 000		\$ 120 000
Centrifugation	Centrifuge			
Storage	Vats			
Pasteurization	Pasteurizer	\$ 240 000		\$ 107 500
Packaging	Doser Packager			
<b>TOTAL EQUIPMENT</b>		<b>\$ 790 000</b>		<b>\$ 250 000</b>
<b>Building</b>				
Building area (m2)	300 m2		80 m2	
Land (m2)	1000 m2		300 m2	
<b>Other investments</b>				
Electrical power	100 Kw		50 Kw	
<b>Total investment</b>		<b>\$ 1.2 million</b>		<b>\$ 460 000</b>

### 2.2.2. Functioning

	OPTION A	OPTION B
<b>Labour</b>		
Production	13	8
Structure	7	4
<b>Consumption</b> (annual)		
Raw materials (cane)	about.2000 T	400 to 500 T
Energy	275 000 KWh	50 000 KWh

## 3 - KEY FACTORS TO THIS PROJECT'S SUCCESS

### 3-1 Supply

The sugar cane used must conform to certain specifications of variety, growing conditions, etc.

The quality must be rigorously controlled, especially from the point of view of bacteria count.

The time of harvest may sometimes be different from that of sugar cane used for sugar refineries.

Particular attention must be paid to the growing conditions and the harvest of the cane (much more than that for classic sugar refineries) : the purchase price will be higher as a result.

### 3-2 Technology and Equipment

The operating technology is especially delicate for the following operations :

- peeling/extraction,
- stabilization,
- clarification.

### **3-3 Personnel**

- Pretreatment calls for mechanical equipment, but may be manual.
- Thermal treatment is more delicate : the thermal adjustments require a specialized technician : training in a juice factory is a requirement.
- When juice is clarified, a specialized technician is indispensable.

### **3-4 Quality Control**

Usual tests :

- dry matter,
- acidity,
- relation of sugar/acid,
- microbiology.

Thus, a small laboratory should be planned for the factory.

- Tests for the performance of equipment, and of the quality of the juice.

### **3-5 Distribution and Commercialization**

- Distribution may take place in local markets, and even regional ones: pure acidified cane juice, and/or flavoured, packaged in individual servings and sold as drinks. Cane juice may be used in the same local markets by industrial food product processors as a base for manufacture.
- For export, products are sold to industrial processors in aseptic or frozen barrels of 250 l as base for drinks.
- Plan for the volume necessary for cold storage, and the cost of preserving frozen products.
- For strategic export, an introductory commercial partner (or user) is recommended.

### **3-6 Financing**

The of investment/turnover ratio is not high.

### **3-7 Other Specific Problems**

Treatment of waste : the treatment leaves waste (cellulose structure of cane void of its juice).

It can therefore be utilised (after complementary drying, or as is) as :

- fuel after drying,
- raw material for secondary industry,
  - panelling for buildings
  - paper manufacture.

### **4 - INDUCED ACTIVITIES**

- Purchasing of 400 to 2,000 tons of sugar cane. Possibility of developing contracts with producers. Necessity for supply of local raw material.
- Possibility of developing local units for manufacture of drinks with juice base for local market. Residue can be sold off to a small unit manufacturing panels.