



**NIGERIAN INSTITUTE OF FOOD
SCIENCE AND TECHNOLOGY**

Proceedings

28th OF THE
ANNUAL CONFERENCE/AGM

Theme: _____

**CURRENT CHALLENGES IN THE
FOOD INDUSTRY IN NIGERIA**

From 12th - 14th October, 2004

VENUE: CONFERENCE CENTRE
UNIVERSITY OF IBADAN,
OYO STATE, NIGERIA,

EDITED BY:

G.O. Adegoke; L.O. Sanni;
K.O. Falade and P.I. Uzo-Peters

Economics of clarified juice production from local fruits using pectinase enzyme hydrolysis

Oyedoyin, B.O. and Akinola, S.O.
Federal Institute Of Industrial Research, Oshodi,
P.M.B 21023, Ikeja, Lagos.

Introduction

Many fruit and vegetable juices are cloudy and the cloud consists of fragments and colloidal suspensions varying greatly from product to product (Bierdermann et al, 1951). Clarification of fruit juices is practiced particularly in the processing of pulpy and stony fruits such as banana, mango, paw-paw, guava and apple, which have little or no liquid. The process may be chemical or physical (Ranken *et al*, 1997). Pectinases which catalyze hydrolysis of pectin, are obtained from fungal solid waste fermentation of materials (e.g. corn pomace) readily available in Nigeria.

FOS (2001) reported expenditure of over 490 million naira on importation of fruit juices. This study establishes the availability of suitable fruits for processing clarified juices in Nigeria; market potential for clarified juice; economic benefit and economic evaluation of local production of clarified juices using pectinases.

Material and methods

Raw materials survey was carried out. Secondary data were obtained from publications of Federal Office of Statistics (FOS), Ministry of Agriculture and Central Bank of Nigeria (CBN). Primary data were obtained from the fruit market in Lagos, Ogun and Oyo states using interview based on the designed structured questionnaire.

Market research was carried out to establish the market potential of locally produced clarified juice. Primary data were obtained from market in Lagos environs using interview based on structural questionnaire designed using Participatory Rural Appraisal method. This established the demand, supply, consumption pattern, pricing and packaging of clarified juices.

Economic benefit of local production of clarified fruit juice was established through collection and analysis of data from publications of FOS and CBN on importation of juices, and pectinase enzyme into the country and exportation of fresh fruits from the country.

Economic evaluation of small-scale production was carried out to determine cost implications, and viability of the project using indices of financial evaluation recommended by UNIDO, 1978. The evaluation was based on 1 ton of fruit per day, 250 working days per annum, and selling price of N110 per litre of juice.

Results and discussion

Analysis of annual production figure for various pulpy fruits from 1992 to 2002, area planted and production figures for pulpy fruits from 1992 to 1996, and out put of major agricultural products from 1990 to 2002, indicated modest growth in agricultural products. CBN reported GDP growth in 2002 by 3.3% down from 4.2% in 2001. Index of agricultural production by type of activity from 1990 to 2002 indicated sustenance of improvement in agricultural output. At 278.5 (1984= 100) the aggregate index of agricultural production increased by 4.0 % in 2002 compared with 3.7% in 2001.

Market research indicates enormous demand for various brands of clarified juices in Nigeria. About 25 brands imported from South Africa, UK, Malaysia, Singapore, Korea, Canada,

France, Holland, Philippines, Australia, Germany, Sweden and Mexico, packaged in plastic bottles, cans, and tetra brik with prices ranging from N135 to N175 per litre of tetra brik, from N60 to N80 for 300 ml can and N125 per litre of plastic bottles. Very few brands (10) of locally produced fruit juices are available at various markets indicating obvious wide supply demand gap and investment opportunities for fruit juice production.

Export of fresh fruits such as cashew, mango, paw-paw, from Nigeria between 1996 and 2000 was 18,337,746 kg valued at N801,904,000. These could have been processed into clarified juices thereby adding value. A total of 42,892,583 kg of fruit juices valued at 1.6 billion naira was imported into Nigeria from 1996 to 2001. Also a total of 887,146 kg of pectinase enzyme valued at N30m naira was imported from 1997 to 2001 (table 1). Table 2 shows the Net income statement based on the economic evaluation. The estimated initial investment cost for the project was N6.0m, which include estimated fixed capital cost of N4.4m and working capital of N1.6m. The probability ratios for the project were the Rate of Return on Investment (RRI) 108%, Pay Back Period (PBP) 10 months, Rate of Return on Equity (RRE) 260%, and Net Present Value at 30% in the fifth year of operation was estimated at N5m. These are impressive ratios indicating a worth-while investment.

Table 1: Importation of fruit juices and pectinase enzyme from 1996 to 2001

YEAR	FRUIT JUICES		PECTINASE ENZYMES	
	Qty (Kg)	Value (N)	Qty (Kg)	Value (N)
1996	3,906,643	174,789,000	-	-
1997	15,418,284	229,020,000	25,186	12,080,000
1998	9,070,688	256,657,000	233,506	34,002,000
1999	5,383,039	148,025,000	-	-
2000	6,590,113	306,866,000	-	-
2001	7,233,811	491,247,170	567,349	218,631,496

Source: FOS, Trade Summary, (1996 – 2001).

Table 2: Net income statement for 1 ton/ day clarified juice production.

NO	ITEMS	COST (N)
1.	Sales Revenue at N110 per litre	27,225,000
2.	Total production cost	17,312,548
3.	Gross Profit	9,312,548
4.	Tax at 30%	2,793,764
5.	Net Profit	6,518,783

REFERENCES:

1. Biedermann.W. (1951). Concerning Pectin and Pectin splitting enzymes in Must. Schiverz Zeit. Fur. Obst. Und. Weibau 60, 351 – 357, 383 – 385, 444 – 445.
2. Federal Office of Statistics 1996 – 2001 Foreign Trade Summary, FOS, Abuja, Nigeria.
3. Ranken, M.D; Kill, R.C. and Baker, C.G.J. (1997) Ed. Food Industries Manual, 24th edition, Chapman and Hall London, pp 211 – 236
4. United Nations Industrial Development Organization, 1978. Manual for the Preparation of Industrial Feasibility Studies. UNIDO, New York, pp 151 – 175.