

**279 . PROFILE ON PRODUCTION OF
MARGARINE FROM ANIMAL FAT**

TABLE OF CONTENTS

	PAGE
I. SUMMARY	279 - 3
II. PRODUCT DESCRIPTION & APPLICATION	279 - 3
III. MARKET STUDY AND PLANT CAPACITY	279 - 4
A. MARKET STUDY	279 - 4
B. PLANT CAPACITY & PRODUCTION PROGRAMME	279 - 6
IV. RAW MATERIALS AND INPUTS	279 - 7
A. RAW & AUXILIARY MATERIALS	279 - 7
B. UTILITIES	279 - 8
V. TECHNOLOGY & ENGINEERING	279 - 8
A. TECHNOLOGY	279 - 8
B. ENGINEERING	279 - 9
VI. MANPOWER & TRAINING REQUIREMENT	279 - 10
A. MANPOWER REQUIREMENT	279 - 10
B. TRAINING REQUIREMENT	279 - 11
VII. FINANCIAL ANALYSIS	279 - 11
A. TOTAL INITIAL INVESTMENT COST	279 - 11
B. PRODUCTION COST	279 - 12
C. FINANCIAL EVALUATION	279 - 13
D. ECONOMIC BENEFITS	279 - 14

I. SUMMARY

This profile envisages the establishment of a plant for the production of margarine from animal fat with a capacity of 25 tonnes per annum.

The present demand for the proposed product is estimated at 23 tonnes per annum. The demand is expected to reach 37.5 tonnes by the year 2020.

The plant will create employment opportunities for 14 persons.

The total investment requirement is estimated at about Birr 2.96 million, out of which Birr 1.18 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 16 % and a net present value (NPV) of Birr 1.1 million discounted at 8.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Margarine is a butter-like product obtained by mixing animal and vegetable fats with or without milk. Margarine was originally marketed as an imitation butter. However, it now has a recognized identity to its own. The proportion of the fat blend and other ingredient varies with the type of margarine & with the country of manufacture.

The product is widely used as a table spread in bakeries, pastries and as ingredient in various food preparations, shortenings, basic input in baked products.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Margarine is a food produce rich in fats and oils and widely used as a substitute for butter. It is widely used as a table spread in bread, pastries and as ingredient in industrial food preparations. Due to absence of plants in the country that manufacture margarine the entire requirement is met through import (see Table 3.1).

Table 3.1.
IMPORT OF MARGARINE (TONNES)

Year	Import
2000	20.0
2001	77.3
2002	59.5
2003	103.7
2004	70.3
2005	99.4
2006	422.8

Source:- Customs Authority .

Import of margarine has shown a general increasing trend although there is fluctuation in some years. The import level which was only 20 tons during year 2000 has increased to 77.3 and 59.5 tonnes by the year 2001 and 2002, respectively. The yearly average level of import during the period 2003-2005 has reached more than 91 tonnes. An exceptionally high level of import has been recorded during year 2006 which amounts to 422.8 tonnes.

In order to determine the current effective demand, first, the recent three years average has been calculated by excluding the outlier of year 2006. Accordingly it is found to be 91 tonnes. Secondly, to arrive at the demand for margarine from animal fats 25% of the 91 tons is calculated as per the opinions gathered from knowledgeable people in the business. Hence, current demand for margarine from animal fats is estimated at 23 tonnes.

2. Projected Demand

The demand for the product will grow as a result of urban population growth, income and change in the eating habit of the population. By considering four percent urban population growth, and the impact of income and change in eating habit a 5% annual average growth is adopted to forecast the demand (see Table 3.2).

Table 3.2

FORECASTED DEMAND FOR MARGARINE FROM ANIMAL FAT (TONNES)

Year	Forecasted Demand
2008	24.2
2009	25.4
2010	26.6
2011	28.0
2012	29.3
2013	30.8
2014	32.4
2015	34.0
2016	35.7
2017	37.5

3. Pricing and Distribution

Based on the average CIF price and additional charges a factory gate price of Birr 75,000 per ton is recommended. The product will find its market outlet through the existing food stores and groceries throughout the county.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The annual production capacity of the envisaged project is 25 tonnes margarine, based on 300 working days per annual and 8 hours per day. This capacity can be increased by increasing the number of shifts per day.

2. Production Programme

Table 3.3 indicates the production program. At the initial stage of the production period, the envisaged project may require some years to capture a significant market share. Therefore, the project may start production at 70% and 85% of its rated capacity in the first and second year of production, respectively. Full capacity production shall be attained in the third year and thenafer.

Table 3.3
PRODUCTION PROGRAMME

Sr.No.	Product	Production Year		
		1	2	3-10
1	Margarine (kg)	17500	22,500	25,000
2	Capacity utilization rate (%)	70	90	100

IV. MATERIAL AND INPUTS

A. RAW & AUXILIARY MATERIALS

The raw materials of margarine production can broadly be classified in three groups: fat, blend, aqueous phase and additives.

In this study, partially hydrogenated cotton seed oil and animal fats are major constituents of the fat blend. Ripened or skim milk, water and brine constitute the aqueous phase.

Lecithin, antioxidant, flavoring agents, fat-soluble dye, vitamins and aroma ingredients are classified under the group additives.

Hydrogenated cottonseed oil, animal fat, skim milk and salt are all from local sources.

Table 4.1 indicates the annual raw and auxiliary materials requirement and cost of the project.

Table 4.1

ANNUAL RAW AND AUXILIARY MATERIALS REQUIREMENT AND COST

Sr. No.	Raw Material	Unit	Qty	Cost ('000 Birr)		
				FC	LC	Total
1	Hydrogenated oil & fat	Kg	22,500	-	562.5	562.5
2	Milk (skimmed)	Kg	4,250	-	17	17
3	Salt	Kg	625	-	0.56	0.56
4	Additives	Kg	1,125	22.5	4.5	27
5	Packing materials	LS	LS	150	30	180
	Total			172.5	614.56	787.06

B. UTILITIES

The major utilities of the proposed project are electricity, furnace oil and water. The annual utility requirement and its cost are indicated in 4.2 .

Table 4.2
ANNUAL UTILITY REQUIREMENT & COST

Sr. No.	Utility	Unit	Qty	Cost ('000 Birr)
1	Electricity	kWh	30,000	14.22
2	Furnace oil	Kg	3,520	19.04
3	Water	M3	5,000	50
	Total			83.26

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Process Description

Raw oils and fats are melted and blended with salt, water, lactic substances, vitamins, colouring agents, aroma and other ingredients. The mixture is then emulsified, sterilized, cooled rapidly and kneaded. The intermediate product is, after being aged for a while, formed into the prescribed shape and finally packed as finished product.

2. Source of Technology

The following company is very popular in the production of machinery for dairy and other products.

Tetra Laval Food Shroder GmbH
 D-23564 Lubeck, Germany
 Tel. 0451-3709-0
 Fax. 0451-3709-200

B. ENGINEERING

1. Machinery & Equipment

The list of machinery and equipment is indicate in Table 5.1 . The total cost of machinery is estimated at Birr 1,182,790 of which Birr 985,658 is required in foreign currency.

Table 5.1
LIST OF MACHINERY AND EQUIPMENT

Sr. No.	Machinery	No.
1	Melting tanks	2
2	Mixing tank	1
3	Emulsifying tank	1
4	Continuous sterilization equipment	1
5	Continuous cooling and mixing	1
6	Forming and packing machine	1
7	Boiler	1

2. Land, Building and Civil Works

The total area of the project is 1000 m² out of which 400 m² is a built-up area. Therefore, the cost of building is estimated at Birr 600,000. The lease value of land, at a rate of 1 Birr/m²/year, is about Birr 80,000 for 80 years.

3. Proposed Location

For its access to potential raw material sources, Omarata town is selected as the best location for the envisaged project.

VI. MANPOWER & TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The list of manpower and labour cost are indicated in Table 6.1. The total annual cost of labour is estimated at Birr 178,500.

Table 6.1
MANPOWER REQUIREMENT & LABOUR COST

Sr. No.	Manpower	No.	Monthly Salary (Birr)	Annual Salary (Birr)
1	General manager	1	2,500	30,000
2	Sales officer	1	1,000	12,000
3	Accountant	1	1,500	18,000
4	Production head	1	2,000	24,000
5	Operators	3	2,100	25,200
6	Labourers	5	2,000	24,000
7	Guards	2	800	9,600
	Sub total	14	11,900	142,800
	Benefits (25% BS)		2,975	35,700
	Total	14	14,875	178,500

B. TRAINING REQUIREMENT

On-the-job training shall be carried out by the experts of machinery supplier during plant erection and commissioning. The training cost is estimated at Birr 20,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the margarine from animal fat project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity 70 % loan
Tax holidays	5 years
Bank interest	8%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30days
Work in progress	5 days
Finished products	30 days
Cash in hand	5 days

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 2.96 million, of which 17 per cent will be required in foreign currency.

The major breakdown of the total initial investment cost is shown in Table 7.1.

Table 7.1
INITIAL INVESTMENT COST

Sr. No.	Cost Items	Total Cost (‘000 Birr)
1	Land lease value	80
2	Building and Civil Work	600.00
3	Plant Machinery and Equipment	1,182.79
4	Office Furniture and Equipment	100
5	Vehicle	450
6	Pre-production Expenditure*	373.99
7	Working Capital	179.87
	Total Investment cost	2,966.7
	Foreign Share	17

* *N.B Pre-production expenditure includes interest during construction (Birr 173.99 thousand) training (Birr 20 thousand) and Birr 180 thousand costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

B. PRODUCTION COST

The annual production cost at full operation capacity is estimated at Birr 1.69 million (see Table 7.2). The material and utility cost accounts for 51.21 per cent, while repair and maintenance take 8.83 per cent of the production cost.

Table 7.2**ANNUAL PRODUCTION COST AT FULL CAPACITY ('000 BIRR)**

Items	Cost	%
Raw Material and Inputs	787.06	46.31
Utilities	83.26	4.90
Maintenance and repair	150	8.83
Labour direct	107.1	6.30
Factory overheads	44.63	2.63
Administration Costs	71.4	4.20
Total Operating Costs	1,243.45	73.17
Depreciation	292.28	17.20
Cost of Finance	163.66	9.63
Total Production Cost	1,699.39	100

C. FINANCIAL EVALUATION**1. Profitability**

According to the projected income statement, the project will start generating profit in the first year of operation. Important ratios such as profit to total sales, net profit to equity (Return on equity) and net profit plus interest on total investment (return on total investment) show an increasing trend during the life-time of the project.

The income statement and the other indicators of profitability show that the project is viable.

2. Break-even Analysis

The break-even point of the project including cost of finance when it starts to operate at full capacity (year 3) is estimated by using income statement projection.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 52 \%$$

3. Pay Back Period

The investment cost and income statement projection are used to project the pay-back period. The project's initial investment will be fully recovered within 6 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 16 % and the net present value at 8.5% discount rate is Birr 1.1 million.

D. ECONOMIC BENEFITS

The project can create employment for 14 persons. In addition to supply of the domestic needs, the project will generate Birr 661,990 in terms of tax revenue.