

**254. PROFILE FOR THE PRODUCTION OF
AVOCADO OIL FOR INDUSTRIAL USE**

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I. SUMMARY

This profile envisages the establishment of a plant for the production of avocado oil for industrial use with a capacity of 75 tonnes per annum.

The present demand for the proposed product is estimated at 47 tonnes per annum. The demand is expected to reach at 198 tonnes by the year 2022.

The plant will create employment opportunities for 44 persons.

The total investment requirement is estimated at Birr 4.92 million, out of which Birr 2.01 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 13 % and a net present value (NPV) of Birr 566,370 discounted at 8.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Avocado oil is heavy oil that is rich in vitamin A and E. It is a superb addition in soap making because of its high percentage of unsaponifiables namely oleic, palmitic and linoleic. It is used both as an emollient and helps to retard moisture loss. It is also greatly used for shaving soap, as it reduces razor drag and facilitates better shaving. Dehydrated avocado fruit can be harvested from areas in Dawuro zone, particularly from Marreka woreda.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Avocado oil (*Persea americana*) is extracted from the pulp of the fruit of the avocado tree. Avocado Oil is a mono-unsaturated oil, which is dark green in color. It is rich in vitamins A, D and E and contains proteins, lecithin and amino acids. The oil is very soothing for the skin in general but particularly good for mature and dry skin. The product is used as massage oil, in creams, lotions and hair products.

The local cosmetics manufacturing industry is at an early stage of development. Therefore, the envisaged product is mainly for export market.

According to the International Trade Center (ITC) market brief (2006) the market for non edible avocado oil is expanding. World trade in the product grew on average by 13% and 8% annually in terms of volume and value respectively during the period 2000 – 2005.

China and India are the principal producers and suppliers of avocado oil to international markets. In 2005, total world imports of avocado oil reached 371 tons valued at USD 59 million, of which China and India's exports contributed USD 14 million and USD 9 million, respectively, for quantities exceeding 85 tons each. The United States, Malaysia and Germany are among the major markets for avocado oil. In 2005, the United States accounted for 24% of the total value of avocado oil imports, followed by Malaysia 8% and Germany 7%.

To estimate the present global demand for the product the average growth rate registered by world avocado oil export during the period 2000 – 2005 in terms of volume i.e. 13% is assumed to continue in the near future. Accordingly, taking the 2005 level of international trade (371 tonnes) as a base and applying 13% annual growth rate the

current (2007) demand for the product is estimated at 473.73 tonnes. In order to be conservative the market share that could be capture by locally produced avocado oil for industrial use is assumed to be 10% which is 47 tonnes.

2. Projected Demand

The global market for non edible avocado oil is expanding one therefore based on past trend it can be assumed that the market grows at an annual growth rate of 5%. Accordingly by taking the estimated present demand as a base and applying a 5% growth rate the projected demand for the product and estimated share of local product is shown in Table 3.1.

Table 3.1
PROJECTED DEMAND

Year	Projected Global Demand	Local Product Market Share
2008	521	52
2009	573	57
2010	631	63
2011	694	69
2012	763	76
2013	839	84
2014	923	92
2015	1,015	102
2016	1,117	112
2017	1,229	123
2018	1,352	135
2019	1,487	149
2020	1,635	164
2021	1,799	180
2022	1,979	198

3. Pricing and Distribution

Based on international price of non-edible avocado oil/industrial and other costs, a factory gate price of Birr 12,142 per ton is recommended. The product can be sold directly to the end user industries in the country.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The market study for industrial avocado oil indicates (Table 3.1) that the demand for the product in 2008 will be 52 tons, and is shown to grow to 102 tonnes and 198 tonnes by the year 2015 and 2022, respectively. Considering that the demand is relatively low, the envisaged plant will have annual production capacity of 75 tonnes of industrial avocado oil per annum. The plant will operate double shift 16 hours a day and 300 days a year.

2. Production Programme

Considering the need for skill development and the time required for market penetration the processing plant will be planned to start operation at 75% of the capacity in the first year, and will grow to 85% and 100% in the successive years.

IV. MATERIALS AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The main raw material required is ripe avocado fruit. This raw material yields as much as 85% oil. This fruit is believed to grow in Dawuro Zone, particularly in Marreka woreda.

Auxiliary materials include barrels (metallic drums), plastic containers, and other inputs. Annual requirements of raw and auxiliary materials, including costs associated with annual material and input consumption is shown in Table 4.1 below.

Table 4.1

RAW AND AUXILIARY MATERIALS AT FULL CAPACITY PRODUCTION

Sr. No.	Description	Qty	Cost ('000 Birr)
1	Ripe avocado oil (ton)	57.5	120.35
2	Metallic barrels (pcs)	35	5.25
3	Plastic containers (pcs)	100	4.0
	Total	-	129.6

B. UTILITIES

Utilities required for industrial avocado oil plant consists of electricity, water, fuel oil and lubricants. Annual requirement of each of these inputs at full capacity production is shown in Table 4.2 below.

Table 4.2
ANNUAL REQUIREMENT OF UTILITIES

No.	Description	Qty	Cost ('000 Birr)
1	Electricity (kWh)	40,000	18.96
2	Water (m3)	7500	75.00
3	Fuel oil (litres)	3500	18.935
4	Lubricants	Reqd.	5.0
	Total		117.90

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

Avocado oil for industrial use consists of the following unit operations:

- a) Sorting out of ripe avocado fruit
- b) Washing
- c) Scalding
- d) Peeling
- e) Pressing
- f) Refining
- g) Filling, packing and dispatching to market

Ripe avocado fruit harvested from farm in first properly sorted out and is prepared for processing. The damaged cenes are avoided from being processed. The sorted out fruit is then washed to remove any foreign material that might have passed from farm area to this stage. The washed avocado fruit is then dried and scalded byhot water produced by a

boiler. This action further removes unwanted particles that might have possibly remained attached to the fruit.

The next operation is peeling. This is carried out by a machine, where the upper skin of the fruit is carefully removed and discharged as waste. The inner part is directly charged into a pressing machine where the oil is separated from the non-oil part. The crude oil is then refined by a refinery unit. The output of the refinery is then charged into a fulling machine, where the industrial avocado oil is filled into metallic or plastic containers for final dispatch into market.

2. Source of Technology

The machinery and equipment required for processing avocado fruit to produce oil for industrial use can be procured from the following companies:

- 1) JAWLA Engineering Company
6, MADHU IND. EST., OFF 11B PATEL ROAD
GORE GAONE (E)
Mumbai – 4000063, Maharashtra, India
Phone: 91-22-56902548/56903038
Fax: 91-22-26862622

- 2) Shanghai Small Enter Prise Trade
Development Service Centre
International Cooperation Division
Shanghai 200032
Fax: (00862) (64220814).

B. ENGINEERING**1. Machinery and Equipment**

The list of machinery and equipment required for the production of industrial avocado oil is shown in Table 5.1 below.

Table 5.1
LIST OF MACHINERY AND EQUIPMENT FOR PRODUCING INDUSTRIAL
AVOCADO OIL

Sr. No.	Description	Qty	Cost ('000 Borr)		
			LC	FC	TC
1	Washing basins (stainless steel basins)	4	60	-	60
2	Hot water washing basins (stainless steel)	4	60	-	60
3	Peeling machine	1	10	35	45
4	Filter press	1set	30	185	215
5	Settling tank	2	34	-	34
6	Oil refinery	1 set	150	750	900
7	Filling machine	1	10	45	55
8	Boiler (hot water generation)	1 set	50	300	350
9	Miscellaneous-laboratory equipment, measuring devices, tools, etc...	Reqd.	30	270	300
	CIF Landed Cost	-	434	1,585	2,019

2. Land, Building and Civil Works

Industrial avocado oil processing of raw material and final product, for factory building, for administration and general purpose building, pathways, and space for expansion in the future. A total of 3000 square meters of land is allotted for the envisaged plant. At the rate of Birr 1.0 per m² as land lease value for 80 years, the total investment on land will be Birr 240,000. Of the total land leased for the processing plant 1000 m² will be built-up area, and at the rate of Birr 2000 per m², the building and civil construction cost will be Birr 2.0 million. Thus, the total investment on land, building and civil works will be Birr 2.24 million.

3. Proposed Location

Location of a plant is determined on the basis of proximity of raw materials, availability of infrastructure market out lets. Moreover, consideration is given to fair distribution of projects among SNNPR woredas. In view of this avocado tree is grown in Dawuro zone, particularly marreka woreda. The industrial avocado oil producing plant will therefore be established in Tercha town (Marreka woreda).

VI. MANPOWER & TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The processing plant requires direct production workers and administrative and supervisory staff. Details of manpower requirement and estimate of annual expenses on salaries is shown in Table 6.1.

Table 6.1
MANPOWER REQUIREMENT AND LABOUR COST

Sr. No.	Job Title	Req. Nos.	Monthly Salary (Birr)	Annual Salary (Birr)
	A. Administration			
1	Plant manager	1	2,000	24,000
2	Secretary	1	800	9,600
3	Accountant	1	1,000	12,000
4	Sales officer	1	700	8,400
5	Store man	1	700	8,400
6	Cashier	1	600	7,200
7	Clerk	1	450	5,400
8	Time keeper	1	450	5,400
9	Driver	2	450	10,800
10	Messenger	2	250	6,000
11	Guard	4	250	12,000
	Sub-Total	16		109,200
	B. Production			
1	Production supervisor	2	1,500	36,000
2	Skilled operator	8	600	57,600
3	Chemist	2	1,000	24,000
4	Boiler operator	2	600	14,400
5	Technicians	4	600	7,200
6	Laborer	10	250	30,000
	Sub-Total	28		169,200
	Workers' Benefit (25%)			69,600
	Grand-Total	44		348,000

B. TRAINING REQUIREMENT

Workers directly related to production, supervisor, operators and technicians need to be given on the job training for two weeks by qualified personnel of machinery supplier.

The training cost is estimated to be Birr 30,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the avocado oil for industrial use 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	2 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 4.92 million, of which 57 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	240
2	Building and Civil Work	2,000.00
3	Plant Machinery and Equipment	2,019.00
4	Office Furniture and Equipment	75
5	Vehicle	200
6	Pre-production Expenditure*	332.85
7	Working Capital	58.25
	Total Investment cost	4,925.1
	Foreign Share	57

* *N.B Pre-production expenditure includes interest during construction (Birr 232.85 thousand) training (Birr 30 thousand) and Birr 70 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 1.34 million (see Table 7.2). The material and utility cost accounts for 18.42 per cent, while repair and maintenance take 5.58 per cent of the production cost.

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

Items	Cost	%
Raw Material and Inputs	129.60	9.65
Utilities	117.9	8.77
Maintenance and repair	75	5.58
Labour direct	208.8	15.54
Factory overheads	87	6.47
Administration Costs	139.2	10.36
Total Operating Costs	757.50	56.38
Depreciation	369.4	27.49
Cost of Finance	216.73	16.13
Total Production Cost	1,343.63	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.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 41 \%$$

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 4 years.

2. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 13 % and the net present value at 8.5% discount rate is Birr 566,370.

D. ECONOMIC BENEFITS

The project can create employment for 44 persons. In addition to supply of the domestic needs, the project will generate Birr 1.01 million in terms of tax revenue