Profile No.: 65 **NIC Code: 46305**

CASTOR OIL COMMERCIAL

1. INTRODUCTION

The castor oil plant, *Ricinus communis*, is a species of flowering plant in the spurge family, *Euphorbiaceae.* Its seed is the castor bean which, despite its name, is not a true bean. Castor is indigenous to the south-eastern Mediterranean Basin, Eastern Africa, and India, but is widespread throughout tropical regions. Castor seed is the source of castor oil, which has a wide variety of uses. The seeds contain between 40% and 60% oil that is rich in triglycerides, mainly ricinolein. The Indian variety of castor seed has an oil content of 48% but only 42% can be extracted. The seed contains ricin, a toxin, which is also present in lower concentrations throughout the plant and therefore castor oil is inedible.

2. PRODUCTS AND ITS APPLICATION:

Castor oil has many industrial applications as it is widely used in manufacturing of soaps, cosmetics, paint, varnishes, adhesives, lubricants etc. Being a mild laxative and smoothing agent, it is widely used in many medicinal preparations. It is used further for manufacturing of castor oil derivatives which again are valuable industrial chemicals having many applications

Proposed Product Mix:

The minimum viable capacity is to crush 55 tons of castor seeds per day. One can go up to 1 ton or 5 tons per day crushing capacity depending on market assurance and investment envisaged. Based on minimum crushing capacity, the followings are output of products:

Capacity Working	Unit	Qnty
Castor seed Crushing Capacity	TPD	55.00
Castor seed Handling Losses	TPD	0.27
Castor seed Available for Processing	TPD	54.73

Capacity Working	Unit	Qnty
Commercial Castor Oil Recovery	TPD	22.98
Castor Oil Losses	TPD	0.11
Castor Oil Actual Recovery	TPD	22.87
BSS Grade Castor Oil Production	TPD	10.00
Commercial Castor Oil Production	TPD	12.87
De-oiled Castor Cake	TPD	31.74
Actual Availability of De-oiled cake	TPD	31.42

3. DESIRED QUALIFICATION FOR PROMOTER:

As being this project is simple crushing technology, an entrepreneur with business sense, market penetrator and risk bearing capacity is preferable as castor seeds is a speculative market whereas selling of castor oil of commercial and BSS grades required hard efforts to penetrate the highly competitive market of this segment.

4. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY:

India accounts for 91-93% of world exports of castor oil. The world export of castor oil in 2016-17 (up to March-2017) was 5.25 lakh tons in which India contribution was 4.85 lakh tons. The expected consumption by end of 2017 is 7.00 Lakh tons whereas export is of 5.25 Lakh tons.

It is well known source of a monounsaturated, ricin oleic and 18-carbon fatty acid. Owing to its unique chemical structure and rich properties, castor oil and its derivatives find uses in many industries such as cosmetics, food, lubricants, paints, agriculture, electronics & telecommunications, pharmaceuticals, perfumeries, plastics and rubber, inks & adhesives and textile chemicals. After plant oils; castor oil is considered to be the most required oil. However, growing concerns pertaining to bio-fuels specially biodiesel and biopolymer across the globe is pushing castor oil to play a much larger role in the world economy

Castor Oil: World Supply & Demand Balance (x1000 tons)					
October to September					
Yrs.:	**2016.17 P**	**2015.16**	**2014.15**	**2013.14**	**2012.13**
Opening Stock	145	125	107	134	119
Production	655	705	675	541	675
Imports	524	567	495	496	518
EU-28	169	180	162	169	157
USA	50	49	61	57	54
China PR	225	247	189	189	229
Thailand	19	27	24	20	18
Exports	525	563	496	495	516
India	485	522	451	454	474
India's % share	92.38%	92.72%	90.93%	91.72%	91.86%
Consumption	690	688	657	667	662
Ending Stock	108	145	121	109	134

5. RAW MATERIAL REQUIREMENTS:

Gujarat is the highest castor seeds growing state in India contributing 90% of total indigenous production. The season for castor seed is considered from December to March and arrival is continuing up to May. The processing is continue up to May or Mid June, i.e., approximately 260 days in a year. Based on capacity of 55 tons per day, the processor needs approximate 14,300 MT of castor seeds per annum which is abundantly available in Gujarat and other states like Rajasthan, Andhra Pradesh, and Telagana.

6. MANUFACTURING PROCESS:

Castor oil seed contains about 30%–50% oil (m/m) depending on variety. Castor oil can be extracted from castor beans by mechanical pressing, solvent extraction, or a combination of pressing and extraction. After harvesting, the seeds are allowed to dry so that the seed hull will split open, releasing the seed inside. The extraction process begins with the removal of the hull from the seeds. This can be accomplished mechanically with the aid of a castor bean de-huller or manually with the hands. When economically feasible, the use of

a machine to aid in the de-hulling process is more preferable. After the hull is removed from the seed, the seeds are then cleaned to remove any foreign materials such as sticks, stems, leaves, sand, or dirt.75 These materials can usually be removed using a series of revolving screens or reels. Magnets used above the conveyer belts can remove iron. The seeds can then be heated to harden the interior of the seeds for extraction. In this process, the seeds are warmed in a steam-jacketed press to remove moisture, and this hardening process will aid in extraction. The cooked seeds are then dried before the extraction process begins. A continuous screw or hydraulic press is used to crush the castor oil seeds to facilitate removal of the oil (Fig. 5). The first part of this extraction phase is called prepressing. Prepressing usually involves using a screw press called an oil expeller. The oil expeller is a high-pressure continuous screw press to extract the oil.

7. MANPOWER REQUIREMENT:

Sr. No	Category	Persons
1	Technical Staff	5
2	Adm. Staff	4
3	Marketing Staff	4
4	Labour	20
	Total	33

8. IMPLEMENTATION SCHEDULE:

Project Stages	MONTHS									
	1	2	3	4	5	6	7	8	9	10
Purchase of Land										
Completion of Building										
Ordering of Machinery										
Delivery of Machinery										
Term/Wkg Loan Sanction										
Installation of Machinery										
Commissioning of Plant										
RM/Inputs Procurement										
Manpower Appointments										
Commercial Production										

9. COST OF PROJECT:

Sr. No.	Heads	Basis		Rs. Lakh
1	Land	1,000.00	1,000.00	10.00
2	Building	500.00	9,000.00	45.00
3	Machinery			95.00
4	P&P Expenses			5.00
	Total:			**155.00**

10. MEANS OF FINANCE:

Sr. No.	Heads	Basis	Rs. Lakh
1	Promoters' Capital	25% of project cost	38.75
2	Term Loan	Max. 65% of Fixed Cap. Invest.	81.25
3	MOFPI Subsidy	Max. Rs. 50 L or 25% of Cost	35.00
	Total		**155.00**

11. WORKING CAPITAL CALCULATION:

Particulars	Total Amount	Stock Period Days	Value of Stock Period	Promoter Margin	Promoter Share	Bank Borrowings
Raw Material	6,292.00	15	314.60	0.60	188.76	125.84
Packing Material	91.00	30	9.10	0.75	6.83	2.28
Work in Process	6,956.75	3	69.57	0.40	27.83	41.74
FP Stock	6,798.92	15	339.95	0.40	135.98	203.97
Bills Receivable	6,798.92	15	339.95	0.40	135.98	203.97
Working Expense	25.00	30	2.50	1.00	2.50	0.00
Total:	**26,962.60**		**1,075.66**		**497.87**	**577.79**

12. LIST OF MACHINERY REQUIRED:

Sr. No	Equipment	Qtty
1	Seed Crushing Expellers Sets	Lot
2	Support, Platfor & Fabrication	Lot
3	Castor Oil Pipelines & Fittings	Lot
4	Boiler, Pipelines, Chimney etc	Lot
5	DG Set of 400 KVA	1
6	Weigh Bridge 60 Tons	1
7	Laboratory Equipments	Lot
8	Fire Fighting Equipments	Lot
9	Workshop Equip./Essential Spares	Lot
10	Furniture/Fixtures/Computers etc.	Lot
11	Erection/Commissioning etc.	Lot

13. PROFITABILITY CALCULATIONS:

Sr. No.	Particulars	Year 1	Year 2	Year 3	Year 4	Year 5
A	**Gross Sales**	4759.244	5439.136	6119.028	6119.028	6119.028
	Less:					
1	Raw Materials, Rs. 1/lit	4404.4	5033.6	5662.8	5662.8	5662.8
2	Packing Material	63.7	72.8	81.9	81.9	81.9
3	Fuel	14.56	16.64	18.72	18.72	18.72
4	Power	80.724	92.256	103.788	103.788	103.788
5	Manpower	26.676	30.096	33.516	33.516	33.516
6	Depreciation	21.525	24.6	27.675	27.675	27.675
7	Sundry Expenses	8.4	9.6	10.8	10.8	10.8
8	Interest on Term Loan	6.825	7.8	8.775	8.775	8.775
9	Interest on WC Loan	62.734	71.696	80.658	80.658	80.658
10	Repairs & Maintenance	7	8	9	9	9
B	**Production Cost**	4696.544	5367.088	6037.632	6037.632	6037.632
C	**Gross Profit (A-B):**	62.7	72.048	81.396	81.396	81.396
	Taxes @ 30%	18.81	21.6144	24.4188	24.4188	24.4188
	Net Profit	43.89	50.4336	56.9772	56.9772	56.9772

14. BREAKEVEN ANALYSIS:

Break Even Point	
Annual Fixed Cost x100/ Annual Fixed Cost + Profit	**62.19**

15. CRITICAL FACTORS FOR THE PROJECT:

- Trade of castor seeds is very speculative. One has to keep constant watch on crop availability, season, variety of growing centre and price trend.
- Need to control losses during processing and refining, otherwise there will not be viability.
- Selection of equipments for crushing and refining to get maximum possible yield.
- Price trend of final products and doing stock or sale accordingly.