

**Profile No.: 52**

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## **DE-HULLED SESAME SEEDS.**

### **1. INTRODUCTION:**

Sesame seeds comprise a crazy taste and a fragile, about imperceptible, chew to many Asian plates. They are as well the major ingredients in sesame seed paste and the magnificent Middle Eastern sweet call halvah. Sesame seeds can be available all through the year. Sesame seeds are an excellent resource of: Best source of copper, Resource of manganese, it is also rich in magnesium, calcium, phosphorus, iron, zinc, molybdenum, as well selenium. India produces a wide range of sesame varieties with different grades each peculiar to the region. Sesame is harvested twice a year and is available around the year.

### **2. PRODUCT & ITS APPLICATION:**

Sesame has been classified in different colors as below: White seed Yellow seed Red seed Brown seed Black seed

Uses of sesame in various forms Seeds: Sesame seeds are used in various food and snack preparations as well as in, salad dressing. Sesame is used mainly as a food ingredient in whole, broken, crushed, shelled, powdered and paste forms. Oil: Sesame seeds contain the highest oil compared to any other oilseed to an extent of 50% and above. The unique qualities of sesame oil are stability and resistance to rancidity, with long shelf life due to the presence of the high level of natural antioxidants. Other than for cooking and salad dressing, the oil is an essential ingredient in manufacture of soaps, pharmaceuticals (as healing oil) and lubricants with additional use in cosmetic and skin care industries. Meal: Sesame seeds are rich in protein with about 25% of their weight. Sesame meal contains 35 - 50% protein and used as feed for poultry and livestock.

Sesame seed cleaning and sorting Sesame seed soaking in water tanks Sesame seed dry roasting Roasted sesame seed Crushing in expellers Filtration of roasted sesame oil Packing of oil in tins/bottles Packing in cartons for export Sesame seed aqua de-hulling

Separation of hulls by centrifuging Drying of de - hulled sesame seed Packing in multi - wall laminated paper bags

### **3. DESIRED QUALIFICATIONS FOR PROMOTER:**

Successful running this project does not require any specific qualification.

### **4. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY:**

Sesame is cultivated over an area of about 74 lakh hectares in the world with an annual production of about 40 lakh tones and yield of 535 kg/hectares. Myanmar and India are the major sesame growing countries, accounting for almost 40% of the global sesame production. India accounts for over one - fourth of land area under sesame cultivation in the world. Among oilseeds, sesame occupies 2nd position after groundnut as far as exports of oilseeds are concerned. More than 40% of the sesame seeds produced in India is exported every year. India is the largest exporter of sesame seeds in the world, contributing nearly 25% to international trade. Vietnam is the primary destination for Indian sesame seed, followed by South Korea, USA, Taiwan and China. For the period Jan'14 – July'16, Mundra accounted for 53.3% of exports followed by Nhava Sheva Sea and Pipavav (Victor) Port which account for 18.7% and 15.9% of exports respectively India is the largest exporter of sesame seeds in the world, contributing nearly 25% to international trade. More than 85% production of Sesame comes from West Bengal, Madhya Pradesh, Rajasthan, Uttar Pradesh, Gujarat and Andhra Pradesh. Gujarat ranks amongst the top sesame producing states in the country (2013/14). 4th in terms of area under production and yield 2nd in terms of production.

### **5. RAW MATERIAL REQUIREMENTS:**

Of the average (2009/10–2013/14) area under production for oilseeds in India (about 270 lakh hectares), Sesame ranks fourth with about 19 lakh hectares, this is about 7% of the total. So availability of sesame is very ease.

## **6. MANUFACTURING PROCESS:**

Sesame seeds have a thin shell or husk which needs to be removed and this process is known as DE hulling. The weight of hull is about 17% of total weight of sesame seed. The hull contains a great deal of oxalic acid and in-digestive fiber. Oxalic acid can reduce biological utilization ratio of Ca in Food and influence taste. After DE hulling, oxalic acid can reduce from 3% to 0.25% in sesame seeds, which improve the protein digestibility greatly. So, DE hulling of sesame seeds is the precondition of enlarging application of sesame in food field. Hulled sesame seeds are softer and tastier than unshelled seeds. Sesame seeds are also an excellent source of unsaturated fatty acids and phytosterols. Wet DE hulling Process is compared with dry DE hulling process. Dry DE hulling process is that dry the sesame seeds after cleaning at a certain level, which can dehydrate the moisture in hull quickly and be brittle. Then use clash DE hulling method, the hulls are peeled from sesame seeds. The dry process is short in technology line, few investments in equipments but low at DE hulling rate, easily get yellow or brown even burnt at high temperature. So, for commodity use, dry method is not commonly used in processing sesame seeds, generally, only for little quantity self-use in some foodstuff factories.

A wet DE hulling process has been developed for easy removal of the husk from the sesame seed. The process of DE hulling consists of preliminary cleaning and grinding, hot lye treatment, removal of the skin and pigments, thorough washing and drying. The de hulled seed is expelled to get high grade oil. The cake is further expelled to recover the residual oil and protein-rich meal. The protein-rich sesame cake flour finds multiple uses in protein fortification of food preparations. The de-hulled sesame seeds and flour offer good potential for both domestic and export markets. A process has also been developed for washing of white sesame seeds to produce confectionery grade product. Brilliant white seeds are produced, which is known as hulled sesame seeds.

Process Flow of Complete Sesame hulling Plant

Soaking: The purpose of soaking is that make hull of sesame seeds sopped up water to expand for peeling off from seeds. The project use lye, soaking raw sesame seeds in a certain temperature, which improve the speed of infiltration ratio of water into hull, shorten the soaking time greatly to 30-40 minutes from original 7-8 hours. The produce

periods is shortened. At the same time, lye weakens pigments in hull for the whiteness of sesame seeds.

DE hulling: The project use vertical huller to make sesame seeds in relative movement. By soft friction between sesame seeds, the hull is removed.

Separating: It is the key process in sesame seeds production, affecting final yield of finished product. Generally, put the mixture of hulls and seeds into water tank, by different buoyancy of hulls and seeds, fish out the hulls by hand. But it is not thorough method by buoyancy. So the project uses separation theory by different geometrical sizes of hulls and seeds. Namely, use best soaking technology to soften hulls, increase crush rate of hulls but do not influence intact rate of seeds when hulling, then use hulls smaller than seeds, taking away the hulls with water flow in subsidence-type automatic separator. The seeds are captured. The separation of hulls and seeds succeeded. The technology save labour and product yield next to theoretical value.

Drying: The process use single chamber fluid bed drier. The sesame seeds float in hot air flow and polish by friction between seeds, which decrease sticky hull rate and improve the smoothness of finished product. It avoids the disadvantage of yellow, unpolished, high sticky hull rate etc. in normal fluid bed drier.

## 7. MANPOWER REQUIREMENT:

The enterprise requires 10 employees as detailed below:

Sr. No.	Designation Of Employees	Salary Per Person	Monthly Salary ₹	Number of Employees				
				Year-1	Year-2	Year-3	Year-4	Year-5
1	Production Manager	18,000	18000	1	1	1	1	1
2	Operators	12,000	36000	3	3	3	3	3
3	Helpers	10,000	80000	8	8	8	8	8
4	Admin Manager	15,000	30000	2	2	2	2	2
5	Accounts/Stores Assistant	12,500	50000	4	4	4	4	4
6	Office Boy	9,000	80000	3	3	3	3	3
	Total		294000	23	23	23	23	23

## 8. IMPLEMENTATION SCHEDULE:

The project can be implemented in 4months' time as detailed below:

Sr. No.	Activity	Time Required (in months)
1	Acquisition of premises	2.00
2	Construction (if applicable)	2.50
3	Procurement & installation of Plant & Machinery	2.50
4	Arrangement of Finance	1.00
5	Recruitment of required manpower	1.00
	Total time required ( <i>some activities shall run concurrently</i> )	4.00

## 9. COST OF PROJECT:

The project would necessitate utilities like water, electric power and fuel for roasting. Estimates for a project with a capacity of 3000 MTPA or 15 MT per day: 35 KL/day water, 1100 KWH /day power, 25 to 15 MTPD coal / FO, respectively as fuel, would be a basic requirement for the proposed project. Land (600 m<sup>2</sup>) Built up area: (150 m<sup>2</sup>) and plant and machineries like, Sesame seed pre - cleaning unit, de stoner, wire mesh basket, mixing tanks, vibratory screen, pulper and mechanical drier are major requirements. The Total Fixed Capital would be Rs. 40, 13,613.

Sr. No.	Particulars	₹ in Lacs
1	Land	5.00
2	Building	15.00
3	Plant & Machinery	23.50
4	Furniture, other Misc. Equipments	5.00
5	Other Assets including Preliminary / Pre-operative expenses	2.35
6	Margin for Working Capital	56.00
	<b>Total</b>	<b>106.85</b>

## 10. MEANS OF FINANCE:

Bank term loans are assumed @ 75 % of fixed assets. The proposed funding pattern is as under:

Sr. No.	Particulars	₹ in Lacs
1	Promoter's contribution	26.71
2	Bank Finance	80.14
	<b>Total</b>	<b>106.85</b>

## 11. WORKING CAPITAL CALCULATION:

The project requires working capital of ₹56.00 lacs as detailed below:

Sr. No.	Particulars	Gross Amt	Margin %	Margin Amt	Bank Finance
1	Inventories	28.00	0.25	7.00	21.00
2	Receivables	14.00	0.25	3.50	10.50
3	Overheads	14.00	100%	14.00	0.00
4	Creditors	-		0.00	0.00
	<b>Total</b>	56.00		24.50	31.50

## 12. LIST OF MACHINERY REQUIRED:

A detail of important machinery is given below:

Sr. No.	Particulars	UOM	Qty	Rate (₹ in Lacs)	Value (₹ in Lacs)
	<b>Plant &amp; Machinery / equipments</b>				
<i>a)</i>	<i>Main Machinery</i>				
1	Sesame seed pre - cleaning unit	Nos	1	5.00	5.00
2	de stoner	Nos	1	3.00	3.00
3	wire mesh basket	Nos	1	2.50	2.50
4	mixing tanks	Nos	1	6.00	6.00
5	vibratory screen	Nos	1	2.00	2.00
6	pulper and mechanical drier	Nos.	1	2.40	2.40
7	Misc. Tools	LS	1	2.60	2.60

Sr. No.	Particulars	UOM	Qty	Rate (₹ in Lacs)	Value (₹ in Lacs)
	<i>sub-total Plant &amp; Machinery</i>				<b>₹ 23.50</b>
	<b>Furniture / Electrical installations</b>				
1	Office furniture and Electrification	LS	1	5.00	5.00
	<i>sub total</i>				<b>₹ 5.00</b>
	<b>Other Assets</b>				
1	preliminary and preoperative	LS			2.35
	<i>sub-total Other Assets</i>				<b>2.35</b>
	<b>Total</b>				<b>30.85</b>

### 13. PROFITABILITY CALCULATIONS:

Sr. No.	Particulars	UOM	Year-1	Year-2	Year-3	Year-4	Year-5
1	Capacity Utilization	%	60%	70%	80%	90%	100%
2	Sales	₹. In Lacs	168.00	196.00	224.00	252.00	280.00
3	Raw Materials & Other direct inputs	₹. In Lacs	126.35	147.41	168.46	189.52	210.58
4	Gross Margin	₹. In Lacs	41.65	48.59	55.54	62.48	69.42
5	Overheads except interest	₹. In Lacs	18.56	19.72	22.04	22.74	23.20
6	Interest @ 10 %	₹. In Lacs	8.01	8.01	5.34	4.01	3.21
7	Depreciation @ 30 %	₹. In Lacs	16.45	11.75	8.23	5.88	5.29
8	<b>Net Profit before tax</b>	₹. In Lacs	<b>-1.37</b>	<b>9.11</b>	<b>19.93</b>	<b>29.86</b>	<b>37.73</b>

### 14. BREAKEVEN ANALYSIS:

The project shall reach cash break-even at 38.04 % of projected capacity as detailed below:

Sr. No.	Particulars	UOM	Value
1	Sales at full capacity	₹. In Lacs	280.00
2	Variable costs	₹. In Lacs	210.58
3	Fixed costs incl. interest	₹. In Lacs	26.41
4	$BEP = FC / (SR - VC) \times 100 =$	% of capacity	38.04%