

1 TEXTURISED VEGETABLE PROTEIN (TVP)

1.1 Introduction

The market size of the popularly known 'miracle bean' in India is over Rs 5,000 crore. Production of soyabean in the country has been growing at the rate of 5.57% (over the last ten years). With an annual production of 5.0-5.4 million tons, soyabean constitutes nearly 25% of the country's total oilseed production. Of the total bean produced, 6-7 lakh tons goes for direct consumption in the form of 'bean' itself (sowing, human consumption, etc.), leaving the rest of the quantity for crushing- for meal and oil. While the country imports soyabean oil, it is a leading exporter of meal in the Asian region.

Soya extraction industry in India is concentrated mainly in the State of Madhya Pradesh. It has been reported that more than 90 per cent of soya cake/meal comes from this State. Seoni, Malwa, Sehore, Churhat and Ujjain are the main centres of production. Rajasthan, Gujarat and Maharashtra are the other important states where the industry is located.

Ever since its inception in 1979, the M.P. State Cooperative Oilseed Growers Federation, popularly known as OILFED, has been playing a pivotal role in restructuring production of oilseeds including soyabean and soya-based preparation viz. meals. As a result of these efforts, the cost of processing soyabean per metric tonne, has come down substantially in the country.

To increase productivity, the Government of India launched a centrally sponsored scheme through its Oilseeds Production Programme from 1990-91.

Nuggets and granules technically termed Texturised Vegetable Protein (TVP), are economical and convenient for consumption of all consumers. TVP is made from very good quality defatted soya flour using a highly versatile extrusion technology. These products have more than 50% protein, which make it one of the richest source of protein. Its nutritional composition is similar to that of defatted soya flour. It is ideal as a protein source in a vegetarian diet. These products have hydration properties which are ideal for a wide range of food applications. TVP can be used to replace vegetables and meat in a variety of recipes. The product is bland and blends itself with the other ingredient in which it is added. In addition to that health benefit nuggets and granules have low in fat and a good source of iron and vitamin B. as they are pre cooked, so they are easily digestible and require very less time to cook. The extrusion cooking process destroys the anti nutritional factors associated with soy completely. Since the extrusion process is as high temperature short time process the nutritional loss is minimal. Nuggets and granules have very low in moisture so can be kept for long time.

1.2 Objective

The primary objective of the model report is to facilitate the entrepreneurs in understanding the importance of setting up unit of texturised vegetable protein. This model report will serve as guidance to the entrepreneurs on starting up such a new project and basic technical knowledge for setting up such a facility.

1.3 Raw Material Availability

The most critical material will be good quality deoiled soya flour. Rice and baking powder shall be required in small quantity.

1.4 Market Opportunities

Soya products have become very popular not only amongst the health conscious people but also with others as they are easy to digest and rich in proteins. Products like edible oil, paneer, flour, milk, nuggets or chunks etc. made from soyabeans are gaining popularity. Texturised soya products like nuggets or chunks are used in large quantities alongwith other vegetables while making curries. Thus restaurants, caterers, clubs and canteens and ready-to-eat vegetable manufacturers are the bulk consumers. There are good export possibilities as well but that market can be explored once the quality of the product is well established.

1.5 Project description

1.5.1 Applications

Texturised soya products have become popular. They are used alongwith other vegetables for making curries etc. They are low cost but protein rich substitutes of cheese, paneer, meat and fish.

1.5.2 Availability of know how and compliances

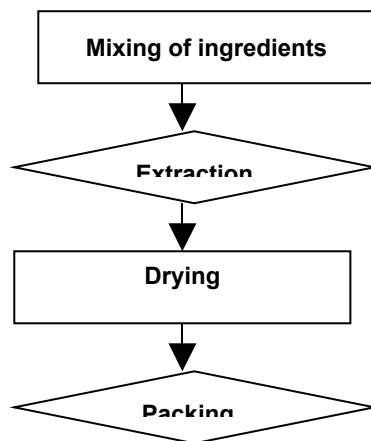
Provisions of the PFA Act must be strictly adhered to.

1.5.3 Capacity of the Project

498 MT per anum.

1.5.4 Manufacturing process

It is imperative to have good quality solvent extracted flour for processing with the Nitrogen solubility index in the range of 45% to 50%. Other parameters are 7.5 to 8.5% moisture, 53 to 54% proteins, less than 10% fat, 2 to 3% fiber and yellow to light brown colour. Extracted flour with these characteristics is suitable for extrusion. Extrusion technology is based on high temperature short time processing. Rice and baking powder in a small quantity are mixed with the deoiled soya flour or cake. The chunks are dried after extrusion. The chunks can also be converted into flakes or granules. The typical process flow chart is as under.



1.6 Project component and cost

Major components of the projects and their costs are described in the table hereunder:

1.7 Land and Building

Particulars	Unit	Qty	Cost/unit	Total
LAND & BUILDING				10.50
Land	SqM	300	250.00	0.75
Land Development				
Land Area		300	500.00	1.50
Building				
Production Block				
Main Production Area	SqM	150	5,000.00	7.50
Contingencies		10%		0.75
PLANT & MACHINERY				16.26
Mixing cum grinding machine		1	150,000.00	1.50
soya nuggets extrusion palnt		1	1,200,000.00	12.00
viberating seive		1	40,000.00	0.40
Weighing Scale		1	15,000.00	0.15
Bag Sewing machine		1	10,000.00	0.10
Contingencies		15%		2.11
MISCELLANEOUS FIXED ASSETS				1.38
Misc. Assets	LS	1	120,000	1.20
Contingencies		15%		0.18
PRE-OPERATIVE EXPENSES				11.29
Establishment		1	869,000	8.69
Professional Charges		1	100,000	1.00
Security Deposits		1	160,000	1.60
TOTAL				39.43

1.8 Plant and Machinery

The total cost of the plant and machinery is Rs. 16.26 Lakhs.

1.9 Building

The main production block will cost around Rs. 8.25 lakhs.

1.10 Miscellaneous Assets

A provision of Rs. 1.38 would take care of all the requirements.

1.11 Preliminary & Pre-operative Expenses

A provision of Rs. 11.29 lakhs would take care of pre-production expenses like establishment, professional charges, security deposits etc.

1.12 Working Capital Requirement

ITEMS	Year 1	Year 3	Year 5
STOCK OF RAW MATERIAL & PACKING MATERIAL	9.37	12.05	12.05
SUNDRY DEBTORS	28.64	36.82	36.82
TOTAL	38.01	48.87	48.87
MARGIN	9.50	12.22	12.22
MPBF	28.51	36.65	36.65
INTEREST ON WC	3.14	4.03	4.03

1.13 Means of Finance

EQUITY CAPITAL			35.00%	17.13
MOFPI SUBSIDY	25%	50.00	25.00%	12.23
TERM LOAN				
FINANANCIAL INSTITUTIONS		10.00%	40.00%	19.57
-Payable half yearly Installments	10	2.00		
TOTAL			100%	48.93

1.14 Cash flow statement

PARTICULARS	Year 1	Year 3	Year 5	Year 7
SOURCES OF FUNDS				
EQUITY CAPITAL	-	-	-	-
SUBSIDY				
NET PROFIT	3.59	10.27	8.68	7.04
(INTEREST ADDED BACK)				
DEPRECIATION	2.09	2.09	2.09	2.09
PRELIMINARY EXP.W/O	1.61	1.61	1.61	1.61
INCREASE IN TERM LOAN	-	-	-	-
INCREASE IN BANK BORROWINGS-WC	28.51	2.04	-	-
TOTAL	35.81	16.01	12.39	10.74

1.15 Projected balance sheet

PARTICULARS	Year 1	Year 3	Year 5	Year 7
LIABILITIES				
EQUITY CAPITAL	17.13	17.13	17.13	17.13
RESERVES & SURPLUS	10.73	18.90	27.85	34.83
TERM LOAN	17.57	9.57	1.57	(0.00)
BANK BORROWINGS-WC	28.51	36.65	36.65	36.65
TOTAL	73.94	82.26	83.20	88.61

1.16 Projected profit and loss account

Particulars	Year 1	Year 3	Year 5	Year 7
INCOME	105.00	135.00	135.00	135.00
EXPENDITURE	97.70	121.02	122.61	124.26
VARIABLE	64.69	81.67	81.26	80.85
FIXED	33.01	39.35	41.36	43.41
GROSS PROFIT	7.30	13.98	12.39	10.74
PROFIT BEFORE TAX	(1.50)	4.98	4.19	3.01
RETAINED PROFIT	(1.50)	4.98	4.19	3.01

1.17 Key Indicators

NET PRESENT VALUE at current Inflation (Rs. in lakhs)	53.38
INTERNAL RATE OF RETURN %	26.78
AVERAGE DSCR	1.54
BREAK EVEN POINT %	94.44
PAY BACK PERIOD (YEARS)	5.24

1.18 Manpower Requirement

PARTICULARS	NOs.
SUPERVISORY STAFF	
Production Supervisors	2
WORKERS	
Machine Operator	3
Skilled Workers	4
Helpers	6
Salesman	2
Total	17

1.19 Assumptions

Contingencies on Building			10%
Contingencies on Equipment			15%
Term Loan			40%
Rate of Interest on Term Loan			10%
Subsidy Considered	Subject to ceiling		25%
Expected time of Installation		Months	10
Moratorium		Months	6
CAPACITY			
Rated Capacity Per Annum	80% of Installed capacity	TPA	600
Number of Operational Days	DAYS		300
Working Hours Per day	Hrs		20
CAPACITY UTILIZATION			
Year I			70%
Year II			85%
Year III			90%
SALES PRICE			
W S Price			25,000
OTHER EXPENSE			
Commission			10.00%
Marketing Expenses			2.5%
POWER			
Connected Load	HP		40
DEPRICIATION AS PER COMPANY'S ACT			
BUILDING			3.34%
PLANT & MACHINERY			10.34%
MISC. FIXED ASSETS			7.07%
LAND & SITE DEVELOPMENT			1.63%
MAINTENANCE			
BUILDING			1.00%
PLANT & MACHINERY			3.00%
MISC. FIXED ASSETS			2.00%
LAND & SITE DEVELOPMENT			1.00%

1.19.1 Sources of technology

- Brimco Engg. Works, M-24/1, Street No 9, Anand Parbat Inds Area, New Delhi 110005. Tel. No. : 25726347- 25761786, Fax: 22145040
- Flavourite Foods & Services Pvt Ltd, 208 Manas Bhavan, 11 RNT Marg, Indore 452008, Tel. No. : 2527644, 5046509, Fax: 5040953
- Osaw Agro Inds Pvt Ltd, PO Bag No 5, Osaw Complex, Jagadhri Road, Ambala Cant 133 001, Tel. No. : 2699167-354-547, Fax: 2699018

The actual cost of projects may deviate on change of any of the assumptions.