VACUUM DRIED FRUITS, VEGETABLES AND HERBS

1. INTRODUCTION:

India is the 2nd largest producer of vegetables in the world. Processing of fruits and vegetables in India becomes very important as major chunk of them gets exported to various countries. Drying of food is the one oldest technology to preserve them for longer period. Among various known methods, vacuum drying is one such method which is very important because of numerous benefits.

2. PRODUCT & ITS APPLICATION:

To preserve fruits and vegetables for longer duration, vacuum drying is necessary process. Vacuum dried fruits and vegetables have not only retained minerals and vitamins intact but also improve the quality of fruits and vegetables. As vacuum reduces thermal stress and sustains better color and texture of dried products. Vacuum dried fruits, vegetables and herbs have wide range of applications. They are used in tea, biscuits, sauces, dried mixes (seasoning mixes and marinades).

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Successful running this project does not require any specific qualification.

4. INDUSTRY LOOKOUT AND TRENDS

Diverse types of vegetable snacks made using different drying methods are becoming increasingly commercially important for the food processing industry worldwide because they are also recognized as healthy for human consumption. Here we consider four aspects of drying snacks: unit operations currently used in the industry, novel or emerging methods with nontraditional means, combined (or hybrid) drying methods and the quality changes during storage. Each drying method has its own advantages and limitations. Hybrid drying techniques are being developed to maximize the benefits of different drying techniques to produce better quality vegetable snacks that are attractive to the consumer. The merits and limitations of more than 10 drying techniques used for making dried vegetable snacks are discussed. Moreover, several new vegetables snacks dried using new drying methods are presented and discussed. A comprehensive review of the recent progress in production of dried vegetable snacks is presented and recommendations are made for future research.

5. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY:

In Dried and Preserved vegetable market high return is usually in the export market, especially Europe. The export customers are mostly ready-to-eat food manufacturers and hotel chains in those countries. The dried and preserved vegetables market of India is expected to grow at a CAGR of 16% by the year 2020. India is also a prominent exporter of dried and preserved vegetables to the world. The country has exported 87,279.99 MT of dried and preserved vegetables to the world for the worth of Rs. 1,088.55 crores/ 162.88 USD Millions during the year 2016-17. The market for dried vegetables and fruits are growing every year, as these products are heavily used in foreign countries by food processors and restaurants. Even domestic market is also becoming attractive as these enhance preservation efficiency of food.

6. RAW MATERIAL REQUIREMENTS:

Raw materials required here are various vegetables and fruits such as, orange, apricot, peach, plum, date, cherry, garlic, onion, cucumber, mushroom, sweet corn, green and lime beans and other fruits.

7. MANUFACTURING PROCESS:

Products like fruits and vegetables have moisture content typically in the range of 70-90%. Therefore the dielectric losses are mainly determined by water and dielectric heating begins with selective heating of water, as the moisture content drops to less than 5-10%, dielectric heating will then pick up the product temperature. In the first drying phase until 5-10% the product can stand high energy densities and the temperature of the product is close to the evaporation temperature depending on the vacuum (typical 30 mbar and 30 °C). The second drying phase is critical and energy densities have to be reduced significantly as the product itself is absorbing energy and the temperature may rise over the evaporation temperature in vacuum. In order to keep the product properties like flavor, texture and ingredients etc. temperatures above 50 °C have to be avoided.

8. MANPOWER REQUIREMENT:

The enterprise requires 6employees as detailed below**:**

Sr. No.	**Designation of Employees**	**Salary Per Person**	**Monthly Salary ₹**	**Number of employees required**				
				Year-1	**Year-2**	**Year-3**	**Year-4**	**Year-5**
	Variable Labour: Workers							
1	Operator	₹ 10,000.00	₹ 10,000.00	1	1	1	1	1
2	Un Skilled Workers	₹ 8,000.00	₹ 16,000.00	2	2	3	3	3
	sub-total		₹ 26,000.00	3	3	4	4	4
	Fixed Staff:							
1	Accountant	₹ 12,000.00	₹ 12,000.00	1	1	1	1	1
2	Store Keeper	₹ 8,000.00	₹ 8,000.00	1	1	1	1	1
3	Sales Supervisor	₹ 12,000.00	₹ 12,000.00	1	1	1	1	1
	sub-total		₹ 32,000.00	3	3	3	3	3
	Total		₹ 58,000.00	6	6	7	7	7

9. IMPLEMENTATION SCHEDULE:

The project can be implemented in 7months' time as detailed below:

Sr. No.	Activity	Time Required *(in months)*
1	Acquisition of premises	1.00
2	Construction (if applicable)	2.00
3	Procurement & installation of Plant & Machinery	2.00
4	Arrangement of Finance	1.00
5	Recruitment of required manpower	1.00
	Total time required *(some activities shall run concurrently)*	7.00

10. COST OF PROJECT:

The project shall cost ₹ 29.08 lacs as detailed below:

Sr. No.	Particulars	₹ in Lacs
1	Land	4.50
2	Building	2.50
3	Plant & Machinery	8.70
4	Furniture, other Misc. Equipments	0.70
5	Other Assets including Preliminary / Pre-operative expenses	0.87
6	Margin for Working Capital	11.81
	Total	**29.08**

11. MEANS OF FINANCE:

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

Sr. No.	Particulars	₹ in Lacs
1	Promoter's contribution	7.27
2	Bank Finance	21.81
	Total	**29.08**

12. WORKING CAPITAL CALCULATION:

The project requires working capital of ₹11.81lacs as detailed below:

Sr. No.	Particulars	Gross Amt	Margin %	Margin Amt	Bank Finance
1	Inventories	5.91	0.25	1.48	4.43
2	Receivables	2.95	0.25	0.74	2.21
3	Overheads	2.95	100%	2.95	0.00
4	Creditors	-		0.00	0.00
	Total	11.81		5.17	6.64

13. LIST OF MACHINERY REQUIRED:

A detail of important machinery is given below:

Sr. No.	Particulars	UOM	Qtty	Rate (₹ in Lacs)	Value (₹ in Lacs)
	Plant & Machinery / equipments				
a)	***Main Machinery***				
1	Vacuum Drying Machine	Nos	1	₹ 6.50	₹ 6.50
2	Packing Machine	Nos	1	₹ 1.00	₹ 1.00
3	Freezer	Nos	1	₹ 1.00	₹ 1.00
4	Weighing Scale	Nos	1	₹ 0.20	₹ 0.20
	Furniture / Electrical installations				
1	Office furniture and Lab Setup	LS		₹ 0.70	₹ 0.70
	Other Assets				
1	preliminary and preoperative	LS		0.87	₹ 0.87
	Total				**₹ 10.27**

All the machines and equipments are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. It may be worthwhile to look at reconditioned imported machines, dies and tooling. Some of the machinery and dies and tooling suppliers are listed here below:

1. Fry-Tech Food Equipments Private Limited
   S. No. 4, Raviraj Industrial Estate,
   Bhikhubhai Mukhi Ka Kuwa Bharwadvash,
   Ramol, Ahmedabad - 380024,
   Gujarat, India

2. Hindustan Vibrotech Pvt. Ltd.
Office No. 2, Ground Floor,
   Vrindavan Building, Vile Parle East,
Mumbai – 400057,
   Maharashtra, India

3. Electrons cooling systems Pvt. Ltd.
   S-27, SIDCO Industrial Estate
   Kakkalur Industrial Estate
   Tiruvallur – 602003,
   Tamil Nadu, India

4. Springboard Enterprises India Ltd.
1st, 2nd & 3rd Floor,
   Plot No. 7, 8 & 9,
   Garg Shopping Mall,
   Service Centre, Rohini Sector 2
   New Delhi – 110085,
   Delhi, India

5. Flour Tech Engineers Private Limited
Plot No. 182, Sector 24,
Faridabad - 121005,
Haryana, India

6. P Square Technologies
3, Swami Mahal,
Gurunanak Nagar,
Off. Shankarsheth Road Bhavani Peth,
Pune - 411002,
Maharashtra, India

7. Ricon Engineers
10 To 13, Bhagwati Estate,
Near Amraiwadi Torrent Power,
Behind Uttam Dairy,
Rakhial, Ahmedabad - 380023,
Gujarat, India

8. Kamdhenu Agro Machinery
Plot No. 6, Near Power House,
Wathoda Road Wathoda,
Nagpur - 440035,
Maharashtra, India

14. 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	50.40	58.80	67.20	75.60	84.00
3	Raw Materials & Other direct inputs	₹. In Lacs	32.44	37.85	43.26	48.66	54.07

4	Gross Margin	₹. In Lacs	17.96	20.95	23.94	26.94	29.93
5	Overheads except interest	₹. In Lacs	9.21	9.78	10.93	11.28	11.51
6	Interest @ 10 %	₹. In Lacs	2.18	2.18	1.45	1.09	0.87
7	Depreciation @ 30 %	₹. In Lacs	6.09	4.35	3.05	2.18	1.96
8	**Net Profit before tax**	₹. In Lacs	**0.48**	**4.64**	**8.51**	**12.39**	**15.59**

The basis of profitability calculation:
This unit will have processing capacity of 150 Kg/day and Conversion Quantity 24 MT/ annum with sales at average Rs 350 per Kg. The growth of selling capacity will be increased 10% per year. (This is assumed by various analysis and study; it can be increased according to the selling strategy.)

Energy Costs are considered at Rs 7 per Kwh and fuel cost is considered at Rs. 65 per liter. The depreciation of plant is taken at 10-12 % and Interest costs are taken at 14 -15 % depending on type of industry.

15. BREAKEVEN ANALYSIS:

The project shall reach cash break-even at 41.37% of projected capacity as detailed below:

Sr. No.	Particulars	UOM	Value
1	Sales at full capacity	₹. In Lacs	84.00
2	Variable costs	₹. In Lacs	54.07
3	Fixed costs incl. interest	₹. In Lacs	12.38
4	BEP = FC/(SR-VC) x 100 =	% of capacity	41.37%

16. STATUTORY / GOVERNMENT APPROVALS

The Ministry of Food Processing Industries has been operating several plan schemes for the development of processed food sector in the country during the 10th Plan. One of the

schemes relates to the Technology Up-gradation/ Establishment/ Modernization of food processing industries.

The Indian food processing industry is regulated by several laws which govern the aspects of sanitation, licensing and other necessary permits that are required to start up and run a food business. The legislation that dealt with food safety in India was the Prevention of Food Adulteration Act, 1954 (hereinafter referred to as "**PFA**"). The PFA had been in place for over five decades and there was a need for change due to varied reasons which include the changing requirements of our food industry. The act brought into force in place of the PFA is the Food Safety and Standards Act, 2006 (hereinafter referred to as "**FSSA**") that overrides all other food related laws.

FSSA initiates harmonization of India's food regulations as per international standards. It establishes a new national regulatory body, the Food Safety and Standards Authority of India (hereinafter referred to as "**FSSAI**"), to develop science based standards for food and to regulate and monitor the manufacture, processing, storage, distribution, sale and import of food so as to ensure the availability of safe and wholesome food for human consumption. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

All food imports will therefore be subject to the provisions of the FSSA and rules and regulations which as notified by the Government on 5th of August 2011 will be applicable.

Key Regulations of FSSA

A. Packaging and Labeling
B. Signage and Customer Notices
C. Licensing Registration and Health and Sanitary Permits

17. BACKWARD AND FORWARD INTEGRATIONS

The objective of the scheme is to provide effective and seamless backward and forward integration for processed food industry by plugging the gaps in supply chain in terms of availability of raw material and linkages with the market. Under the scheme, financial assistance is provided for setting up of primary processing centres/ collection centres at farm

gate and modern retail outlets at the front end along with connectivity through insulated/ refrigerated transport.

The Scheme is applicable to perishable horticulture and non-horticulture produce such as, fruits, vegetables, dairy products, meat, poultry, fish, Ready to Cook Food Products, Honey, Coconut, Spices, Mushroom, Retails Shops for Perishable Food Products etc. The Scheme would enable linking of farmers to processors and the market for ensuring remunerative prices for agri produce.

The scheme is implemented by agencies/ organizations such as Govt. / PSUs/ Joint Ventures/ NGOs/ Cooperatives/ SHGs / FPOs / Private Sector / individuals etc.

Backward Linkage:

- Integrated Pack-house(s) (with mechanized sorting & grading line/ packing line/ waxing line/ staging cold rooms/cold storage, etc.)
- Pre Cooling Unit(s)/ Chillers
- Reefer boats
- Machinery & equipment for minimal processing and/or value addition such as cutting, dicing, slicing, pickling, drying, pulping, canning, waxing, etc.
- Machinery & equipment for packing/ packaging.

Forward Linkage:

- Retail chain of outlets including facilities such as frozen storage/ deep freezers/ refrigerated display cabinets/cold room/ chillers/ packing/ packaging, etc.
- Distribution centre associated with the retail chain of outlets with facilities like cold room/ cold storage/ ripening chamber.

18. TRAINING CENTERS AND COURSES

There are few specialized Institutes provide degree certification in Food Technology, few most famous and authenticate Institutions are as follows:

1. Indian Institute of Food Science & Technology,
   Plot No.1, Near Maa-Baap ki Dargah,Opp to Nath Seeds,
   Paithan Road Aurangabad
   Aurangabad - 431005
   Maharashtra, India

2. MIT College of Food Technology, Pune
   Gate.No.140, Raj Baugh Educational Complex,
   Pune Solapur Highway,
   Loni Kalbhor, Pune – 412201
   Maharashtra, India

3. CSIR - Central Food Technological Research Institute (CFTRI)
   Cheluvamba Mansion, Opp. Railway Museum,
   Devaraja Mohalla, CFTRI Campus, Kajjihundi, Mysuru
   Karnataka – 570020

Udyamimitra portal (link : www.udyamimitra.in) can also be accessed for handholding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates all over India.

Disclaimer:

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein.

Further the same have been given by way of information only and do not carry any recommendation.