

# **HOT AIR DRIED VEGETABLES: ONION, GARLIC, ETC.**

## **1. INTRODUCTION:**

Onion and Garlic are one of the most important commercial vegetable crops grown in India. Both immature and mature bulbs are used as vegetable and condiment. It contains vitamin B and a trace of vitamin C and also traces of iron and calcium. The outstanding characteristic of onion is its pungency, which is due to a volatile oil known as allyl-propyl disulphide. Onions and Garlics compared with other fresh vegetable are relatively high in food energy, intermediate in protein content and rich in calcium and riboflavin. Onion and Garlic's are dried / dehydrated to largely increase its shelf life. Dehydrated onion is used mainly for making soup in Europe and USA.

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

The application and use of dehydrated Onions and Garlic are as condiment for cooking, for vegetable and instant food, other application where true tomato color and flavor are required. The main advantages of dehydrated onions are that they are easy to store, being lighter in weight and smaller in bulk than fresh or other processed onions, they are cheap to pack compared with canned goods, they do not require refrigerated storage as do frozen onions and the contents of a container can be used some time after opening provided they are not rehydrated. The newest dehydration process appears to be a variation on the air-drying process and is based on the principle of vapour pressure differentials, using air circulated around the onions at relatively low temperatures to 'sweat' the water from the food. It is reported that this method of dehydration prevents a crust forming on the outside of the pieces of food and that the low temperatures have less effect on flavor, texture, color and vitamin contents of onion than do the higher temperatures used in conventional hot air-drying methods.

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

Successful running this project does not require any specific qualification.

### **4. INDUSTRY LOOKOUT AND TRENDS**

The growing demand for food products, with longer shelf-life, and seasonal products, across the year is supporting the growth of the dehydrated food market during the forecast period. Moreover, the gradual increase in the demand for food manufacturers to preserve food products is fuelling the demand for dehydrated foods, as well, during the forecast period. Contamination of ingredients & raw material and harmful effects of preservatives are the major threats to the market. Consumers are opting gluten-free diets, owing to several health concerns, further prompting them to adopt other healthier options like regular dried food products, etc.; thus, pushing several other manufacturers to add gluten-free dried food offerings to their products portfolio.

The dehydrated food market can be segmented based on technology, which includes drum-dried, spray-dried, freeze-dried, *vacuum-dried*, and others. Traditionally, the sun-dried process of dehydration was in use by food manufacturers, followed by hot-air-dried process. With the increase in new technologies, spray-dried process accounts for the largest share in terms of revenue, followed by freeze-dried segment, during the forecast period. Furthermore, dehydrated food market can also be segmented based on the type, including dehydrated dairy products, dehydrated fruits, dehydrated meat products, *dehydrated vegetables* and others. Amongst all, meat products are expected to account for the largest market share, followed by dairy products.

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

Dehydrated Onions have been produced in small quantities since the nineteenth century. Onion is an important vegetable crop grown in India and forms a part of daily diet in almost all households throughout the year. India is the second largest producer of onion in the

world. Onion is one of the most important but perishable groups known. It is also used for medical purpose. But due to non-availability of appropriate post-harvest storage facilities, 20-25% of the total produced onions are wasted, which in terms of value amounts to crores of rupees. Unprocessed foods are susceptible to spoilage by biochemical processes, microbial attack and infestation. The right post harvest practices such as good processing techniques, and proper packaging, transportation and storage (of even processed foods) can play a significant role in reducing spoilage and extending shelf life. Among various methods of preservation, dehydration of vegetables is one of the most popular and oldest methods. Dehydration increases the storage period of vegetables and make them available throughout the year and even in off-season, thus supplying the important nutrients in a concentrated form. Dehydrated foods are more concentrated source of minerals than any other preserved form of foodstuff. Almost all dehydrated onion products like-kibbled, sliced, rings (half & full), large kibbled, minced (in various cut sizes), chopped, granulates and powder forms are not new to households & restaurants. It has good potential in food processing industries, defence, pharmaceutical industries, hotels and restaurants, caterers, etc. In the food processing field, dehydration is sometimes described as the removal of 85% or more of water from a food substance, by exposure to thermal energy by various means. The main advantages of dehydrated onions are that they are easy to store, being lighter in weight and smaller in bulk than fresh or other processed onions. They are cheap to pack compared with canned goods. They do not require refrigerated storage as do frozen onions and the contents of a container can be used some time after opening provided they are not dehydrated. Dried onion is now available in market in the powdered or kibbled form. The composition of the fresh and dried forms is given. The kibbled form has moisture content of about 10% microscopically onion powders shows abundant parent chymatous cells. In India dehydration of many food products especially vegetables and some fruits are in practices at home and industry level throughout year. As a whole the products have fair market demand. There is a good scope and good market potential in such products and new entrepreneurs should venture in such projects.

## 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 6 employees as detailed below:

Sr. No.	Designation	SALARY	Monthly	Number of employees				
	<b>Variable Labour:</b>							
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
	<i>sub-total</i>		₹ 26,000.00	3	3	4	4	4
	<b>Fixed Staff:</b>							
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
	<i>sub-total</i>		₹ 32,000.00	3	3	3	3	3
	<b>Total</b>		₹ 58,000.00	6	6	7	7	7

## 9. IMPLEMENTATION SCHEDULE:

The project can be implemented in 7 months' 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 <i>(some activities shall run concurrently)</i>	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
	<b>Total</b>	<b>29.08</b>

## 11. MEANS OF FINANCE:

Bank term loans are assumed @ 75 % of fixed assets.

Sr. No.	Particulars	₹ in Lacs
1	Promoter's contribution	7.27
2	Bank Finance	21.81
	<b>Total</b>	<b>29.08</b>

## 12. WORKING CAPITAL CALCULATION:

The project requires working capital of ₹11.81 lacs 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
	<b>Total</b>	11.81		5.17	6.64

## 13. LIST OF MACHINERY REQUIRED:

A detail of important machinery is given below:

Sr. No.	Particulars	UOM	Qty	Rate	Value
	<b>Plant &amp; Machinery</b>				
<b>a)</b>	<b>Main Machinery</b>				
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
	<i>sub-total Plant &amp; Machinery</i>				<b>₹ 8.70</b>
	<b>Furniture / Electrical</b>				
1	Office furniture and Lab	LS		₹ 0.70	₹ 0.70
	<i>sub total</i>				<b>₹ 0.70</b>
	<b>Other Assets</b>				
1	preliminary and preoperative	LS		0.87	₹ 0.87
	<i>sub-total Other Assets</i>				<b>₹ 0.87</b>
	<b>Total</b>				<b>₹ 10.27</b>

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	<b>Net Profit before tax</b>	₹. In Lacs	<b>0.48</b>	<b>4.64</b>	<b>8.51</b>	<b>12.39</b>	<b>15.59</b>



The basis of profitability calculation:

This unit will have capacity of 180 MT/Annum 90 MT/Annum Dehydrated Onion (Chopped and Sliced) 90 MT/Annum (Dehydrated Onion Powder). 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 litre. 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:

<b>Sr. No.</b>	<b>Particulars</b>	<b>UOM</b>	<b>Value</b>
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	$BEP = FC/(SR-VC) \times 100 =$	% 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 Labelling

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 specialised 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

Udyamimitraportal ( link : [www.udyamimitra.in](http://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.