

## DEHYDRATED ONION AND GARLIC



**Production capacity/annum**

300 M.T.

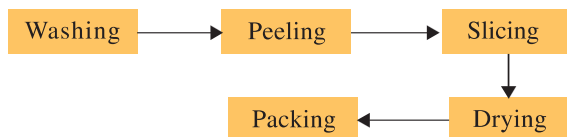
### **Production process**

Onions are washed thoroughly in agitated water to remove dirt, dust etc. Washed onions are hand-peeled by particular knives. Peeled onions are cut into suitable thickness of slices. Then slices are subjected to drying in shielded driers. After reduction of moisture of 10%, onion slices are further dried into bin driers under very low pressure/temperature. Properly dried onion flakes now brought to colour and wholesness and packed.

Kibbled onions are prepared from dehydrated onions flakes by kibbling them into kibbling machine. Onion powder is prepared from dehydrated onion flakes made from small onions. Dehydrated Garlic- Big Garlic bulbs are first subjected to cracking in garlic huller, immediately followed by clove grading operation. Graded cloves are subjected to flaking or chopping as desired, under continuous stream of water. Washed, flaked garlic cloves are spread over drier and subjected to drying into shielded drier. Further drying is carried out in Bindriers. Dried cloves/flakes are now sorted to remove dark coloured burnt and damaged flakes. Then they are taken for packing.

Garlic grits are prepared from broken pieces of garlic cloves. Black garlic flakes are sorted out from dried garlic flakes.

### **Process flow chart**



### **Garlic Flakes**



### Machinery & equipment required

• Onion bulb grader	1
• Abrasive peeler	1
• Onion washing machine	1
• Onion Rotary slicer	1
• Shield driers	4
• Bin driers	14
• Kibbling machine	1
• Garlic bulb cracker	1
• Garlic bulb/clove grader	1
• Garlic Flaker	1
• Garlic Chopper	1
• Garlic skin removing machine	2

### Raw material/consumables required

- Fresh Onions, Fresh Garlic and chemicals

### Utilities required

Power required (load)	:	20 KW
Water required (per shift basis)	:	9000 litres

### Manpower required

Supervisor:	:	1 No.
Skilled:	:	2 Nos.
Unskilled:	:	10 Nos.

### Area required

Total Area	:	1000 Sq. Mtr.
Covered Area	:	500 Sq. Mtr.

### Investment required

Machinery & Equipment	}	₹ 35.1 Lakhs
Working Capital for 3 Months		
(Raw material, utilities & salary)		

## DEHYDRATED VEGETABLES

PRODUCT CODE	: 202101010
QUALITY AND STANDARDS	: The F.P.O. and P.F.A. certification are mandatory. Dehydrated vegetables should conform to the specifications laid down in F.P.O. Relevant ISI specifications are as follows: IS 4626:1978 Dehydrated Potato IS 4652:1967 Dehydrated Onion IS 5452:1969 Dehydrated Garlic IS 4627:1968 Dehydrated Cabbage IS 4625:1968 Dehydrated Carrot IS 4628:1978 Dehydrated Okra IS 4626:1968 Dehydrated Peas
PRODUCTION CAPACITY	: Per Year Quantity : 90 M.T. Dehydrated Vegetables Value : Rs. 135 Lakhs
MONTH AND YEAR OF PREPARATION	: January, 2003
PREPARED BY	: Small Industries Service Institute 36 B/C, Gandhi Nagar, Jammu and Kashmir

### INTRODUCTION

The principle of preservation by dehydration process is to remove the moisture content of a material to a level where micro-organism may not be able to grow and spoil it. Dehydration of vegetables by sun-drying is the oldest known method. Now modern techniques have been developed for dehydration of vegetables. In this process, the dehydrated product has better flavour, colour, aroma, rehydration, acceptability, etc. in comparison to sun-dried dehydrated products.

There are some dehydrated vegetables as cabbage, carrot, green chilli, bitter gourd, cucumber, etc. The

dehydrated vegetables are used to manufacture instant vegetable noodles, soups, snacks and fast food. Dehydrated onion is used as condiment and flavouring agent in manufacturing of tomato ketchups, sauces, salad, pickles, chutneys, meat sausages, masala bread and buns, breakfast foods, etc. Dehydrated garlic is used for aids in digestion and for absorption of food having athelemetic and antiseptic properties and in some medicinal formulations. The latest technique for dehydration of vegetables known as osmotic dehydration, has been developed by Bhabha Atomic Research Centre, Mumbai.

## MARKET POTENTIAL

Dehydrated cabbage, carrot, okra, etc. are widely consumed by food processing industry in the manufacture of instant vegetable noodles, soups, mixes, snacks and salads. Dehydrated potato products are good snack items. Dehydrated ginger, garlic, etc. have the medicinal values and are largely consumed in Ayurvedic medicines.

The market is limited to Indian houses due to social environment and availability of fresh vegetable throughout the year but it has good potential in food processing industries, defence, pharmaceutical industries, hotels and restaurants, caterers, etc.

Besides, it has good export potential especially as one of the processed products.

## BASIS AND PRESUMPTIONS

- i) This project is based on single shift basis and 300 working days in a year.
- ii) The average yield of dehydrated vegetables has been taken 12% based on fresh vegetables.
- iii) Fruits such as apples, figs, apricots, etc. can be dehydrated with the same machinery and equipments, when vegetables are not available.
- iv) The cost of machinery and equipments/materials indicated refer to a particular make and the

prices are approximate and those ruling at the time of the preparation of scheme.

- v) Non refundable deposits-project preparation cost, trial production, fees, etc., are considered under pre-operative expenses.

## TECHNICAL ASPECTS

### Process of Manufacture

The fresh vegetables are washed thoroughly and prepared into suitable size. These prepared vegetable pieces are then blanched or treated with permitted chemicals/preservatives. The treated vegetables are then dehydrated in two stages. In first stage, the moisture content is reduced upto 20+5% and in the second stage moisture content is reduced to 8+2% depending upon type of vegetables. The temperature of drier in first stage drying is normally kept at 60+5° C. and in second stage, the temperature is maintained at 40+5° C. The dehydrated vegetables are then cooled and packed in suitable polythene bags and stored at cool and dry place.

### Quality Control and Standards

Fruit Products Order and Prevention of Food Adulteration Act, are mandatory.

Dehydrated vegetables should conform to the specifications laid down in Fruit Products Order. The FPO specifications are as under:

Product	Variety	Special Characteristics	General Characteristics
Dehydrated Vegetables	Any vegetable of suitable variety	Ash insoluble in Hydrochloric Acid shall be not more than 0.5%	The product shall be prepared from wholesome vegetables free from blight, discolouration or fungi. Only the edible portion of the vegetable shall be used and it shall be free from stalks, peel stems and extraneous leaves. The dried or dehydrated vegetables may contain permitted preservatives. The finished product shall be of good edible quality and shall reasonably reconstitute to its original shape and quality on boiling from fifteen minutes to an hour. The finished product should be free from visible mould, insects or larvae.

The Bureau of Indian Standards has laid down specifications for dehydrated vegetables as:

Dehydrated Potatoes	IS 4626:1978
Dehydrated Onion	IS 4652:1967
Dehydrated Garlic	IS 5452:1969
Dehydrated Cabbage	IS 4627:1968
Dehydrated Carrot	IS 4625:1968
Dehydrated Okra	IS 4628:1978
Dehydrated Peas	IS 4626:1968

#### Production Capacity (per annum)

Quantity	:	90 M.T.
Value	:	Rs. 135 Lakhs

Motive Power 65 K.W.

#### Pollution Control

The entrepreneur should contact the State Pollution Control Board for guidance in the matter. However, the water effluent in the industry comes from cleaning, washing, pre-treatment and blanching of raw materials. It is advisable to test the water discharge as per the specifications laid down by the Bureau of Indian Standards for which the provision of water treatment has been made in the profile.

#### Energy Conservation

In electric installation, appropriate motors should be used and properly installed.

## FINANCIAL ASPECTS

### A. Fixed Capital

(i) Land and Building	Total (Rs. in lakhs)
Land 1000 Sq. mt. @ Rs 300/sq. mt.	3.00
<i>Built-up area</i>	
Area of production	150 Sq. Mtr.
Raw materials store	50 Sq. Mtr.

Finished goods store	100 Sq. Mtr.
Office, Laboratory Boiler house, etc.	100 Sq. Mtr.
Total 400 sq. mtr. @ Rs 2,000/sq.m.	8.00
Total	11.00

#### (ii) Machinery and Equipments

Sl. No.	Description	Qty.	Total (Rs. in lakhs)
1.	Washing machine rotary type equipped with jet spray arrangement Size 9.3' x 3.3' x 6' Electric power 1.5 HP	1	1.50
2.	Sulphitation chamber	1	1.25
3.	Universal slicer for slicing of onion etc. capacity 1 Ton/Hr. Electric power 2 HP	1	2.10
4.	Pea podder capacity- 250 kgs./hr. Electric power 2 HP	1	2.10
5.	Pea pricking machine capacity 300 kgs./hr Electric power 1 HP	1	1.50
6.	Potato/Carrot peeler Capacity 250 kgs/hr. Electric power 2 HP	1	3.50
7.	Rotary dicer for slicing and dicing of root vegetable Capacity 1 Ton/hr. Electric Power 5 HP	1	3.50
8.	Blanching tank with 6 Nos. S.S. perforated baskets with electric heating elements 5 K.W. Size 900x600x450 mm	1	1.30
9.	Tray Drier capacity 96 Trays with extra 200 Nos. aluminium Trays and 4 No. Trolleys. Electric power 2 HP for fan heating Element 21 K.W.	1	3.50
10.	Tray Drier Capacity 48 trays with extra 100 Nos. of aluminium Trays and 2 Nos. of Trolleys Electric power 1 HP for fan Heating Element 14 K.W.	1	2.10
11.	Impulse heat sealer electric power 400 watts @ Rs. 15,000 each	2	0.30

Sl. No.	Description	Qty.	Total (Rs. in lakhs)
12.	Preparation tables with aluminium top size 2350×860×860 mm @ Rs. 15,000	4	0.60
13.	Water storage tanks (Plastic)	1	0.45
14.	Aluminium trays size 450×300×70mm	50	0.30
15.	Misc. equipments such as baskets, drums knives, peelers, mugs, weighing scales of different capacity etc.	LS	0.40
16.	Laboratory equipments	LS	0.40
17.	Pollution control equipments, water treatment tanks etc.	LS	0.80
	<b>Total</b>		<b>25.60</b>
	<i>Packaging, forwarding, taxes, insurance charges etc. @ 10%</i>		<i>2.56</i>
	<i>Erection and electrification @ 10%</i>		<i>2.56</i>
	<i>Office furniture and fixtures</i>		<i>0.45</i>
	<b>Total</b>		<b>31.17</b>

(iii) Preliminary and Pre-operative Expenses 0.43  
 Total Fixed Investment (i+ii+iii) 42.60

## B. Working Capital (per month)

### (i) Personnel

Sl. No.	Designation	Nos.	Salary/month	Total (Rs. in lakhs)
<i>(a) Administrative and Supervisory</i>				
1.	Manager	1	6,000	0.06
2.	Purchase Assistant	1	6,000	0.06
3.	Accountant	1	3,000	0.03
4.	Store keeper/Clerk	1	2,000	0.02
5.	Clerk/Typist	1	2,000	0.02
6.	Sales Assistant	3	2,000	0.06
7.	Peon	1	1,000	0.01
8.	Watchman	2	1,000	0.02
<i>(b) Technical and other</i>				
1.	Plant Manager	1	6,000	0.06
2.	Food/Fruit Technologist	1	6,000	0.06
3.	Chemist	1	3,000	0.03

Sl. No.	Description	Nos.	Salary (In Rs.)	Total (Rs. in lakhs)
4.	Foreman/Mechanic	1	4,000	0.04
5.	Skilled Workers	2	3,000	0.06
6.	Unskilled workers	8	2,000	0.16
7.	Sweeper (Full time)	1	1,000	0.01
	<b>Total</b>			<b>0.70</b>
	<i>Perquisites @ 15%</i>			<i>0.10</i>
	<b>Total</b>			<b>0.80</b>

### (ii) Raw Material including Packaging

Sl. No.	Particulars	Qty.	Rate (In Rs.)	Total (Rs. in lakhs)
1.	Fresh vegetables (Cabbage, Carrots, Peas, Potato, Ginger Garlic etc.)	62.5 MT	10,000	6.25
2.	Chemicals (Sodium sulphate, potassium metabisulphite, Aluminium silicate, Bleaching powder etc.)	LS		0.25
3.	Packing material (polythene bags, corrugated boxes, straps, gum etc.)	LS		0.25
4.	Wastage and cleaning materials	LS		0.10
	<b>Total</b>			<b>6.85</b>

### (iii) Utilities

	Total (Rs. in lakhs)
Power Load-65 KW	0.52
Load × No. of WH × No. of days × rate Water 2000 KL @ Rs. 8/K. Litre	0.16
<b>Total</b>	<b>0.68</b>

### (iv) Other Contingent Expenses

	Total (Rs. in lakhs)
1. Postage and stationery	0.01
2. Consumable stores	0.02
3. Repair and maintenance	0.04
4. Transport charges	0.15
5. Advertisement and publicity	0.10
6. Insurance, Taxes, Telephone bills etc.	0.02
7. Other unforeseen expenditure	0.10
<b>Total</b>	<b>0.44</b>

v) Total Recurring Expenditure (per month)	Rs. 8.77 lakhs
vi) Total Working capital (For 3 months)	Rs. 26.31 lakhs

### C. Total Capital Investment

	(Rs. in lakhs)
Fixed Capital	42.60
Working Capital (for 3 months)	26.31
Total	68.91
or Say	69.00

### MACHINERY UTILISATION

In the process of dehydrated vegetables, the bottleneck operation is drying in a drier. Since dehydration process takes about 8-12 hours in various vegetables, for maximum utilization of drier, the process is divided into two batches, the first batch of prepared raw material is fed into bigger drier and transferred to a small drier after a few hours. Simultaneously, the 2nd batch is fed to a bigger drier and, once the first batch is out from the smaller drier, the 2nd batch is shifted to the second drier.

### FINANCIAL ANALYSIS

1. Cost of Production (per year)	Total (Rs. in lakhs)
1. Total recurring expenditure	105.24
2. Depreciation on building @ 5%	0.40
3. Depreciation on machinery and equipments @ 10%	3.07
4. Depreciation on office furniture and fixtures @ 20%	0.09
5. Interest on total investment @ 15%	10.35
Total	119.15
or Say	119.00

#### 2. Turnover (per year)

Items	Qty.	Rate (Rs.)	Total (Rs. in lakhs)
Dehydrated vegetables	90 M.T.	150/kg.	135.00

3. Net Profit (per year) (before income tax)	Rs. 16.00 Lakhs
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4. Net Profit Ratio	= $\frac{\text{Net profit (per year)} \times 100}{\text{Turnover per year}}$
	= 11.85%

5. Rate of Return	= $\frac{\text{Net profit (per year)} \times 100}{\text{Total investment}}$
	= 23.19%

#### 6. Break-even Point

(i) Fixed Cost	Total (Rs. in lakhs)
1. Depreciation on building	0.40
2. Depreciation on machinery and equipments	3.07
3. Depreciation on office furniture and fixtures	0.09
4. Interest on total investment	10.35
5. 40% of salary and wages	3.84
6. 40% of other contingent expenditure	2.02
7. Insurance	0.12
Total	19.89

(ii) Net Profit (per year)	Rs. 16.00 Lakhs
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$$\begin{aligned} \text{B.E.P.} &= \frac{16 \times 100}{35.89} \\ &= 44.58\% \end{aligned}$$

### Addresses of Machinery and Equipment Suppliers

1. M/s. Mather and Platt (India) Ltd.  
805-806, Ansal Bhawan,  
16, Kasturba Gandhi Marg,  
New Delhi - 110 001.
2. M/s. Raylons Metal Works  
Kondivita Lane,  
Post Box - 17426,  
P.O. M.J.B. Nagar,  
Andheri (E),  
Mumbai - 400 059

3. M/s. International Food Machinery Corporation  
Krishna Opp. Deep Bhavan,  
Pandit Nehru Marg,  
Jamnagar - 361 008  
(Gujarat)
4. M/s. The Master Mechanical Works Pvt. Ltd.  
75, Link Road, Ist Floor,  
Adjacent to Moolchand Hospital,  
Lajpat Nagar - III,  
New Delhi - 110 024.
5. M/s. Narangs Corporation  
P-25, Cannought Place,  
(Below Madras Hotel),  
New Delhi - 110 001.
6. M/s. B. Sen Barry and Co.  
65/11, Rohtak Road,

Karol Bagh,  
New Delhi - 110 005.

#### Addresses of Raw Material Suppliers

1. M/s. Devendra Cottage Industries  
Sector 22-C,  
Chandigarh.
2. M/s. T. Ali Mohammed and Co.  
144-45, Sarang Street,  
Near M.J. Phule Market,  
Mumbai - 400 003.
3. M/s. S.B. Mehta and Associates  
2-B, Ganga Vihar,  
94, Kanji Sayed Street,  
Mumbai - 400 003.
4. M/s. Chemical Market  
Tilak Bazar, Khari Baoli,  
Delhi - 110 006.