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Research Article

Economic Analysis of Processing Industry with Special Reference to Onion Flex by Dehydration Method in Pune District of Maharashtra

Neha A. Godase^{1*}, Dr. Geeta S. Rao²

¹Research Scholar, College of Management, MIT Pune, Dist. – Pune, State- Maharashtra, County-India. ²Associate Professor, Department of Management, College of Management, MIT Pune, State- Maharashtra, County-India.

Abstract

Background: The fruit and vegetable processing industry play an important role in processing of agricultural products. India ranks third in the production of dried fruits and vegetables. The growth of this industry will bring immense benefits to the economy, raising agricultural yields, enhancing productivity, creating employment and raising life standards of people across the country, especially in rural areas. The commercial production of processed fruits and vegetables is very low in India, contributing only to around 2.2 percent of the total food production.

Dehydrated fruits and vegetables projects are a new product of value addition series where the shelf life is increased & space for storage is reduced along with easy transportation. Demand for fruits and vegetables are prevalent across length and breadth of the country throughout the year. However, due to specific climatic requirements availability/ supply of most of these crops is seasonal. So, preservation through dehydration technique can play an important role.

Objectives: The research outlook was studied with following points.

To examine the capital investment of the processing industry

To calculate the performance and feasibility parameters of the processing industry

Methodology: The dehydration unit "Naturals Agro Private Limited" located at Manjari Budruk in Pune district has been selected purposively for working out economics of dehydration of fruits and vegetables with special reference to Onion flex. Primary data were collected with the help of personal interaction with the Company Managing Director and Workers. Secondary data were collected from annual report, internet and company records.

Analysis of Data: This is done with the help of various type of mathematical & statistical tools like graph, table, charts & various formulas. The data phased on fixed cost, variable cost, Net Present worth, Breakeven point, Benefit cost ratio and payback period to work out the efficiency and feasibility of processing industries.

Result: The total Procurement of Onion was 2,550 kg which cost Rs. 12,750 which was procured in the month of January, February and March (2021-22).

B:C Ratio of Onion Flex was 1.2, it indicates that the B:C ratio is more than so these product is profitable to run the processing unit.

Keywords: Dehydration, Dehydrated products, Project cost, Onion flex, Processing, Financial ratio

*Corresponding Author: Neha A. Godase, ¹Research Scholar, College of Management, MIT Pune, Dist. – Pune, State- Maharashtra, County-India.

INTRODUCTION

India is known as the second largest fruits and vegetables producer in the world followed by China. India accounts for about 15 per cent of the world's vegetable production. In the production of many fruits and vegetables, India is either first or second. However, fruits and vegetables being perishable in nature, get wasted to the tune of 20-30 per cent in the whole supply chain due to poor postharvest management. On the other hand, only 2 per cent of fruits and vegetables are processed in to value added products and the rest is consumed as fresh. Therefore, processing of fruits and vegetables offers immense scope for wastage minimization and value addition; thus, can generate significant income and employment in Indian agrarian economy.

Agro-processing is now regarded as the sunrise sector of the Indian economy in view of its large potential for growth and likely socio-economic impact specifically on employment and income generation. Some estimates suggest that in developed countries, up to 14 per cent of the total work force is engaged in agro-processing sector directly or indirectly. People generally prefer fresh fruits and vegetables in India due to abundance of seasonal fruits throughout the year available at low price. However, in the recent years, processed foods in the form of canned fruits such as pineapple, Mango slices and pulps, grapes, apple, peaches etc have increased considerably. The uses of fruits in the form of concentrated juice, dry powder, jam and jelly have also increased.

Fruits and vegetables are seasonal as well as perishable in nature. Through processing (dehydration) vegetables can be used as raw vegetables for cooking. With the help of fresh fruits and vegetables value added products such as pickle, sauce, chips etc. can be prepared. Dehydration of seasonal fruits and vegetables are good bet for long term storage even up to 5 years or beyond if hermitically sealed and can be made available to the consumers during off season. Dehydrated vegetables are used to manufacture instant vegetable noodles, soups, snacks and fast food. Onions are a good source of vitamins, minerals, and fibre and are known to offer a variety of health benefit.

Objectives

The research outlook was studied with following points.

- 1) To study capital investment of the processing industry
- 2) To calculate the performance and feasibility parameters of the processing industry

Methodology

The dehydration unit "Naturals Agro Private Limited" located at Manjari Budruk in Pune district has been selected purposively for working out economics of dehydration of onion flex. Primary data were collected with the help of personal interaction with the Company's Managing Director and Workers. Secondary data were collected from annual report, internet and company records.

RESULTS AND DISCUSSION

Dehydrated Products Range

There is wide range of agricultural products which can be dehydrated and marketed locally or internationally. The information on dehydrated products viz; vegetables, fruits and medicinal plants of selected unit is given in Table 3.1, Table 3.2 and Table 3.3, respectively.

 Table 3.1 Dehydrated Vegetables produced in Naturals Agro unit

Spinach Powder	onion powder	Drumstick powder	Spinach Powder
Bottle Gourd Powder	Basil Leaves Powder	Tomato Powder	Methi Powder
Curry leaf Powder	Dry Cococasia	Mint Powder	Beet Powder
Ginger Powder	Garlic Powder	Palak Powder	Moringa Leaves Powder

 Table 3.2 Dehydrated Fruits produced in Naturals Agro unit

Dry Jamun	Dry Pineapple	Awala Candy	Dry Banana
Tamarindus indica Powder	Dry Mango cubes	Amchur Powder	Dry Ber
Jamun beej Powder	Awala Supari	Raw mango Powder	Orange Powder

Table 3.3 Dehydrated Medicinal plants produced in Naturals Agro unit

Lemon Grass Powder	Shikekai Powder	Gulab Powder	Stevia Powder
Lemon Grass, Ginger,	Ditha Dowdor	Awala Dowdor	Lavmi Taru
Cardamom Mix Powder	Kitila Fowdei	Awala FUWUEI	

Fruits and Vegetables Dehydration Temperature and Moisture level

Sr	Emuita and	Drying Conditions			Finished Products	
No.	Vegetables	Load/batch (Kg)	Temp. (ºC)	Time (hr.)	Moisture (%)	Yield /batch (Kg)
1.	Dry Jamun	70	50 to 55	14	2 to 7	5.5
2.	Dry Ambadi	25	45 to 50	12	8 to 12	1
3.	Moringa Powder	50	42 to 48	12	4.5 to 5.65	4.5
4.	Onion Flex	50	50 to 55	10	Less than 7	5
5.	Mango Cubes	10	50 to 55	16	10 to 15	2

Table 3.4 Dehydration Temperature and Moisture level

Percentage loss of selected fruits and vegetable in processing

 Table 3.5 Percentage loss of selected fruits and vegetable

Sr. No.	Fruits and Vegetables	Loss (%)		
1.	Dry Jamun	10 to 15		
2.	Dry Ambadi	5 to 10		
3.	Moringa Powder	3 to 5		
4.	Onion Flex	1 to 2		
5.	Mango Cubes	20 to 30		

Project Cost

This research suggests a plant with an average capital investment Rs. 51,83,000, with minimum human resource requirement of five people, where at least one manager is mandatory. The average electricity and water costing for processing unit is 3,90,000.

Table 3.6	Capital	investment
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Sr. No.	Items		Rate (Rs)	Amount (Rs.)	Total Amount (Rs.)	Percentage (%)
1	Acquisition of La	and (2.5 R)	10,00,000	25,00,000	25,00,000	48%
2	Water stru	cture				
	a) Bore we	ll (1)	68,000	68,000	68,000	1%
3	Construction o	f building	-	20,00,000	20,00,000	39%
4	Machinery and E	quipment's				
	1.Tray dryer	(1)	3,50,000	3,50,000		
	2. Pulverize	er (1)	65,000	65,000		
	3. Grader	(1)	45,000	45,000		
	4. Packing	(2)	2,500	5,000		
	Total				4,65,000	9%
5	Furnitu	re	-	1,50,000	1,50,000	3%
6	Insurance pren	nium rate	-			

Human Resource Requirements

For running a small processing unit, a single manager is sufficient for managing all the activities which are carried out in processing unit and minimum human resource requirement is as follows:

Table 3.7 Human Resource

Labour	Numbers	Working days/month	Salary/Month (Rs.)	Annual Salary (Rs.)
Male (Rs.300)	1	25	7,500	90,000
Female (Rs.250)	4	25	6,250	300,000
Total	5			3,90,000

For running a small processing unit, a single manager is sufficient for managing all the activities which are carried out in processing unit and minimum human resource requirement is as follows:

Table 3.8 Human Resource

Labour	Numbers	Working days/month	Salary/Month (Rs)	Annual Salary (Rs)
Male (Rs.300)	1	25	7,500	90,000
Female (Rs.250)	4	25	6,250	300,000
Total	5			3,90,000

Electricity and Water Charges

The fruits and vegetables processing unit average electricity and water charges as given below

Table 3.9 Electricity and Water

Particulars	Amount (Rs.)
Electricity	1,44,000
Water	60,000
Total	2,04,000

About Onion flex

The selected processing unit had wide range of products which is shown in dehydrated product range. The further research is taken with the special consideration of Onion flex.

Procurement of Fresh Onion in Kg and prices at different time period in (2021-22)

The data of total procurement of fresh onion by the company was collected and given in Table 3.10.

Table 3.10 Procurement prices at different time period of Fresh Onion

Sr. No.	Month	Procurement (Kg) / Rs. 5	Total Price (Rs.)
1	Jan	1020	5,100
2	Feb	1020	5,100
3	March	510	2,550
Total		2,550	12,750

The Table 3.10 provides the information about the quantity of fresh onion was procured 1020 kg, 1020 kg and 510 kg with the price Rs.5 per kg in the month of January, February and March respectively. The peak procurement is done in the month of January, February and March while lean in when the prices are high in the market.

Detail procedure of Onion flex

Fresh Onion

Take fresh onion without any damage and rotten.

Cutting and Cleaning

Cut top and bottom part of onion, peel it and wash it with water and clean it with cotton cloth

Manual slicing

Manually slice onion with approximately 4mm in size

Drying

Dry in shadow for 3-4 hours.

Dehydration

Put slices on the tray and put trays into dehydrator at 45° c to 65° c for 12 hours. And check it with every 2-3 hours and turn the slices.

Cooling

After 12 hours remove the trays from dehydrator and cool leaves at room temperature

Weighing and packaging

After cooling at room temperature weigh it and pack it.

Labelling

Label the packets according to different sizes.

Flow Chart of Dehydrated Onion Flex

Raw Onion Cutting top & bottom, Grading Peeling Washing & Cleaning Manual Slicing (Approx. 4mm) Drying under fan for 3-4 hr. Dehydrate at 45 °C to 65°C for 12 hr. (Using Dehydrated machine) Cool at room temp Weighing & Packaging Labelling

Figure 3.1 Flow chart processing of Dehydrated Onion Flex

Processing cost of Onion Flex

Processing Quantity of dry onion flex and price of raw onion mentioned in the table 4.35

Table 3.11 Processing Quantity of onion flex (2021-22)

Sr. No.	Month	Onion (Kg)	Dry Onion Flex (Kg)	Total Price (Rs.)
1	Jan	1000	100	5,000
2	Feb	1000	100	5,000
3	March	500	50	2,500
Total		2,500		12,500

The Table 4.35, provides the information about the quantity of dry onion flex processed 8 kg, 9 kg and 10 kg in the month of January, February and march respectively. 1000 kg fresh onion required for making 100 kg dry onion flex.

Per unit Cost of processing of Dry Onion Flex

The process of converting raw material into final product have some value addition. So that, there is some cost required to process the product. Per unit Cost of processing of Dry Onion Flex mentioned in the following table 3.12

Table 3.12 Per unit Cost of processing of Dry Onion Flex

Sr. No.	Particulars	Amount (Rs.)
a)	Fixed Cost	
	Depreciation on Fixed Assets	6,638.79
	Interest on fixed capital	38,126
	Total fixed cost 250 kg.	44,764.79
	Fixed cost Per kg.	179.05
b)	Variable cost	
	Raw Material cost (2500kg)	12,500
	Wages	23,907
	Electricity Charges	8827.2
	Water Charges	3678
	Packaging cost	250
	Loss in Processing	250
	Interest on working capital (49,412.2) 12%	5929.46
	Total variable cost for 250 kg	55,341.66
	variable cost per kg.	221.36

The above table shows that fixed cost and variable cost required for processing. Total fixed cost and variable cost required for processing is ₹44,764.79and ₹55,341.66respectively. The fixed cost and variable cost per kg is ₹ 179.05 and ₹221.36.

Total cost for processing

Total cost for processing mentioned in the following table 3.13

Table 3.13 Total cost for processing

Sr. no	Cost	Total cost (Rs.)	Cost per kg	
1	Fixed cost	44,764.79	179.05	
2	Variable cost	55,341.66	221.36	
	Total cost	1,00,106	400.41	

Table 3.13 indicates that the total fixed cost of processing of dry onion flex was Rs. 44,764.79 and fixed cost per kg was Rs.179.05. Total Variable cost was Rs. 55,341.66 and Variable cost per kg was Rs. 221.36.

Income during the year 2021-22

Income during the year 2021-22 is given in table 3.14

Table 3.14 Income during the year

Product Name	Production (Kg)	Cost of Production (Rs./kg.)	Price Realized (Rs./kg)	Total cost (Rs.)	Total Income (Rs.)	Profit (Rs.)
Onion Flex	250	400.41	500	1,00,102	1,25,000	24,898

From table 3.14 it was observed that company gets profit Rs 24,898 by sale of 250 kg of dry onion. Price per kg of dry onion was Rs.500 and cost of production was Rs. 400.41 hence total cost was also Rs 1,00,102 and total income was

Rs 1,25,000. Benefit Cost Ratio of Onion Flex

BCR = Gross income / Total cost of production

BCR = 1,25,000 / 1,00,102

BCR = 1.2

Here, we compare the Present worth of Gross income with Present worth of Cost. BCR was more than one, i.e. 1.2 was indicate Project was satisfactory. B:C Ratio indicates the, how much amount of money is received after investing Rs 1/-. For Natural agro project B:C Ratio is 1.2 means, when we investing Rs 1/- then we received Rs 1.2/-

Total profit = Total Contribution – Total fixed cost = 1,07,160 - 44,764.79 = 62,395.21

Thus, total profit of dry onion flex at Natural Agro Pune in year 2021-22 is ₹ 62,395.21.

Actual sales = Quantity in kg * sales price

= 250 *650 = 1,62,500

Thus, actual sales of dry onion flex at Natural Agro Pune in year 2021-22 is ₹ 1,62,500.

Margin of Safety = <u>Actual Sales</u> – <u>BEP at Rs.</u>× 100

Actual Sales =(1,62,500 - 67825.43) / 1,62,500× 100 =94,674.57 / 1,62,500× 100 =0.58 × 100 =58%

Thus, Natural Agro Pvt Ltd, Pune have 58% Margin of

safety for dry onion flex product. It indicates that actual profit of the company once it pays for all fixed and variable costs.

CONCLUSIONS

- 1. The total Procurement of Onion was 2,550 kg which cost Rs. 12,750 which was procured in the month of January, February and March (2021-22).
- 2. B:C Ratio Onion Flex was 1.2, it indicates that the B:C ratio is more than so these product is profitable to run the processing unit.
- 3. BEP of Onion Flex indicates that the production of these products is much more than BEP point.
- 4. The per kilogram processing cost of Onion flex was Rs 400.41.
- 5. The given financial ratios analysis concluded that the processing unit of fruits and vegetable with small capacity can also give optimum profit and which is far more profitable for further investments.

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