

## Extruded Potato Chips

PRODUCT CODE	219804001
QUALITY AND STANDARDS	IS: 4626-1978 IS: 2860-1964
PRODUCTION CAPACITY	Extruded Potato Chips 17280 Kg/annum Value Rs. 21, 60, 000/- /annum
MONTH AND YEAR OF PREPARATION	March 2021
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### A. Introduction:

In India good quantity of potatoes are grown. It is estimated around 25% of the potatoes are spoiled due to various reasons such as transportation, type of packaging, non-availability of sufficient cold storage space during harvesting season. This spoilage can be saved by making various preserved and processed potato products. Potato chips and wafers are one of the products which have great market potential.

Potato chips are ready to eat food item and convenient snack food consumed by large number of urban population. Proper spicing/packing makes these products very tasty and attractive. These chips are produced in various sizes and design under hygienic condition. Potato, as it contains 20% of sugar and reasonable amount of Vitamin A, B and C. This is considered to be rich source of energy giving food.

**B. Market:**

With the popularity of snack food through electronic and other media and rise in population and living standard the demand for snack foods is increasing rapidly including potato wafers. Earlier this industry was confined to cottage scale and small scale which gradually moved into the hand of mechanized sector. Special packaging has also added its value and attracted more customers and increased export potential as well.

It is estimated roughly 500-600 no. of units are already engaged in the manufacture of various types of potato wafers in the country. In West Bengal also there is 50 - 100 nos. of units engaged in production of potato chips/wafers in different parts of the state. Still there exist very good prospects for setting up of unit for the manufacture of above items as it has emerged as a potential snack food. These products can be easily marketed in tea stalls, restaurants, railway station, public places, and tourist spots and in number of shops and stores. Further, West Bengal being one of the major potato and Banana grower there is very good scope for setting up such an industry in the state.

**C. Basis and Presumptions:**

- 1) The unit shall run 8 hours (single shift) a day and for 300 days in a year.
- 2) The estimates are drawn for a production capacity generally considered techno-economically viable for a model type of manufacturing unit.
- 3) The cost in respect of land, building, machinery, raw materials, selling prices are generally those obtained at the time of preparation of the scheme and are likely to vary with time, place and other related factors.
- 4) The plant is indigenously available.

- 5) Interest rates are calculated at 11% percent per annum.
- 6) All the estimates of plant and machinery, land and building are taken generally as those prevailing at the time of preparation of the scheme.
- 7) Minimum salary and wages of the staff taken into account.
- 8) 80% maximum capacity utilization has been taken into consideration, 50% of which will be sold as raw wafer and 50% will be sold as fried wafer. 20% of the raw material will be converted into wafer and 30% of the raw material will be converted into fried wafer.

**D. Implementation schedule:**

To implement the project, a minimum period of 12 months is required. The various activities that need to be taken care of within the time, schedule is

- (i) Project report preparation/market survey,
- (ii) Land acquisition and construction of building,
- (iii) Ordering and installation of machinery,
- (iv) Procurement of raw materials,
- (v) Electrical installation,
- (vi) Recruitment of staff and
- (vii) Trial runs and commissioning of the unit.

**TECHNICAL ASPECTS OF MANUFACTURING OF POTATO CHIPS**

**1. Process of manufacture:**

The potatoes should be large, free from disease and should be fully matured. They should have the minimum number of eyes to cut down the loss by trimming. They are washed thoroughly in water and peeled manually with

a stainless steel knife or by means of an abrasive potato peeling machine. The peelings are washed away with sprays of water. They are then trimmed and placed in water to prevent browning. They are cut into pieces 0.4 to 0.5 cm thick in a slicing machine, and the slices again placed in cold water, whenever, there is considerable delay in cold water, whenever, there is considerable delay in the subsequent operations of blanching, etc. The slices may be kept in water containing 0.05 per cent potassium metabisulphite to prevent spoilage. The slices are blanched for 3 to 5 minutes in boiling water and spread on trays at the rate of 4.88 kg. To 7.30 kg. Per square metre of tray surface. The blanched chips are then subjected to hydro machine (centrifugal) to remove excess of water and fried in edible oil at 180-200°C for 3-4 minutes. The fried potato wafers are then kept on the sieve to remove excess of oil, cooled and other ingredients like salts, acid is sprayed as per taste. Cooled potato wafers are then packed in polythene bags and sealed.

**Selection of Raw material:**

The best results are obtained from second crop potatoes grown in a dry sandy soil although varieties of Yoti and chandramukhi are also very good. The selected potatoes must be large in size, free from disease of eyes. In addition the reducing sugar (R.S.) must not be greater than 2.5 R.S. (moisture free basis). The potato should be large and soft. Bananas should be firm and semi ripe.

**Washing:**

The potatoes should be thoroughly washed to remove adhering dirt prior to processing. Washing may be accomplished by passing the potatoes under water sprays and through a tank of brine in which they float while any

stones, which may have been mixed with them during digging, sink to the bottom.

### **Peeling and Trimming:**

There are several systems in use for peeling and trimming of potatoes. Some of these are described below.

- (i) Abrasive peeling: In this method the potatoes are rotated against rough surfaces such as carborandum, which rub off the soft peel. Losses in this system range between 15-30%.
- (ii) Lye peeling: The lye peeling operation involves a preliminary dusting and water wash, followed by a rigorous water rinse and tumbling in a washer to remove all skins and chemicals and then an acid neutralising bath, after which hand trimming and cutting is done to give perfectly finished potatoes.
- (iii) Flame retardant Heat peeling: Peeling by this process is a recent development. In this process, the potatoes are brought either in direct contact with live flame or subjected to high radiant heat temperature.
- (iv) Steam peeling: In this process the potatoes are exposed to steam at 90 psig pressure for about 25 seconds. After exposure the potatoes are passed high pressure jets water in a rotary washer which removes the loosened peel.

### **Slicing and cutting:**

In this operation, the potatoes are fed to the hopper of a universal slicing and shredding machine in which the thickness of the product can be adjusted by fixing suitable slicing disc in the machine. This is to ensure that

the chips are uniform in thickness otherwise variation in thickness may lead to large difference in moisture content of the finished product thereby affecting the quality of the product.

### **Washing, sorting, And Dewatering:**

The sliced material is washed with a water spray to remove the starch and is made to flow on a moving belt conveyor from which sorting of any foreign material or damaged product can be done manually. Removal of surface moisture for dewatering of sliced material from the washed vegetables) is done on centrifuges. This process helps in reducing the frying time as well as saving frying oil.

### **Frying and Cooling:**

The potato slices are fried by being carried on a moving conveyor through a trough of oil which is maintained at a predetermined temperature of 150-180° depending upon the residence time of frying. The heat generator particle extractor, oil filter and oil extractor are incorporated in the frying post to avoid wastage of frying oil. The process ends with cooling and salting, which is carried out manually while feeding the fried chips to hopper through a moving belt conveyor in small plants and by dosing in an automatic plant.

### **Packaging:**

In the case of higher chips production capacities the packaging of the finished product is performed automatically in an automatic packaging machine.

If unit wants to adopt this process following plant and machinery is required to be installed by the unit.

**Quality control:**

- (1) Potato chips are made as per FPO and PFA regulation.
- (2) BIS specification:  
IS: 4626-1978  
IS: 2860-1964

**2. Production capacity (Per annum):**

<u>Quantity</u>	<u>Rate</u>	<u>Value</u>
Potato Chips - 17280 Kg.	Rs. 125/- per Kg	Rs. 21, 60, 600/-

3. Approximate Power requirements: 5 KW.

**E. FINANCIAL ASPECTS**1. Fixed capital(a) Land and building

Land: 1000 sq.ft. Open land

Built up area: 800 sq.ft. Shed/building

Rs.

1, 00, 000/-

6, 60, 000/-

7, 60, 000/-

(b) Machinery and Equipments:**Plant and Machinery of Potato Chips Manufacturing Unit:**

<b>Sl. No.</b>	<b>Description</b>	<b>Qty.</b>	<b>Value</b>
1.	Potato peeler (10 kg. per hour) ½ HP motor	1 no.	20, 000
2.	Power operated slicing machine with arrangement to adjust the thickness of slices with motor 10 kg./hr. ½ HP motor	1 no.	30, 000
3.	Heat Sealing machine manual operated	2 nos.	10, 000
4.	Cast Iron pan for frying (50 lit. cap.)	1 no.	10, 000
5.	Other necessary equipment (trays, strainer)	LS	10, 000
6.	Transportation, Erection and electrification @ 10%		8, 000
7.	Office furniture		10, 000
<b>Total</b>			<b>98, 000</b>

II. Working capital per month:(a) Personnel

	<u>Nos.</u>	<u>Salary(p.m)</u>	<u>Total (Rs.)</u>
1. Production Manager cum			
2. Tech. supervisor	1	10,000	10,000/-
2. Office Asst./Storekeeper	1	8,000	8,000/-
3. Salesman	2	8,000	16,000/-
4. Skilled workers	2	6,000	12,000/-
5. Unskilled labour	5	4,000	<u>20,000/-</u>
			66,000/-
			<u>9,900/-</u>
			75,900/-

Add perquisites @ 15%

(a) **Raw Material (Per Month):**

1. Potatoes	1600 kg @ 5/kg	8,000
2. Edible oil	200 lit. @ 60/lit.	12,000
3. KMS	2 kg. @ 50/kg.	100
4. Amchur powder, chilli powder Black salt, common salt, Mixture	3 kg. @ 90/kg	270
5. Packing material	LS	<u>10,000</u>
		30,370

c) Utilities per month:

Power	2,000/-
Oil / Coal	<u>10,000/-</u>

12,000/-

d) Other expenses per month:

Insurance	2,500/-
Repair and maintenance	2,000/-
Stationery, postage and other admn. overheads	2,000/-
Transport, travelling etc.	<u>5,000/-</u>
	11,500/-

**Working Capital per month: Rs.1, 29, 770/-**



**Total Capital Investment:**

	<u>Rs.</u>
i) Fixed Capital	9, 87, 770/-
ii) Working Capital (3 months)	<u>3, 89, 310/-</u>
	13, 77, 080/-

**F. FINANCIAL ANALYSIS:****1. Cost of production per year:****In Rs.**

i) Total recurring cost	15, 57, 240
ii) Depreciation on building @5%	33, 000
iii) Depreciation on machinery & <a href="#">eqpt.@10%</a>	8, 000
iv) Depreciation on misc. fixed assets @ 20%	2, 000
v) Interest on total capital investment @ 11%	<u>1, 51, 479</u>
Total:	17, 51, 719

**3. Turnover per annum:**

17280 Kg @ Rs.125/-Kg	21, 60, 000
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**Profit per annum (In Rs.) = 21, 60, 000 – 17, 51, 719 = Rs. 4, 08, 281/-**

4. **Net profit ratio** = Profit x 100 ÷ Sales = 18.90%

5. **Rate of return** = Profit x 100 ÷ Investment = 29.64%

**6. Break Even Analysis:****Fixed Cost (per annum):**

1. Dep. on machinery and equipt. @ 10%	8, 000
2. Dep. on wooden furniture @20%	2, 000
3. Interest @ 11% of the loan amount	1, 51, 479
4. 40% of salary	3, 64, 320
5. 40% of other expenses	55, 200

Total: Rs. 5, 80, 999/-

**Break Even Point** =  $\frac{\text{Fixed Cost} \times 100}{\text{Fixed Cost} + \text{Profit}}$  = 58.73%

**ADDRESSES OF PLANT AND MACHINERY SUPPLIERS:**

1. M/s.Larsen & Toubro Ltd., L&T House, Ballard Estate, Mumbai-400038.
2. M/s.Kilco Perfect Machine Traders,Kuruppam Road, Thrissur-1, Kerala.
3. M/s.Chemical Equipt & Linings,2<sup>nd</sup> floor, 735, Poona Mallee High School Road, Chennai-600029.
4. M/s.Gardeners Corporation,6, Doctor's Lane, P.B.No.229, New Delhi-110001.
5. M/s.Jyothi Industries,31, Pampamahakavi Road, Bangalore-560004.
6. M/s.B.Sen Barry & Co.,65/11, New Rohtak Road, Karol Bagh, New Delhi-110005.
7. M/s.N.V.Industries Pvt.Ltd.,“Sudha Park”, 1, Raja S.C.Mallik Road, Calcutta-700086.
8. M/s.H&P Industries,Near Mundupalam, Trichur-6.
9. M/s.Chemplast,17, Shiv Shakti Industrial Estate, L.B.Shastrri Marg, Ghatkopar(W),Mumbai-400086.
10. M/s.The Metal Box Co. of India, Allahabad Bank Building, Connaught Circus, New Delhi.
11. M/s.Revlon Metal Works, 293, Ballasis Road, Mumbai-400008.
12. M/s.Kanoi Engg.& Industries Ltd., 2 Jessore Road, DumDum, Calcutta-700028.
13. M/s.Fun Snacks Pvt.Ltd., B-134, DDA sheds, Okhla Industrial Estate, New Delhi-110020.
14. M/s.Guru Nanak Engg.Corporation, No.2-3-685/5 Amberpet, Hyderabad-500013.
15. M/s.Canon Engg.Branch Office at W-6/444, Nayapalli, Jaydev vihar,Bhubaneswar. Tel.550177.

**ADDRESSES OF RAW MATERIAL SUPPLIERS:**

Locally available.