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Short Communication

A FEASIBILITY REPORT ON ESTABLISHMENT OF EXTRUDED BASED SNACK INDUSTRY

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Abstract- Ready to eat foods like snacks, breakfast cereals, baby foods, pet foods and pastas are made of hot and cold extrusion process. Now a days establishing a industry and production of low cost with effective quality extrudates is the biggest challenge especially for small scale food industries. The aim of this paper is to provide economic, financial and technical information that is required for the industry appraisal. The study is concluded that in order to produce 15, 00,000 units of 20 gram packets of ready to eat extruded snacks of blended flour consisting of blend of broken Sago: Water chestnut: Amaranth in blend ratio of 70:15:15 per month, the break even quantity was 1301544.40 packets and break even sales was 10412355.2 /- and break even period was 277days and finally it is proved that plant is economically viable.

Key words- Extrusion industry, technical, investment analysis, profit, Break even analysis.

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Introduction

Extrusion is simply the operation of shaping a plastic or dough-like material by forcing it through a restriction or die and this technology is increasing popularity day by day as it very flexible, versatile, variability of product shape, low cost of production and processing [1,6]. The extruder consists of three main zones namely metering zone, transition zone, and feed zone. As the feed passes through these zones it produces voluminous, expanded and crispy product. These expanded products are similar to that of cooked and baked product also has less microbial count due to HTST process. Often these products are called as ready to ear extruded snacks [1].

The Indian food processing industry accounts for 32 per cent of the country's total food market, one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. According to food extrusion market the extruded food products and equipment is projected to reach a value of worth 68.38 billion USD by 2022 (Published by Markets and Markets) [8]. The material, energy and money which is required for production of product considerable bags high initial and processing cost so it is necessary to optimize the technical and economic feasibility parameters which are required for establishing an industry [2,3]. Hence in this paper also it is aimed to optimize and study the analysis of techno-economic feasibility of water chest nut based extruded small-scale industry by taking and calculating various parameters like fixed cost, variable cost, profit, loss, BEA, BEP and at last by calculating above parameters it is concluded that whether the plant is viable or not in long run [3,4]

Methodology

The experimental model plant analysis is carried out at JNKVV, Jabalpur. The raw materials used are blend flour of Sago, Water chestnut and Amaranth Flour in blend ratio of 70:15:15. The expanded snacks were prepared through extrusion cooking of sago floor blended with water chestnut and amaranth flour for better puffing of extrudate in a single screw extruder (make from Brabender) [7,9]. The methodology and process correspond to the analysis of cost of product making, processing, marketing in relation to product characteristics, raw material requirement, prices, sources, schedule manufacturing process and production techniques. It also includes requirements of land, area and building, labor and expenses on wages. By taking above data the feasibility analysis is carried out by estimating financial implications like fixed cost, working capital, project cost and profitability. At the end risk bearing analysis is also carried out by estimating break even analysis like Break even period, Break Even Sales [10].

Results and Discussion

In calculating the break-even point certain assumptions were which are listed below. The selling cost of one unit of 20 gram was fixed as ₹ 8/- because at present the similar products are available at retail price of ₹ 10/- and their selling price at factory retail outlet is ₹ 8/-.

Fixed Cost

Table-1 *Cost of machines and equipments*

S. No.	Machine/Equipment	Cost in Rupees ₹
1.	Food extruder with accessories	20,00,000
2.	Hammer Mill	35,000
3.	Automatic Pouch Packaging Machine (total quantity 3, @ Rs. 13,00,000 each) Cost inclusive of freight, Installation & Commissioning, taxes, duty and insurance charges.	39,00,000
4.	Weighing Balance	22,000
5.	Moisture Tester	45,000
6.	Furniture	20,000
7.	Containers for raw materials and finished product.	40,000
8.	Crates	20,000
Total		**₹ 60,82,000**

Table-2 *Cost of land and buildings*

S. No.	Item	Cost in Rupees ₹
1.	Land area 600 sq. ft.@ Rs. 300 per sq. ft.	1,80,000
2.	Construction cost @ Rs. 800 per sq. ft.	4,80,000
	Total	**₹ 6,60,000**

Total fixed cost = 60,82,000 + 6,60,000
Fixed cost per month: = 6,742,000

Assumptions

Useful life of machines = 10 years.
Useful life of building = 20years.
Salvage value = 10% of initial cost.
Rate of interest = 12% p.a.

1. Depreciation of machines per year = $(\frac{C-S}{L}) = \frac{60,82,000-608200}{10}$ = 5,47,380
2. Cost of Land and Building per year= $\frac{6,60,000}{20}$ = 33,000
3. Fixed Cost= 33,000+547380= 580380
4. Interest @ 12% per year= (580380×12)/100= 69645.6
5. **Total Fixed Cost= 580380+69645.6=** 650025.6 per year **= 54169/- per month**

Table-3 *Labour and other charges*

S. No	Item s	Cost in Rupees ₹
1.	**Labour Charges**	
	(a.) One Manager/Supervisor	18,000/- p.m.
	(b.) One operator	9,000/- p.m.
	(c.) One helper	6,000/- p.m.
	(d.) One watchman	5,000/- p.m.
	Total	38,000 /- p.m.
2.	Electricity charges for 5400 kW in a month @ 6/- per kW	32,400/- p.m.
3.	Raw materials required per month	
	Sago (30,000 kg ×0.70 part ×@ Rs 60 per kg.)	1260000
	Water chestnut (30,000 kg × 0.15 part ×@ Rs 120 per kg.) Amaranth (30,000 kg x Part x @ 90 per kg)	540000 405000
	Total	2205000
4.	Spices @ 2% @Rs. 400 per kg	2,40,000/-
5.	Packaging material @ 0.25 per packets (15,00,000×0.25)	3,75,000/-
6.	Repair and maintenance @ 10% of machine cost.	2,22,000/-
7.	Insurance charges @ 10% of TFC	61,622.40/-
	Total	**₹ 3174022.44/-**

Variable Cost

The cost of production, break even volume, break even sales and break even period:

Assumptions:

Capacity =100 kg raw materials per hr.
Operating time = 10 hr/day
Working days = 26 days in a month.

Total installed capacity of unit in terms of kg. of materials = 30,000 kg
Size of one unit = 20 grams.
Total number of units p.m. = $\frac{30,000\times1000}{20}$
= 15,00,000

Assuming the unit to operate at 75% of installed capacity
Therefore, total number of units produced per month is = 11,25,000
Cost of one unit = ₹ 8- per unit

Variable per unit = $\frac{3174022.44}{11,25,000}$=2.82

Break even quantity = $\frac{67,42,000}{8-2.82}$ =1301544.40 units.

Break even sales = $\frac{6742000}{8-2.82}$×8=10412355.2/-

Break even period = 9.25 months
= 277 days

Table-4 *The result of cost analysis is tabulated as follows:-*

S. No.	Item	Values in Rupees ₹
1.	Fixed cost	67,42,000
2.	Variable cost	3174022.44
3.	Variable cost per pack of 20 grams	2.82
4.	Break even quantity	1301544.40
5.	Break even sales (Rs.)	10412355.2
6.	Break even period	277 days

Conclusion

Therefore, from the technical analysis like plant capacity, production, size and number of units of finished goods and from economic point, analysis of fixed cost, variable cost, profitability ratio, showed that setting up extruded based snack industry is profitability. From breakeven, analysis it was found that in order to produce 15, 00,000 units of 20 gram packets of ready to eat extruded snacks, the breakeven quantity was 1301544.40 packets and break even sales was 10412355.2 /- and break even period was 277days. Which indicates profits can be seen after 277 days and the relation of output to input risk is less and finally it is proved that plant is economically viable.

Application of research

1. This research was done for the purpose of analysis of technical economic feasibility which is required to known before startup of new extruded small scale industry.
2. The research encourages for betterment of the preparation expanded products, processing and marketing of the product. It also gives information about the cost of machines, establishment charges, and recurring expenses involved in establishment of industry and preparing the extruded product.
3. It can improve the income of the entrepreneur, farmer by increase in sales of the product

Research Category: Processing and Food Engineering, Post harvest processing

Abbreviations

BEA: Break Even Analysis
BEP: Break Even Period
BEQ: Break Even Quantity
B/C: Benefit cost Ratio

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