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Cost dynamics and operational constraints in spice powder processing: A case study of Srivari spices and foods ltd.

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Abstract

Spice processing constitutes a significant segment of the agro-industrial sector by facilitating value addition, improving market linkage and enhancing farm-based incomes. The present study evaluates the cost composition, profitability and operational constraints of spice powder processing using a case study of Srivari Spices and Foods Private Limited, functioning in Telangana and Andhra Pradesh. The enterprise follows a dual marketing strategy involving direct-to-consumer sales through retail networks alongside business-to-business supply channels, with chilli, turmeric and coriander powders forming the principal products. The analysis shows that the unit made a total capital investment of ₹646.79 lakhs, with a major share allocated to plant and machinery, highlighting the capital-intensive nature of the processing activity. Cost assessment for the year 2023–24 indicates that depreciation on processing equipment and labour expenses were the dominant components of fixed and operating costs, respectively. The firm processed over 8.12 lakh kilograms of output during the study period. Among the products, chilli powder recorded the highest production cost as well as the highest net return per kilogram, driven by strong market demand and comparatively stable raw material supply. Turmeric and coriander powders also yielded positive returns, with benefit–cost ratios greater than one. Break-even analysis revealed that actual production volumes exceeded break-even levels for all major spice powders, confirming economic feasibility. Nevertheless, the unit faced challenges such as raw material price volatility, quality inconsistency, technological limitations and storage-related issues. Addressing these constraints through technological upgrading, improved quality management and efficient sourcing is essential for enhancing long-term competitiveness.

Keywords: Cost structure, value addition, benefit–cost analysis, break-even analysis, agro-industry

Introduction

"Agro-industry" is a broad concept including a wide range of industrial, manufacturing and processing activities that rely on agricultural raw materials, along with ancillary services and inputs that support agricultural production. In India, the food processing industry has emerged as a sunrise sector, gaining economic significance in recent years. Factors such as abundant raw material supply, evolving consumer preferences and supportive fiscal measures have accelerated its growth. Economically, this sector plays a crucial role in bridging agriculture and industry, enhancing overall value chains. Prioritizing this sector, can effectively address issues related to food security. Strengthening this linkage is essential to reduce post-harvest losses, enhance the value and shelf-life of agricultural output and improve nutritional content. Notably, India already holds a strong position as a major exporter of various food products

India is widely known as the “Origin and Land of spices”. No other country has the diversity and volume of spice production found in India because of its favorable agro-climatic conditions. Spices hold significant economic value as key commercial crops, contributing to both domestic consumption and international trade. Domestically, they are extensively used not only in culinary applications but also across sectors like medicine, pharmaceuticals, perfumery and cosmetics. The consistent demand for Indian spices in global markets has substantially boosted the country's export earnings, reinforcing their importance in India’s trade portfolio

India offers ideal conditions for the cultivation of nearly all types of spices, with every state and union territory producing at least one spice variety in substantial quantity. Under the act of Parliament, 52 spices fall under the regulatory scope of the Spices Board, while the International Organization for Standardization (ISO) recognizes 109 different spices. Spice products are derived from whole spices and are available in various forms such as powders, essential oils, oleoresins, natural colors and preserved formats including freeze-dried, dehydrated, frozen, brined and syrup-based. Spices, known for their strong aroma and flavor, are plant-based substances predominantly sourced from tropical regions and commonly used as condiments. Historically, spices were highly valued due to their utility in medicine, preservation and perfumery. Today, India plays dominant role in global spice production

Importance of spices processing industry

There is a significant surge in the consumption of processed foods, reflecting the impact of scientific and technological advancements on daily requirements and lifestyles. Spices, known for their distinctive flavor and aroma, play a vital role in enhancing the taste profile of a wide array of processed food products. Beyond their traditional use in raw or whole form, spices are increasingly processed to meet specific industry needs. You pick any packet of quick savoury around you, it would surely contain added spice powders in it, such is the amount of scope which the processed spice industry has. Processed spices have relatively shorter shelf-life than whole spices and hence they are sold in small packages in retail markets. The spices processing industry in India hence has a wide scope for development due to increasing trend in use of processed spices and in availability of wide range of spices in India.

Materials and Methods

Selection of the Study Area

Hyderabad district of Telangana was purposively selected. Srivari Spices and Foods Limited have wide variety of product mix. So, it has been selected purposively for the study. In addition to wider product mix, maintenance of detailed data and records and easy accessibility to data prompted to its selection.

Data Collection

The required data for the financial year 2023-2024 was collected from the annual budget provided. For calculating the cost of manufacturing, data was collected by taking actual observations of the activity of the unit by conducting interview with the supervisors and from the records maintained by the unit for the year 2023-2024. The detailed data on various aspects like raw material used for different sections of the unit for manufacturing different products, output of different products was acquired from the production manager. Information regarding salary, manpower in each section of the plant and other benefits of the staff were collected from account section and the managing director.

Total Cost and Return of the unit

The total revenue earned from the unit was calculated by multiplying the total quantity of product marketed with the price of that product per unit. Net returns per product is also calculated by subtracting total cost from total revenue of that product to check higher returns from particular product.

Break even analysis

The break-even point is the level of operation at which total revenue equals to total costs. The break-even quantity is estimated by using the formula,

$$BEQ = \frac{TFC}{P - VC}$$

Where,
BEQ= Break even quantity
TFC= Total annual fixed cost (₹)
P= Price per kg produced (₹)
VC= Variable cost per kg produced (₹)

Results and Discussion

Srivari Spices and Foods Private Limited is a company incorporated on 29th January, 2019 as a private limited company under the Companies Act, 2013. The brand name used for marketing its products is "SRIVARI". Its products are marketed in states of Telangana and Andhra Pradesh with a unique business model, firstly comprising of "D2C" (Direct To Customer) where products are delivered at the doorstep of the customers using approximately 15,000 retail stores. Secondly, "B2B" (Business To Business) wherein products are supplied to suppliers. The major manufactured spice powders include chilli powder, turmeric powder and coriander powder, besides whole wheat atta. To come into the conclusion of production cost per unit per product, there is a need to consider the fixed costs, operational costs separately which include the costs of investments; for machineries, human workforce, raw material etc and other miscellaneous costs, which we will look into with the help of several tables below and then attempt to calculate the per unit costs of each product.

Table 1: Total initial capital investment of the unit

Sr. No.	Particular	Total investment of unit	
		Amount ₹ (Lakh)	Percentage to total
1.	Land	87.48	13.53
2.	Computers and Data Processing Units	6.50	1.00
3.	Electrical Installation and Equipment	14.91	2.31
4.	Factory Building and Shed	75.30	11.64
5.	Lab Equipment	4.11	0.64
6.	Furniture and Fixtures	10.88	1.68
7.	Plant and Machinery	434.83	67.23
8.	Office Equipment	1.06	0.16
9.	Vehicles	11.72	1.81
	Total	646.79	100

The total investment in capital assets was ₹ 646.79 lakhs. The major part was invested for plant and machinery which accounted to ₹ 434.83 lakh (67.22%). The second major investment was made on land which was accounting to ₹ 87.48 lakh (13.53%). Investment were also done in factory building and shed, electrical installation and equipment, vehicles, furniture and fixture, computers, lab equipment, office equipment which was ₹ 75.3 lakhs, 14.91 lakhs, ₹11.72 lakhs, 10.88 lakhs, 6.5 lakhs, 4.11 lakhs and ₹1.06 lakhs, respectively.

Total fixed and operating cost of the unit

The information regarding the total fixed cost and operating costs of the unit in 2023-2024 are mentioned in the table 2 and 3.

Table 2: Total fixed cost of Srivari Spices and Foods Limited (2023-2024)

Sr. No	Particular	Fixed cost of unit	
		Amount ₹ (Lakh)	Per cent share
1	Annual Rent expenses	37.08	11.71
2	Depreciation of computers	5.81	1.84
3	Depreciation of Electrical Installation and Equipment	9.24	2.92
4	Depreciation of Factory Building and Shed	22.42	7.08
5	Depreciation of Lab Equipment	2.88	0.91
6	Depreciation of Furnitures and Fixtures	4.24	1.34
7	Depreciation of Plant and Machinery	188.18	59.45
8	Depreciation of Office Equipment	0.83	0.26
9	Depreciation on vehicles	12.26	3.87
11	Insurance	8.08	2.55
12	Taxes	25.5	8.06
	Total fixed cost	316.52	100

Table 3: Total operating cost of the unit (2023-2024)

Sr. No	Particular	Operating cost of Unit	
		Amount ₹ (lakh)	Percent
1	Salary	340.49	47.35
2	Power and Fuel charges	36.29	5.047
3	Business Promotion expenses	154.98	21.55
4	Repair and maintenance	14.89	2.07
5	Travelling expenses	13.34	1.85
6	Software and Subscription	6.37	0.88
7	Provision for bad and doubtful debts	6.58	0.91
8	Rates and Taxes	25.5	3.54
9	Office expenses	8.73	1.21
10	Legal and Professional fees	58.08	8.07
11	Statutory Audit fees	5.71	0.79
12	Advertisement expenses	31.07	4.32
13	Printing and stationery	0.59	0.08
14	Contribution to Provident Fund and other	2.04	0.28
15	Staff Welfare and Gratuity expenses	0.69	0.09
16	Miscellaneous expenses	13.64	1.89
	Total	718.99	100

Production of different products

The information regarding production of different products for year 2023-24 is given in table 4. The total production from the unit amounts to 812400 kilograms. The unit produces six different products. Among the spice powders processed, chilli powder accounts for the highest share of product (35.45%) of total processing of unit followed by turmeric powder share12.56 per cent, coriander powder share 10.64 per cent whereas the share of other two products is only 5.04 per cent of total processing of unit.

Table 4: Production of different products during 2023-2024

Sr. No	Products	Production (000 kg)	Share of product (%)
1	Chilli powder	288.00	35.45
2	Turmeric powder	102.00	12.56
3	Coriander powder	86.40	10.64
4	Madras sambar powder	22.60	2.78
5	Garam masala	18.40	2.26
6	Whole wheat flour	295.00	36.31
	Total	812.400	100

Cost of Raw material

The information related to procurement of raw material for the production of different spice powders during 2023-24 with their cost, rate is presented below in Table 5

Table 5; Total cost of raw material for different spice powders

Sr. No.	Name of Product	Raw material (000 kg)	Rate per kg (₹)	Raw material total cost (₹ Lakh)
1	Red Chilli	360.00 (100.00)	160	576.00
2	Raw turmeric	120.00 (100.00)	150	180.00
3	Coriander seeds	96.00 (100.00)	130	124.80

Per kilogram production cost of different spice powders (2023-2024)

The information related to per kilogram net returns from different spice powders is presented in Table 6.

Table 6: Per kilogram net returns from different spice powders

Sr. No.	Name of product	Fixed cost per kg (₹)	Operating cost per kg (₹)	Raw material cost per kg (₹)	Packing cost per kg (₹)	Total cost of production per kg (₹)	Rate of final product per kg (₹)	Net return per kg (₹)
1	Chilli powder	34.63	78.66	177.77	14.50	305.58	560	254.42
2	Turmeric powder	35.60	80.88	161.29	17.92	295.70	450	154.29
3	Coriander powder	36.91	83.84	136.84	18.96	276.56	450	173.43

From the Table 6, it is observed that the per kilogram production cost of chilli powder, turmeric powder and coriander powder was ₹ 305.58, ₹ 295.70 and ₹ 276.56 respectively. It is concluded that chilli powder accounts for the highest cost of production (₹ 305.58 per kg).

Total cost and Total returns of different spice powders (2023-2024)

The information related to total cost, total returns of different spice powders is presented in Table 7.

Table 7: Total cost and total returns of different spice powders

Sr. No.	Name of Product	Total cost (₹ lakh)	Total returns (₹ lakh)
1	Chilli powder	990.09	1814.40
2	Turmeric powder	330.01	502.20
3	Coriander powder	252.22	410.40
4	Total	157.23	2727.00

The information about the total cost and total returns of different spice powders were estimated and presented in Table 4.17. It is seen from the table; the net profit of Srivari Spices and Foods Limited was obtained ₹ 2727 lakhs during the study period. The total cost of Srivari Spices and Foods Limited unit were ₹ 157.23 lakhs.

Break-even analysis for different spice powders (2023-2024)

The information related to the Break-even points for different spice powders are given in Table 8.

Table 8: Break-even point for different spice powders (2023-2024)

Sr. No.	Name of product	Quantity of final product (kg)	BEP (kg)	Total returns (₹)	BEP (₹)
1	Chilli powder	324000	36,964.77	181440000	20700273.15
2	Turmeric powder	111600	19,122.40	50220000	8605080.87
3	Coriander powder	91200	14,679.61	41040000	6605825.136

From the Table 8, it is concluded that, the break-even for the three spice powders in both physical and monetary terms were more than actual production. The unit produced more than its break-even quantity for all the three spice powders.

Benefit: Cost ratio

The information related to the Benefit:Cost ratio of unit is presented in Table 9.

Table 9: B:C ratio of major spice powders (2023-2024)

Sr. No.	Name of Product	Total cost (₹)	Total returns (₹)	B:C ratio	BEP (₹)
1	Chilli powder	99009364.84	181440000	1.83	20700273.15
2	Turmeric powder	33001233.38	50220000	1.52	8605080.87
3	Coriander powder	25222809.45	41040000	1.63	

The information regarding major spice powders B: C ratio is presented in Table 9. It is revealed that, the B:C ratio for Chilli powder, Turmeric powder and Coriander powder was 1.83, 1.52 and 1.63 respectively. Among the spice powders, the highest B: C ratio was observed in chilli powder (1.83), followed by coriander powder (1.63) and turmeric powder (1.52), respectively.

Problems faced by the unit

The information of problems faced by the unit to run its business are mentioned below:

1. **Price fluctuations of raw material**

Off season availability and market demand affect the prices of raw material like red chillies and turmeric rhizomes, impacting raw material cost predictability

2. **Variability in procurement of raw materials**

Raw materials sourced for the production of spice powders vary because of the differences in farming practices, regional differences and post-harvest handling. In case of turmeric, sourcing turmeric with consistent color, aroma and curcumin could be difficult.

3. Technological advancements
The existing processing equipment for grinding the raw material is functional but lacks advanced technological features when compared to competitors, which impacts efficiency and overall operational performance of the unit

4. Grinding issues
During the grinding process, heat is generated. Overheating during the grinding process reduces the quality and aroma of turmeric powder; reducing essential oils, pungency and flavour of chilli powder. Also, the equipment used for grinding, wear and tear due to the hardness of turmeric rhizomes

5. Consumer preferences
A considerable section of the markets prefer organic spice powders, while others demand high-curcumin varieties, requiring product diversification. Some markets prefer spicier chilies, while others focus on milder varieties with strong color.

6. Moisture sensitivity
Turmeric powder absorbs moisture, leading to caking and loss of quality. The natural oil content in coriander can make the powder sticky, leading to clogging in machinery or might lead to clumping if gets in contact with moisture.

Summary and Conclusion
The study indicates that the total investment in capital assets amounted to ₹646.79 lakhs, with plant and machinery constituting the dominant share of ₹434.83 lakhs, accounting for 67.23 per cent of the total investment. Land formed the second largest component, with an investment of ₹87.48 lakhs (13.53 per cent). The remaining 19.25 per cent of capital investment was allocated to supporting assets such as factory buildings and sheds, electrical installations, vehicles, computers and data processing units, as well as furniture and fixtures, reflecting the comprehensive infrastructure requirements of the processing unit.

In terms of financial performance during the year 2023–24, chilli powder emerged as the most profitable product, recording the highest net return of ₹254.42 per kilogram and a superior benefit–cost ratio of 1.83. This was followed by coriander powder and turmeric powder, which generated net returns of ₹173.43 and ₹154.29 per kilogram with B:C ratios of 1.63 and 1.52, respectively. The comparatively stronger performance of chilli powder can be attributed to sustained market demand, lower processing and storage losses, and relatively stable availability of raw materials throughout the year.

The study reveals that the unit produces more than its break-even quantity for all three spice powders. Therefore, it is concluded that all the products overtake the value in the production, in monetary terms and are risk-free and their worth has been surpassed by their respective production levels.

The study highlights that seasonal fluctuations, off-season scarcity and changing market demand significantly influence the availability and price stability of key raw materials such as red chillies and turmeric rhizomes. Variations in cultivation practices, regional sourcing and post-harvest handling further affect the uniformity of quality parameters. In turmeric, ensuring consistency in colour, aroma and curcumin content remains a major challenge, while evolving consumer preferences for organic, high-curcumin or region-specific spice attributes necessitate product differentiation.

On the processing side, although the existing grinding machinery is operational, its technological limitations affect efficiency and product quality. Heat generation during grinding adversely impacts aroma, pungency and essential oil content, particularly in turmeric and chilli powders, while the hardness of turmeric accelerates equipment wear. Additionally, moisture absorption and oil content pose storage and handling challenges, leading to caking, stickiness and quality deterioration. These constraints underline the need for improved processing technology, better moisture control and quality-oriented sourcing strategies to sustain competitiveness in the spice processing sector.

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