



Economic Analysis of Functional Yoghurt and its Impact on Consumer Acceptability

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ABSTRACT

Yoghurt is famous fermented milk product due to the entry of a number of international and national organized dairy players in the market and gradually replaces the other dairy products due to its varieties and health benefits. From the economic analysis of functional yoghurt preparation, it was found that initial capital investment in starting the business of functional yoghurt was ₹ ten lakh. The proportion of fixed and variable cost was 9 per cent and 91 per cent, respectively. Final cost of production of optimized yoghurt was worked out to be ₹ 99.52 per kg. Considering the prevailing market price of yoghurt to be ₹ 120 per kg, a profit of ₹ 20.48 per kg could be obtained which is a good profit margin for the commercial viability and sustainability of the product. Benefit cost ratio was observed to be 1.21 which is quite higher than one indicating good viability of the investment. The Break Even output was calculated as 31.28 kg of product with a margin of safety of 68.72 per cent which is quite high indicating that the business is secure and less risky. The degree of liking among the respondents shows that nearly 32% described the product as excellent and 39% as very good, while remaining 18% expressed the product as good. 5% of the people neither like or nor dislike the product and 6% of the people dislike the product.

HIGHLIGHTS

- The Break Even output and margin of safety indicating that the business is secure and less risky.
- The consumer study results indicated that the product was well accepted by the consumers.

Keywords: Breakeven point, Encapsulated Resveratrol powder, Fixed cost, Functional Yoghurt, Variable cost

Indian dairy sector has evolved from rags to riches. In the pre-independence era, there was scarcity of milk and there was dependence on imports. Owing to development of dairy sector in various phases of operation flood and de-licensing of dairy industry, India emerged as top milk producing nation. The milk production of India was 17 million tonnes in 1951. Milk production grew from 21 million tonnes in 1970 to nearly 198.4.7 million tonnes in 2019-20. India is the world's largest milk producer, with 22 percent of global production, followed by the United States of America, China, Pakistan and Brazil. Per capita availability of milk in India has reached 406 grams per day in 2019-20 higher than the world average of 293.7 grams per day. Punjab state topping the table with as high as 1120 g (NDDDB, 2022).

As per the recent data, in India, 10% of total milk produced is converted into fermented milk products like yoghurt, *dahi*, *lassi* etc. This sector is growing at more than 20 % as compared to other sector. Yoghurt is a popular fermented dairy product produced by the cultures" consisting of *Streptococcus salivarius subsp. thermophilus* and *Lactobacillus delbrueckii subsp. Bulgaricus*. Resveratrol is having lot of potential beneficial effects on human health, including cardio and neuro-protective, antioxidant,

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protects from infection and ischemia antiviral, prevents ageing, anti-inflammatory, anti-carcinogenic, and anti-obesity effects (Alves *et al.*, 2012). Economic viability is the most important factor to make place in the market for any food product along with its quality and sensory parameters. Further, the product should also be attractive in terms of palatability and price for commercial sustainability of the product in a competitive market. Every market product needs to be commercially viable to become attractive for entrepreneurs and industrialists so that its production can be taken up. Keeping in view of this fact, the present study was focussed to estimate the cost analysis of functional yoghurt and its impact on consumer acceptability.

MATERIALS AND METHODS

Raw material, packaging material, other ingredients and equipments used for the preparation of functional yoghurt include: Milk, encapsulated resveratrol powder, processing equipment and accessories. Yoghurt used for the preparation of functional yoghurt was prepared by the method followed by Tamime and Robinson (1999). The manufacturing cost of functional yoghurt was calculated out as per guiding principle suggested by Chauhan *et al.* (2006) and Chauhan *et al.* (2009).

Therefore, through present investigation, an attempt was made to estimate the cost of production of optimized yoghurt considering certain set of assumptions:

- i. The working space required for optimized yoghurt unit was 600 sq. feet (30×30 sq. feet) and it was taken on rent (@ ₹ 10000/- per month) semi urban city of Ludhiana. Building includes processing section, store and utilities section.
- ii. Capital investment (₹ 10,00,000/-) includes the cost of all equipments viz. pasteurizing vat & its accessories, yoghurt cup filling and sealing machine (manual), incubator room, cream separator, refrigerator, walk in cooler, trays, generator and accessories. Depreciation on machinery and equipments was taken @10 percent per annum. Interest on capital investment and variable cost was taken @12 percent per annum.
- iii. Raw materials such as mixed milk, resveratrol, sodium caseinate, SMP, culture and other required ingredients were required for preparation of optimized yoghurt.

- iv. One batch of optimized yoghurt 100kg was made from raw materials.
- v. Two skilled and three unskilled people were required for manufacturing functional yoghurt and 300 working days of the year.
- vi. The optimised yoghurts were packed in polystyrene cups and stored at 5°C.

To know the acceptability of developed product, final optimized sample of yoghurt was offered to perspective consumers belonging to different age group. Consumer's response about the product was recorded through questionnaire supplied along with the samples to all consumer participated in consumer survey.

RESULTS AND DISCUSSION

Costing of the developed product

Yoghurt products have achieved considerable economic importance worldwide owing to their high nutritional image. Economic viability is the most important factor to make place in the market for any food product along with its quality and sensory parameters. Further, the product should also be attractive in terms of palatability and price for commercial sustainability of the product in a competitive market. Every market product needs to be commercially viable to become attractive for entrepreneurs and industrialists so that its mass production can be taken up.

A scrutiny of table 1 revealed that initial capital investment in starting the business of functional yoghurt was ₹ ten lakh. Daily fixed cost was observed to be ₹ 932 per day which was 9 per cent (Fig. 1) of the total cost of functional yogurt manufacturing. Further, total variable cost per day was observed to be ₹ 9022 per day which was about 91 per cent of the total cost involved in functional yoghurt preparation. Similar results were found by Kumar *et al.* (2017) according to whom the proportion of fixed and variable cost was 9 per cent and 91 per cent respectively. Further, it is evident from the Fig. 2 that the largest share among the variable cost was of raw materials like milk, SMP, Culture and encapsulated powder (67 per cent) followed by the Labour (18 per cent) and miscellaneous expenses including packaging material and other cost components like electricity, laboratory, cleaning

Table 1: Component wise cost analysis*

Total Capital investment required		₹ 10,00,000	
Sl. No.	Particulars	Cost (in ₹)	
(A)	<i>Fixed cost</i>		
	Depreciation on Equipments @10% p.a.	100000	
	Interest on Capital Investment @12% p.a.	120000	
	Building rent per annum	120000	
	Fixed cost per annum	340000	
	Total fixed cost per day (A)	932	
(B)	Variable cost (₹/unit)	Quantity required per batch (100 kg)	Cost (in ₹)
	<i>Raw materials</i>		
	(a) Mixed milk for yoghurt preparation (26/kg)	94 kg	2444
	(b) Skim milk powder (250/kg)	2 kg	500
	(c) Culture (300/kg)	3 kg	900
	(d) Encapsulated Resvertrol Powder	1 kg	2200
	Total		6044
	Labour @ 302/ Day for unskilled and 367/ Day for skilled (1 man day = 8 Hr)	Unskilled = 3 Skilled = 2	1941.8
	Packaging Material	1000	1000
	Electricity @ 8 / unit	40	320
	Laboratory charges@ 0.2% of raw materials		12.00 (rounded)
	Cleaning and sanitizing materials@ 0.1% of raw materials		6.00 (rounded)
	Total variable cost per day (per batch) (B)		₹ 9022
	Total cost of the batch = A+B		₹ 9952
(C)	<i>Returns from batch</i>		
	Yield per batch	100 Kg	
	Total cost per kg (9952/100kg)		₹ 99.52
(D)	Sale price per kg	₹ 120	
	Profit per kg (Before taxes)	₹ 20.48	
	Gross returns	12000	
	Total cost (Fixed +Variable)	9952	
	Net returns	2048	
	BC ratio (Gross returns/Total cost)	1.21	
	Breakeven point	31.28	
	Margin of safety (per cent)	68.72	

*Cost vary between region to region.

and sanitizing together accounting for about 15%. Final cost of production of optimized yoghurt was worked out to be ₹ 99.52 per kg. Considering the prevailing market price of yoghurt to be ₹ 120 per kg, a profit of ₹ 20.48 per kg could be obtained which is a good profit margin for the commercial viability and sustainability of the product. Benefit cost ratio was observed to be 1.21 which is quite high than one indicating good viability of the investment. Kumar *et al.* (2016) reported that the cost of the developed paneer nuggets was ₹ 216.06 per kg a profit of ₹ 83.94 per

kg could be obtained which is a good profit margin for the commercial viability and sustainability of the product.

The break even output is the minimum number of units of finished product produced at which the total revenue equals total cost. A firm will continue its production process or will remain solvent as long as the marginal revenue is greater than or equal to the marginal cost. Break even output provides us with an estimate of the output produced at that level. The Break Even output was calculated as 31.28 kg of product with a margin of safety

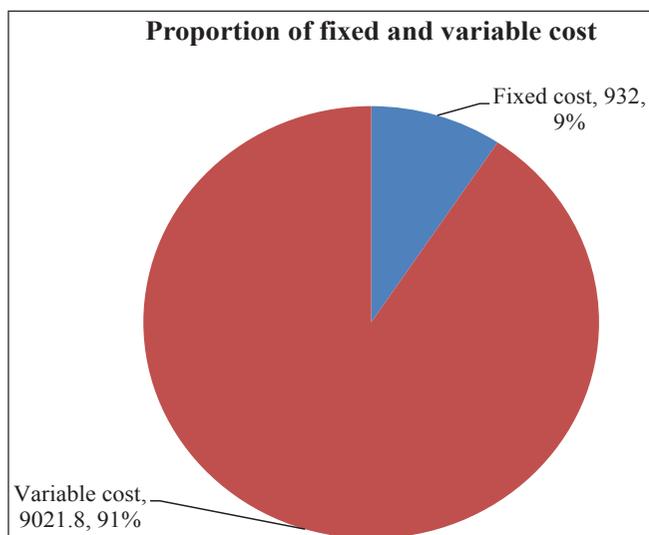


Fig. 1: Proportion of fixed and variable cost

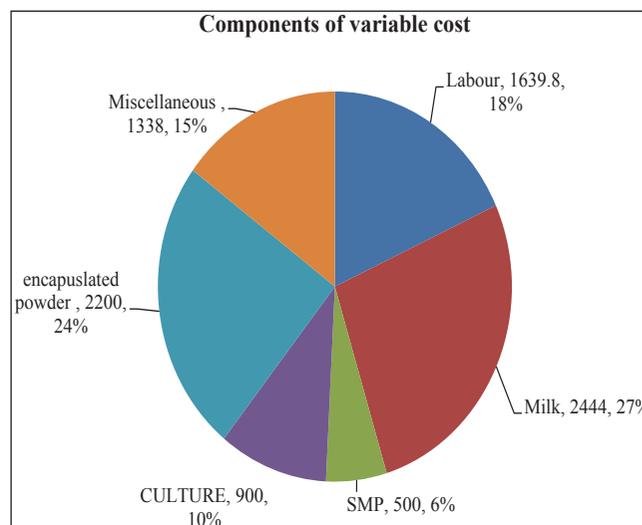


Fig. 2: Components of variable cost

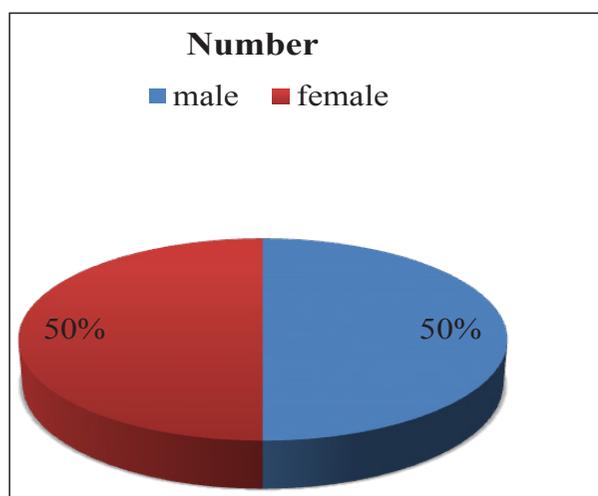


Fig. 3: Consumer- Gender wise

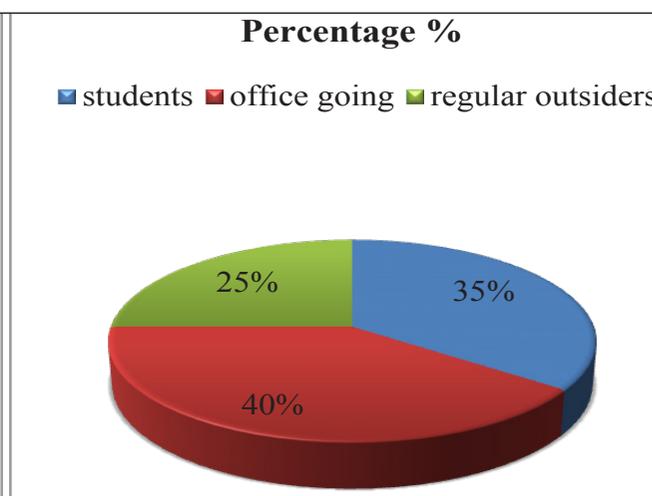


Fig. 4: Details of consumers

of 68.72 per cent which is quite high indicating that the business is secure and less risky. These findings are in line with those of Watharkar *et al.* (2017) reporting that the Break Even output was 8.94 kg of product i.e. spicy paneer, which is much lower than the actual level of production i.e. 36 kg providing enough margin of safety i.e. 75.16 per cent. Krofa *et al.* (2018) reported that in both the cases of control and treatment, the breakeven quantity was lower than the actual level of production providing enough margin of safety *i.e.*, 11.44 kg (58.86 per cent) and 12.28 kg (63.44 per cent) respectively.

Pilot Consumer study of Yoghurt Encapsulated resveratrol powder

Pilot consumer study (Fig. 3-6) on the acceptability of yogurt sample was carried out to find out the potential marketability of the product. Yogurt was optimised as per the earlier mentioned procedures and was packed in polystyrene cups (100 gm) and then distributed to 100 persons who were regular consumers of yoghurt. Among the consumers, nearly 50% were male and 50 % were female. The breakup of the consumers presented in shows that among the consumers nearly 35% were students 40% were office going people and remaining 25% regular

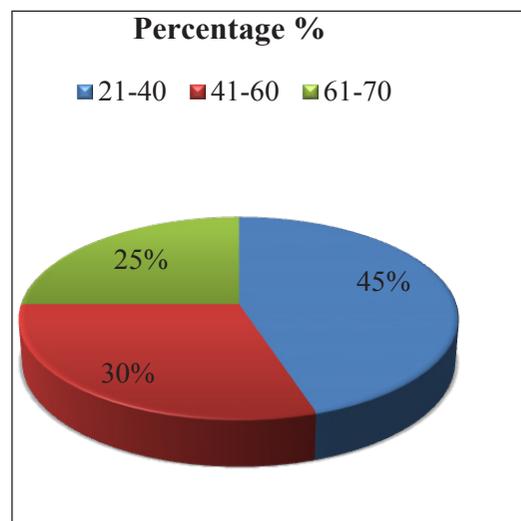


Fig. 5: Age of the respondents

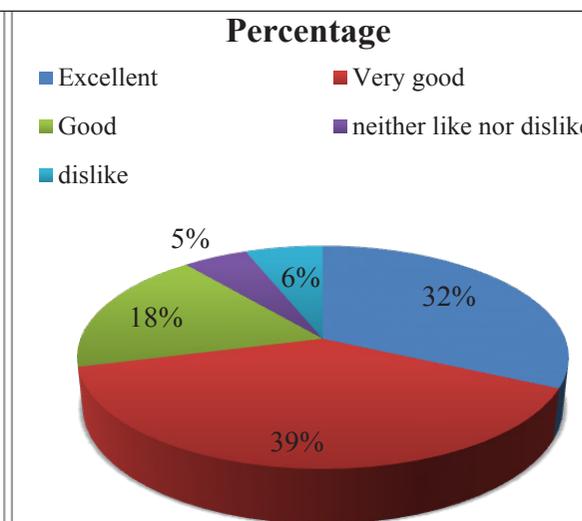


Fig 6: Degree of liking among Respondents

outsiders. Age group distributed in the indicates that 45% of the consumers were in the age group of 21-40 years, 30% were in 41-60 years group and 25% were in 61-70 years group. The degree of liking among the respondents (Fig. 6) showed that nearly 32% described the product as excellent and 39% as very good, while remaining 18% expressed the product as good. 5% of the people neither like or nor dislike the product and 6% of the people dislike the product. Altogether the product was well accepted by the consumers. Therefore, the present investigation revealed that optimised yoghurt was well accepted by the consumers.

CONCLUSION

From the above discussion, it may be said that functional yoghurt preparation business can be started with an initial investment of ₹ ten lakh and yielding ₹ 61,440 per month net profit. The initial investment can be recovered in just one and half year. There is lot of demand of good quality milk products in local as well as international market. People are becoming health conscious and are ready to pay any price for good quality milk products. This enterprise can be adopted by educated unemployed youth of the state creating self employment for themselves and creating job opportunities for others as well.

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