

## “ENTREPRENEURIAL OPPORTUNITY IN DAIRY SECTOR BY CONVERSION OF WHEY INTO A BEVERAGE”

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### ABSTRACT

India is the world's largest Milk producer. It produces 16 % of the world's milk. Milk production in 2009-10 : 112.6 million tonnes. Encouragement of milk producer to produce more milk due to increasing income from sale of milk, value added product Milk and its by products accounted as best among all life-sustaining substances having beneficial effects that in turn reduces bloating of stomach, soothes intestines in IBS and helps in Indigestion, Eases symptoms of Hemorrhoids and constipation. Whey is one such blessing of nutrition easily available at throw away economics in form of by product which is unfortunately ignored. Biofunctionality of Whey Protein are of immense importance. Efforts are made to utilise it in a form that can be incorporated in modern lifestyle. Whey contributes to increased supplies of essential amino acids such as cysteine, isoleucine, leucine, lysine, threonine and tryptophan (Raynal-Ljutovac et al., 2008) Whey, fresh according to international standards is, “The liquid part of the milk that remains after the separation of curd in cheese making”. Its main food use is in the preparation of whey cheese, whey drinks and fermented whey drinks. The main industrial uses are limited to manufacture of lactose, whey paste and dried whey. Two types of whey exist: acid whey, obtained during the production of acid-coagulated cheeses such as cottage cheese, and sweet whey, from the manufacture of rennet-coagulated cheese. Acid whey contains twice as much calcium as sweet whey. For this study, acid whey is utilized that is fermented with probiotic culture and subjected to carbonation to develop an innovative dairy product.

**KEYWORDS:** Dairy Entrepreneurship, Dairy By-Product Management, Innovative Dairy Product

### INTRODUCTION

India is the largest milk producer country in the world and its dairy sector is growing at a consistent rate of 4.5 to 5% per annum. The rise in demand of milk and milk products can be attributed to the favourable demographic factors such as rise in income levels, increase in population and changing lifestyle. Traditionally, whey was considered the low-value by-product of cheese production, but in recent decades, whey components have attracted increasing commercial interest (BulutSolak and Akin, 2012).The demand is growing for both the traditional Indian dairy products as well as western dairy products. This necessitates continuous product innovation and process innovation. In a typical dairy processing plant, whey as a byproduct is the need of the hour to be utilized, conversion of whey into beverage with a value addition can resolve the problem of the dairy effluent treatment. Further, Probiotics and functional foods are gaining importance in the society due to their functionality and the health conscious people, unlike conventional whey beverages that are of course nutritious but lack the essence of health in a way that it is loaded with ample of carbohydrate.

Some studies suggest that moderately increasing protein intake, while controlling total energy intake may improve body composition and improve body-weight maintenance (Westerterp-Plantenga, 2003; Paddon-Jones et al., 2008; Abou-Samra et al., 2011). The potential positive outcomes associated with increased protein are thought to be due to lower energy intake associated with increased satiety and increased thermogenesis. Findings of studies of the impact of dairy proteins, whey and casein, on satiety are inconclusive (Abou-Samra et al., 2011). The effects of whey protein, such as reduction of short-term food intake and increased satiety have been mostly observed in short-term experiments when whey is consumed in much larger amounts than that found in usual serving sizes of dairy products (Luhovyy, Akhavan and Anderson, 2007). Whey proteins can be consumed as nutrition bars, powdered beverages or sports meals (Korhonen, 2009; Hernández-Ledesma, Ramos and Gómez-Ruiz, 2011). Whey proteins, in addition to delivering amino acids, are reported to be involved in protection against infections, immune enhancement and development of the gut (Kanwar et al., 2009)

Whether dairy products or components, such as whey or bioactive peptides, can offer an additional health benefit other than their nutritional value has not been consistently proved by scientific studies. To date, many products claimed as being “health-enhancing” lack the scientific evidence to merit claims. The subject of health and nutrition claims has received considerable attention from both industry and regulators. The general consensus amongst the legislators is that the regulatory framework should protect the consumer from false information, promote fair trade and encourage innovation in the food industry that can ultimately translate into healthier lifestyles (Roupas, Williams and Margetts, 2009).

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One such innovative product suggested by the author is the ‘**probiotic whey based beverage- Profizza**’ which can be prepared by combining Probiotics and whey. The product made in such a way as described in the following paragraphs, has no added sugar. Also, carbonation of whey places the product among the most dominating ‘carbonated beverage market’ at a cheaper rate with the additional benefits of nutrition. Hence, there a huge potential for this product in the coming years

## **METHODOLOGY**

### **Selection of Whey for Product Innovation**

According to its average composition whey is approximately 93% water and contains about 50% of total solids present in the milk of which lactose is the main constituent. Whey proteins constitute less than 1% of dry matter. In this category of products big attention has been paid to development of probiotic whey beverages, since beneficiary effects of probiotic strains on human health like lowering cholesterol level in blood, improving lactose metabolism, lowering blood pressure, anticancerogenic properties and immune system stimulation are known for a long period of time.

### **Production Process of the Product**

The following are the steps for manufacturing the ‘probiotic whey based beverage’.

**Step 1:** Whey is collected from a typical dairy plant effluent.

**Step 2:** Pasteurize the whey

**Step 3:** Bring the temperature down to 37°C

**Step 4:** Add Probiotic culture at rate of 1.5% of whey.

**Step 5:** Incubate for 4 hours at 37°C.

**Step 6:** Addition of Jalzeera (Spice blend) at rate of 0.25% of whey.

**Step 7:** Carry out Carbonation.

**Step 8:** Bottle in a PET bottle.

**Step 9:** Store the product under refrigeration at temperature below 7° C

The technical details and nutritional value of the product prepared by following the above mentioned steps are given in Table 1 and Table 2 below.

**Table 1: Technical Details of the Product**

Advantages of Probiotic carbonated whey	Whey proteins are a rich source of branched chain aminoacids (BCAA) like isoleucine, leucine and valine. Whey protein fractions include also lactoferrin - an iron-binding protein, glycomacropeptide (GMP) which derives after cheese making using rennet and is naturally free of phenylalanine and alpha-lactalbumin which is a calcium-binding protein.
Sensory Quality	Flavour: Typical refreshing, taste moderately salty to tangy, free from curd particles. Body and texture: Uniform consistency and uniform bubbles. Colour and Appearance: Sparkling clear, light greenish, with a tinge of light yellow.
Shelf life	The shelf life of Profizza is 45 days under refrigeration condition.
Packaging material	Pet bottle, tetra pak, glass bottle

**Table 2: Nutritional Value of the Newly Developed Product**

Nutritional Value Per 100 G (3.5 Oz)	
Energy	112 kJ (27 kcal)
Carbohydrates	5.14 g
Fat	0.36 g
Protein	0.846 g
Calcium	47 mg (5%)

## FINANCIAL FEASIBILITY OF THE PROJECT

The financial cash flows of the project have been shown in Table no. 3 and the profitability of the project is shown in Table no. 4. The assumptions used in calculations are as below;-

### Cost of Important Items

**Whey:** 5Rs/kg

**Probiotic culture:** 2 Rs/ 1.5 g

**Jaljeera:** 2 Rs /2.5 g

**Gas consumption:** 1.5 Rs/ lit

**Carbonation:** 3 Rs/lit

**Packaging:** Re. 1 per unit

**Machinery required:** Pasteurizer, packaging machine and other installations

**Land required for the project:** A plot of size 30m x30m.to be taken on Rent in industrial estate.

**Table 3: Cash Flows of a Sample Project (Figures in Rs)**

Year	0	1	2	3	4	5
Plant & Machinery	-500000					
Working capital	-100000					
Production per day		300	500	700	900	1200
working days		325	325	325	325	325
<b>A</b> Sales Quantity (Litres)		97500	162500	227500	292500	390000
<b>B</b> Selling price Rs./litre		30	30	30	30	30
<b>C</b> Sales Revenue(Rs.)		2925000	4875000	6825000	8775000	11700000
<b>Variable cost</b>						
Whey		487500	812500	1137500	1462500	1950000
Probiotic culture		195000	325000	455000	585000	780000
Jaljeera		195000	325000	455000	585000	780000
Gas consumption		146250	243750	341250	438750	585000
Carbonation		292500	487500	682500	877500	1170000
Packaging		97500	162500	227500	292500	390000
<b>D</b> Total Variable cost		1413750	2356250	3298750	4241250	5655000
<b>E</b> Total Contribution (D-C)		1511250	2518750	3526250	4533750	6045000
<b>F</b> Depreciation ( straight line method i.e 5lakhs/10 years)		50000	50000	50000	50000	50000
<b>G</b> Labour ( 2 employees Rs. 10,000 per month)		240000	240000	240000	240000	240000
<b>H</b> Rent of Shed ( Rs. 5000 p.m.)		60000	60000	60000	60000	60000
<b>I</b> Total fixed costs (Rs) (F+G+H))		350000	350000	350000	350000	350000
<b>J</b> Net Profit Annual (E-I)		1161250	2168750	3176250	4183750	5695000
<b>K</b> Tax (30%)		348375	650625	952875	1255125	1708500
<b>L</b> Profit After Tax(J-K)		812875	1518125	2223375	2928625	3986500
<b>M</b> Net Cash flow (F+L)		862875	1568125	2273375	2978625	4036500

**Table 4: Profitability of the Project. (Figures in Rs)**

Year	0	1	2	3	4	5
Cashflows	-600000	862875	1568125	2273375	2978625	4036500
Internal Rate of Return (IRR)	200%					
Payback period	3.2 years					
Net Profit after tax monthly		67739	126510	185281	244052	332208

## CONCLUSIONS

The Indian dairy sector has a huge burden of handling the whey coming as the by-product. The innovative probiotic whey based beverage product suggested by the author is an excellent way to solve this problem and at the same time opens a door of entrepreneurial opportunity in this field. In addition, some components in dairy products, such as calcium, vitamin D, ruminic acid, butyric acid, branched chain fatty acids and whey protein may protect against breast cancer (Moorman and Terry, 2004).The suggested product can be targeted to all age groups and is loaded with enormous health benefits.

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