

## Whey Based Instant Energy Beverage: An Approach to Increase Profits in Milk Processing Industry

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### SUMMARY

The large quantity of protein present in different milk and whey sample are wasted during milk processing. Liquid whey accounts for up to ninety percent of the yield during cheese making and has historically been considered a waste product. As legal and environmentally friendly whey disposal options dwindle, alternative utilization strategies for the liquid whey must be developed. Further processing of whey, such as drying, creates a potential financial burden on small cheese producers. Considering the proteins found in whey are associated with known health benefits, the nutrient laden, unprocessed liquid whey is an ideal base for a wholesome beverage.

### INTRODUCTION

Milk is an important and popular source of nutrition that is widely consumed around the world. Milk for human consumption can be obtained from a number of domesticated animals including sheep, goat, buffalo and cow, whose milk is by far the most consumed. Whey protein is a high quality protein powder from milk. Milk has two proteins: Casein (approximately 80%) and Whey Protein (approximately 20%). Whey protein is more soluble than casein and also has a higher quality rating. It is often referred to as the "Gold Standard" of protein as it is the most nutritious protein available (Raju *et. al.* 2005). Whey protein is a combination of a number of individual protein components. It is estimated that during the production of 1 kg of cheese it produces, approximately 9 kg of whey (Khamrui and Rajorhia, 1998.). By realizing the functional properties of whey, many industries target upon utilizing whey as the functional food ingredient. Whey protein concentrates, whey protein isolates and whey powder are prepared and widely marketed all over the world but all these process require sophisticated equipments. Hence the conversion of whey into beverage is one of the most attractive avenues for utilizing whey for human consumption.

### Whey Processing

Whey is the yellow, watery liquid that separates from the milk during the cheese making process and contains nearly half of all solids found in whole milk. It is estimated that during the production of 1 kg of cheese, approximately 9 litre of whey are produced. At one time, this whey was viewed as nothing more than a waste product. Cheese processors disposed of whey down drains until tightened environmental regulations made the dumping process illegal and expensive. Other disposal mechanisms included the discharge of whey into local waterways, the ocean, or as a component in animal feed (Gupta, 2000). Additionally, some whey has also been used as nutrient-laden soil enrichment in a process called land spreading. As land spreading restrictions and water treatment facility regulations continue to tighten over the next few years, cheese manufacturers will be forced to find alternative methods for disposing of or utilizing whey. Drying technologies are available for processing liquid whey into whey protein isolates and concentrates for an abundance of applications, but the energy needs alone can overwhelm small cheese producers. Equipment costs can also be prohibitive. An alternative solution for liquid whey disposal is needed (Alak and Karunakar. 2012).

### Whey Based Instant Energy Beverages

The conversion of whey into beverages is one of the most attractive avenues for the utilization of whey for human consumption. In terms of functionality, whey protein enhances protein content of beverage while improving its quality. Whey contain protein is an excellent protein choice for individuals of all ages (Mamoun and Ali, 2011).

- Whey protein is a natural, high-quality dairy protein that is derived from milk.

- It is a complete protein that contains all the amino acids in proportions that the body requires.
- Whey protein has a higher biological value compared to other proteins meaning that the human body can use this type of protein very effectively.
- As a comparison, the biological value of whey protein is 104, while the value is 100 for eggs, 74 for soy and 54 for wheat.
- In addition, whey contains a wealth of dairy nutrients, including calcium, phosphorus, magnesium, zinc, thiamin, riboflavin, vitamin B6, B12 and many biological active nutrients.
- Whey protein provides a number of benefits in areas including sports nutrition, weight management, immune support, bone health, and general wellness.

As food and beverage manufactures continue to add healthy ingredients, including high-quality protein sources, to their products, more and more foods and beverages with whey protein will be available in grocery stores.

### Whey Based Mango Instant Energy (RTS) Beverage

In order to make the beverage more attractive, nutritious, delicious and palatable, it was proposed to fortify the beverage with mango pulp as this region of India is the major producer of mango and it is having wide acceptability.

### Materials and Methods

- Milk – 500 ml
- Citric acid – 2 gm
- Mango pulp – 50 gm.
- Sugar
- Benzoic acid – 0.05 %.
- Muslin cloth

### Procedure

#### Whey Preparation:

- Add 2 gm citric acid in warm milk (60°C) and allow for coagulation.
- Filter through muslin cloth and separate whey.
- Use milk casein protein for channa or paneer preparation.
- Now about 400 ml whey coming from 500 ml milk.

#### Mango Pulp Preparation

- Take ripened alphonso mango washed thoroughly under tap water and dip in chlorine water for sanitation, then swiped with sterile cloth, clean and dry.
- After cleaning the fruits were peeled and cut into pieces then remove the seed and extract the pulp by juicer.

#### RTS beverage preparation:

- Whey (400 ml) is heated then add mango pulp, thereafter add Benzoic acid.
- Measure the TSS of the beverage.
- Add appropriate amount of sugar to increase the TSS up to 10-12<sup>0</sup>Brix.
- After capping sterilize the bottles in a autoclave at 121<sup>0</sup>C for 15 minutes.
- Kept bottles at refrigeration condition for storage.

#### Cost Analysis of Whey Based Mango Beverage:

Ingredient	Quantity	Amount (Rs.)
Whey	400 ml	00.62
Sugar	50 gm	01.60
Citric acid	2 gm	00.30
Mango pulp	50 gm	08.00
Benzoic acid	0.25 gm	00.10
<b>Total amount (Rs.)</b>		<b>10.62</b>

**Cost of Production of 200 ml Whey Based Mango Beverage:**

Particular	Quantity	Amount (Rs.)
Whey beverage	200 ml	5.31
Bottle	1 No.	3.50
Label	1No.	1.00
	<b>Total (Rs.)</b>	<b>9.81</b>

**Benefits of Whey Protein**

Whey protein contains the perfect combination of overall amino acids it is known as the highest quality of protein excelling over meat, vegetable, soy or dairy products. An antioxidant, whey protein supports the immune system increasing glutathione levels. In fact, whey protein contains similar immune boosting ingredients found in a mother's milk.

- Whey protein for tissue repair, muscle recovery & healing
- When the protein is digested, it is broken down into organic acids which are essential for metabolism, growth, and repair and maintenance of all of the body's tissues.
- Whey-based peptides have demonstrated activity that may reduce hypertension and dyslipidemia contributing to incidence of cardiovascular diseases worldwide.
- Whey protein suggest that dietary milk products may exert an inhibitory effect on the development of several types of tumors.
- Whey has the ability to act as an antioxidant, antihypertensive, antitumor, hypolipidemic, antiviral, antibacterial, and chelating agent.

**CONCLUSION**

From the results of the present study, it can be concluded that about 10.5 gm/liter of whey protein waste from cheese and paneer industry. Various RTS beverage available in the market but whey based RTS beverages are apart from these because whey based RTS beverages are highly nutritious for all ages of people. Sportsmen which wants energy rich beverages for this people whey based instant energy RTS beverage is a best option. Product developers seeking out functional and nutritional attributes of whey to tap the tremendous growth opportunities in the beverage industry can move forward for the development of such herbal beverages based upon whey and other fruits.

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