

WHEY BASED HERBAL DRINK EVALUATION AS HEALTH SUPPLEMENT

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ABSTRACT

Tea is a most popular alcoholic beverage shown to have antioxidant properties. Tea based drinks are prepared by using water as a main ingredient. The tea powder added to the water contributes to zero calories, zero fat and zero protein but contains up to 25% of poly phenols of their dry weight. Whey based tea in the present study is reported to be a healthy drink with tested quality parameters of whey tea. The stability of the beverage was studied at $7\pm 10^0\text{C}$ for 3 days. The acceptability states that it can be used in cold tea preparations. The organoleptic scores and sensory evaluation confirms the overall acceptability of the beverage. The results obtained indicated that the whey treated with 1.5% tea received wide acceptability among the sensory panelist. It was also found the quality parameters of whey tea by using standard physico chemical, microbial and sensory properties showed that when the concentration of tea goes beyond 2% strong tea flavour with bitterness in product was observed. Hence combining tea with whey in the acceptable range yields a healthy beverage enriched with poly phenols. This may allow the consumers to consume whey without changing its original attributes.

Key Words: *Whey –Tea- Herbal –Beverage-Sensory-Organoleptic Evaluation*

INTRODUCTION

Whey is the valuable by-product obtained during the manufacture of cheese, paneer, chhana, casein and Shrikand in dairy industries. Studies reveal that whey contains 45-50% of total milk solids, 70% of milk sugars, 20% of milk proteins, 70-90% of milk minerals and almost all water soluble vitamins present in milk. 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 processes incur sophisticated equipments. Hence the conversion of whey into beverage is one of the most attractive avenues for utilizing whey for human consumption (Goyal and Gandhi, 2009). Commercial sport drinks, health drinks, fermented whey drinks and flavored non fermented whey beverages are available in the market. In many cases, whey based beverages are inevitably prepared using synthetic food flavor agents and colorants to mask the unacceptable whey flavor.

Increasing awareness on consumption of foods and beverages with functional properties and its positive impact on human health has led to investigate upon the development of whey tea. "Whey tea" is the healthy beverage prepared by combining tea with whey as the prime ingredient instead of water used in routine tea preparations. This paper deals with the development of whey tea using different types of tea powder (green tea, black tea, yellow tea and white tea) and analyze the quality parameters of whey tea by using standard physico chemical, microbial and sensory properties.

MATERIALS AND METHODS

Whey is prepared as per the standard procedure using pasteurized milk and branded herbal tea powders purchased from reputed food chain store in the local market were used for the study.

Preparation of Whey Tea and its Evaluation

The boiled milk (80^0C) was acidified by adding citric acid (2%) and continuously stirred till coagulation of milk casein protein. The liquid whey was filtered using a muslin cloth. Whey tea is prepared by using

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pasteurized whey containing 10% sugar for taste. The experiment was carried out using green tea, black tea, white tea and yellow tea at 0% 0.5%, 1.0%, 1.5% and 2.0% (w/v) concentrations in whey. The tea bags containing the mentioned quantity of tea powder was dipped in hot whey at 80⁰ C and kept soaked for 10 minutes to facilitate the better extraction of bioactive principles from the tea powder. The poly phenols enriched whey teas were tested for its physio chemical, microbial and sensory qualities by the standard methods. To increase the shelf stability of the whey tea it is essential to pasteurize and de fatten the whey before utilizing it.

The physicochemical parameters like moisture, total soluble solids, fat, protein, lactose, ash, PH and titratable acidity of control and test samples were analyzed using AOAC approved procedures.

Sensory analysis of whey tea prepared from the different concentration of tea powders were analyzed by the sensory panel members. The whey tea was served to hot to the panelist and comments were obtained based on the 9- point hedonic scale. The comments of the panelist were recorded on the questionnaire.

The whey tea samples microbial quality was assessed by plating the samples and allowing them to grow in appropriate media at optimum temperature and time. After the incubation period the sample containing Petri-plates were visually observed on the colony counter and the results were calculated.

RESULTS

Whey proteins comprise approximately 20% of the total milk proteins. Whey proteins (or milk serumproteins) are defined as proteins in milk that remain soluble after acid or after rennet casein precipitation (Goyal and Gandhi, 2009). The former whey protein source is known as acid whey, the latter is referred to as sweet or rennet whey. Whey proteins are globular proteins that are soluble over a broad pH range) (Rupnar *et al.*, 2009). From the nutritional point of view, milk whey proteins have been considered superior to casein in various aspects.

DISCUSSION

The whey tea prepared with 1% tea powder received wide acceptability in terms of appearance, color, flavor and taste. The whey tea with 1.5% concentration showed very strong tea flavor and bitter taste while the whey tea prepared with 0.5% and 1% concentration of tea powder showed mild tea flavor and color but the taste was similar to that of the control sample. Studies showed that maximum poly phenols are released from the tea leaves when the water is boiled at 80⁰C for 10 minutes. Hence the whey tea preparation was also carried out at 80⁰ C for 10 minutes to facilitate maximum extraction of poly phenols from tea. Further studies have also stated that poly phenol concentration of the tea depends upon the type of tea varieties used and also the length of the treatment. The experiment targets to provide consumers health non alcoholic whey based beverage enriched with poly phenols.

Table 1: Proximate Composition of Whey

Sl.No	Nutrition	values per 100 g
1	Water	93.5
2	Fat	0.04
3	Protein	0.55
4	Total solids	6.5
5	Lactose	4.9
6	Titrable acidity	0.4
7	p H	5.6

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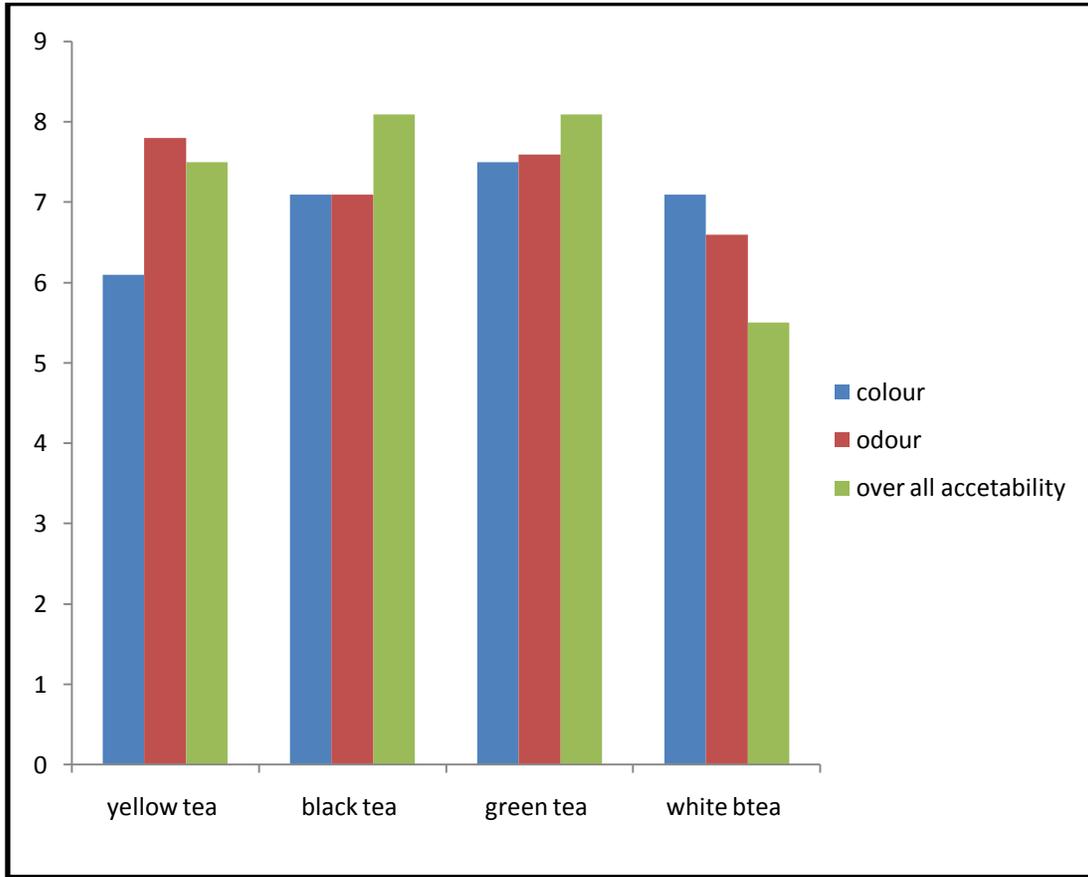


Figure 1: Sensory evaluation of whey tea samples

There have been enough articles which discusses about the functional properties of whey proteins and their digestibility. Though whey contains many essential amino acids like leucine, isoleucine and most of the water soluble vitamins and minerals, it lacks poly phenols which are abundant in tea leaves. Hence combining tea with whey yields a healthy beverage enriched with poly phenols. This may allow the consumers to consume whey without changing its original attributes.

The research findings of Alak and Karunakar (2012) showed that whey could be incorporated in beverages. The research findings of the present study coincided well with the findings of the author. The whey tea has showed to be a good nutritional beverage with appreciable sensory and storage properties. Significant reduced microbial content showed that the whey tea formulations could increase the economical and commercial value of whey which is considered as byproduct.

The whey tea subjected to proximate composition as stated by (Ahmed *et al.*, 2011) were related to the functional properties of whey are in accordance with the present study. The acceptability of whey in the form of tea coincides with the suggestion of Baljeet *et al.*, (2013) that the utilization of whey for the production of instant energy beverage using response surface methodology.

The authors reported that the mineral sodium, potassium, calcium, chlorides, citrates etc contents were almost in the range of oral rehydration solution (ORS).

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Table 2: Physicochemical parameters of control and whey tea samples

S. No	Parameters	Green Tea				Black Tea				Yellow Tea				White Tea			
		0.5%	1%	1.5%	2%	0.5%	1%	1.5%	2%	0.5%	1%	1.5%	2%	0.5%	1%	1.5%	2%
1	Moisture (%)	86	94	98	90	85	84	82	88	87	85.2	84	92	95	86.8	86.8	85
2	TSS (%)	15.0	16.1	16.6	17.3	16.0	17	18.1	16.7	17.0	15.3	16.9	19.6	0.15	18.5	17.5	16.9
3	Fat (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Protein (%)	4.46	5.10	1.91	1.27	5.75	8.93	3.19.	2.55	3,82	2.55	2.55	2.55	2.55	1.27	1.27	1.27
5	Lactose (%)	0.42	0.42	0.43	0.42	0.45	0.48	0.47	0.45	0.47	0.47	0.48	0.46	0.46	0.41	0.45	0.43
6	Titratabl Acidity (%)	0.25	0.26	0.24	0.23	0.25	0.39	0.27	0.27	0.26	0.24	0.25	0.27	0.23	0.21	0.21	0.27
7	pH	6	6	6.8	6	6	6	6	5.8	6.5	6	6	6	6	6	6.2	6

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Hence the present findings are in accordance with the reports of Sudhir *et al.*, (2003) and Damshaniya and Varshini *et al.*, (2013) that this whey tea could be nutritionally adequate to balance the loss of energy and electrolyte and beverage that can be marketable.

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