

Studies on Overall Acceptability of Whey Beverage by using Different Levels of Grape Fruit Juice

Dande KG^{1*}, Biradar GS², Dadge AV², Swami PS³ and Sangve PD³¹Head of the Department, Department of Dairy Science, Mahatma Basweshwar College, India²Assistant Professor, Department of Dairy Science, Mahatma Basweshwar College, India³Graduate Students, Department of Dairy Science, Mahatma Basweshwar College, India

Article Information

Received date: Dec 08, 2017

Accepted date: Jan 24, 2018

Published date: Jan 29, 2018

*Corresponding author

Dande KG, Head of the Department,
Department of Dairy Science, Mahatma
Basweshwar College, Latur- 413 512,
Maharashtra, India, Tel: 02382 245 256;
Email: amitdadge42@gmail.com

Distributed under Creative Commons
CC-BY 4.0

Keywords Whey; Beverage; Grape
juice; RTS; Sensory characteristics

Abstract

Whey is the liquid residue of cheese and casein production and it is one of the biggest reservoirs of food protein still remaining largely outside human consumption channels. The studies on whey based RTS beverages from fruit extract were carried out at Department of Dairy science of Mahatma Basweshwar Mahavidyalaya, Latur. The whey based Ready To Serve (RTS) beverage is prepared by using Grape fruit extract juice with different levels of grape juice in which sugar was added and composition of whey is decreased by increasing the content of grape fruit extract juice on the basis of whey in the treatment T1, T2 and T3 respectively. Control treatment (T0) was the whey. Sensory evaluation was carried out by panelists on the basis of 9 point hedonic scale. The result is compared between the treatments T1, T2 and T3 for overall acceptability.

Introduction

Whey is the watery component removal after cutting of the curd in cheese manufacturing. After the drainage of curd while shrik hand making and when acid coagulated dairy products like Paneer and Channa are prepared [1]. Whey is generally classified as sweet, sour or acidic. It is depend on its titrable acidity and pH. Whey is containing almost all water soluble nutrients present in milk, particularly lactose, whey proteins, vitamins and minerals [2]. Most of the dairy plants are draining it as sewage. By adding some simple ingredients in the whey like sugar, colour, flavor it improves the nutritive value, taste and acceptability. Dairy waste is major issue in the dairy industry. Therefore various techniques are they using to convert such waste into valuable products. So utilization of such whey for the conversion into best beverage would be one of the important ways to utilize it. Nutritive value of whey may be increased by the addition of some simple ingredients. Many attempts have been reported on utilization of whey in the formulation of various dairy products [3-5]. There is a lot of scope to explore the possibility of its utilization in beverage industries [6]. Beverages are very popular across the country and people from all age groups drink either hot or cold beverages regularly.

India is the second largest producer of the fruits in the world after China, as it shares the 1.2% of the total production of fruits in the world. Grape (*Vitis Vinifera*) pulp contains carotenoids, including lycopene. In a 100 gram serving, grape fruit supplies 30 calories and low amounts of essential nutrients (table). Only vitamin C is present in appreciable content at 4% of the Daily Value. Grape fruit is 91% water, contains 6% sugars, and is low in fat. Grape juice can be made into wine or blended with other fruit juices or dairy wastes like whey to prepare whey beverage. Beverages are very popular across the country and people from all age groups drink either hot or cold beverages regularly.

Grape juice is obtained from crushing and blending grapes into a liquid. The juice is often sold in stores or fermented and made into wine, brandy, or vinegar. Grape juice that has been pasteurized, removing any naturally occurring yeast, will not ferment if kept sterile, and thus contains no alcohol. In the wine industry, grape juice that contains 7–23% of pulp, skins, stems and seeds are often referred to as “must”.

Therefore present investigation was carried out by keeping both views that utilization of whey and utilization of such for best quality production of grape fruit juice and sugar for preparation of whey beverage.

Materials and Methods

Materials

The fresh, clean buffalo milk, citric acid, clean muslin cloth, sugar, a good quality grape fruit and stainless steel vessel, stirrer, knife.

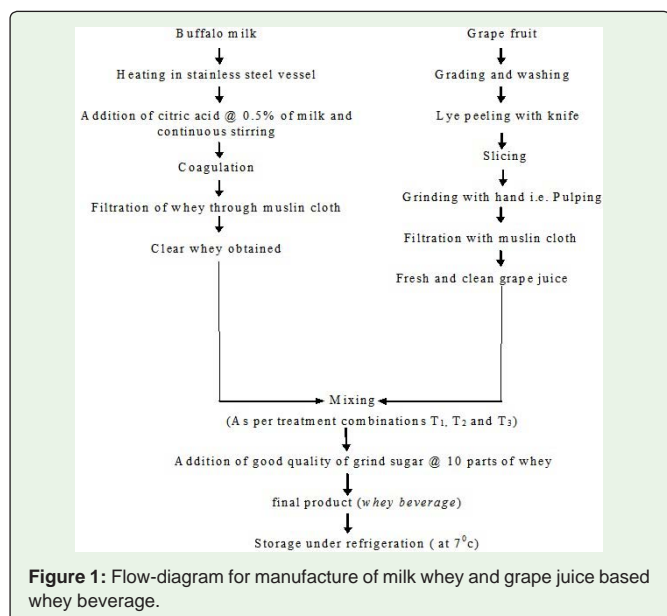


Figure 1: Flow-diagram for manufacture of milk whey and grape juice based whey beverage.

Methods

Treatment combinations: For the preparation of grape juice based whey beverage, the following treatment combinations were taken for study.

- T0= 100 Parts of whey (control sample)
- T1= 80 Parts of whey + 10 parts of grape juice + 10 parts of grind sugar
- T2= 60 Parts of whey + 20 parts of grape juice + 10 parts of grind sugar
- T3= 40 Parts of whey + 30 parts of grape juice + 10 parts of grind sugar

Sensory evaluation of grape whey beverage: Sensory evaluation of grape whey beverage was carried out by a panel of judges so as to grade the product and to know the acceptability. It was judged for, flavour, colour and appearance, body and texture and overall acceptability (Figure 1).

The scoring was done using 9-point Hedonic scale developed by Quarter Master Food and Container Institute, USA, the numerical, values were given from 1 to 9 as shown below [7].

Quality grade distribution	Score
Like extremely	9
Like very much	8
Like moderately	7
Like slightly	6
Neither like nor dislike	5
Dislike slightly	4
Dislike moderately	3
Dislike very much	2
Dislike extremely	1

Table 1: Flavour score for grape whey beverage.

Treatment	Replication				Mean
	R ₁	R ₂	R ₃	R ₄	
T ₁	8.5	8.5	9.0	8.5	8.62
T ₂	8.0	8.5	9.0	8.5	8.50
T ₃	7.5	7.0	8.0	7.5	7.50
T ₀	7.0	6.5	7.0	6.5	6.75
S.E. ± 0.176		C.D. at 5% 0.532			

The score of various treatments in respect of flavour, colour and appearance and body and texture were pooled and mean score for overall acceptability was worked out.

Statistical Analysis

The results obtained during the course of investigation were subjected to statistical analysis by using completely randomized block design as described by Panse and Sukhatme [8].

Results and Discussion

Sensory evaluation of grape whey beverage

The acceptability of the grape based whey beverage was measured in terms of sensory attributes such as flavor, color and appearance and body and texture using 9 point hedonic scale by a panel of five expert judges. The data so obtained were analyzed by using Completely Randomized Block Design (CRBD). The overall acceptability of the product was also worked out.

Flavour score for grape whey beverage: Table 1 showed that, the overall score of grape whey beverage in treatment T1, T2, T3 and T0 were 8.62, 8.50, 7.50 and 6.75 respectively. The treatment T1 was significantly superior over the treatments T2 and T3. It may be concluded that, blending of 10 parts of grape juice in whey was preferred by the judges than the control sample as far as flavor character are concerned because it contain lowest acid content in whey as increasing sugar level from grape.

Colour and appearance score for grape whey beverage: Table 2 showed the overall acceptability of grape whey beverage in terms of colour and appearance. It was observed that, the overall score of grape whey beverage in terms of colour and appearance in treatment T1, T2, T3 and T0 were 8.75, 8.25, 7.75 and 7.25, respectively. All treatment significant with each other. It may be concluded that,

Table 2: Color and appearance score for grape whey beverage.

Treatment	Replication				Mean
	R ₁	R ₂	R ₃	R ₄	
T ₁	9.0	8.5	8.5	9.0	8.75
T ₂	8.0	8.5	8.0	8.5	8.25
T ₃	7.5	8.0	7.5	8.0	7.75
T ₀	7.0	7.5	7.5	7.0	7.25
S.E.± 0.147		C.D. at 5% 0.447			

Table 3: Body and texture score for grape whey beverage.

Treatment	Replication				
	R ₁	R ₂	R ₃	R ₄	Mean
T ₁	9.0	8.0	8.5	8.5	8.50
T ₂	8.0	8.5	8.0	8.5	8.25
T ₃	8.0	7.5	7.0	7.5	7.50
T ₀	7.0	6.5	7.0	7.0	6.88
S.E. ± 0.174		C.D. at 5% 0.532			

Table 4: Overall score for grape whey beverage.

Treatments	Flavour	Colour and appearance	Body and Texture	Overall acceptability
T ₁	8.62	8.75	8.50	8.62
T ₂	8.50	8.25	8.25	8.33
T ₃	7.50	7.75	7.50	7.58
T ₀	6.75	7.25	6.88	6.96

blending of 10 parts grape juice in whey was preferred by the judges than the control sample as far as colour and appearance character are concerned because blending of 10 parts of grape juice affect slightly on colour but it had highly affect by treatment T2 and T3.

Body and texture score for grape whey beverage: The average sensory score for body and texture in treatment T1, T2, T3 and T0 were 8.50, 8.25, 7.50 and 6.88, respectively. It was noticed that the treatment T1 was significantly superior over treatments T2 and T3. The above observation clearly indicates that, the highest liking was towards the T1. As far as body and texture concerned, treatment. T2 and T3 were also acceptable for panel of judges (Table 3).

Overall score for grape whey beverage: Table 4 shows that the mean overall score of acceptability of grape whey beverage for treatments T1, T2, T3 and T0 was 8.62, 8.33, 7.58 and 6.96 respectively. It was observed that treatment T1 was significantly superior over all treatment. T3 which had the lowest mean score than treatment T1. The treatment T1 had comparatively highest mean overall score than the T2 and T3. The lowest overall acceptability score i.e. 6.96

was found in treatment T0 which was due to lack of level of grape juice which decreased flavour, colour and appearance and body and texture, hence overall acceptability score was less as compared to T1 treatment.

Conclusions

1. The treatment T1 scored highest score for all sensory attributes as compared to other treatments.
2. In general sensory score of treatment T1 and T2 with 10 and 20 parts grape juice was comparable and recommended by panelists.

Acknowledgements

The authors are grateful to Swami Ramanand Teerth Marathwada University, Nanded (MS), India for providing required facilities for conducting the research. Also, the students and authors express gratefulness to all the panelists for devoting their valuable time and taking keen interest in the sensory evaluation work.

References

1. Aneja RP, Mathur BN, Chandan RC, Banerjee AK. Heat-acid coagulated products. In Technology of Indian milk products. Delhi, India. 2002.
2. Goyal Nupur, Gandhi DN. Comparative Analysis of Indian Paneer and Cheese Whey for Electrolyte Whey Drink. World Journal of Dairy and Food Sciences. 2009; 4: 70-72.
3. Singh S, Ladkhani BG, Kumar A, Mathur BN. Development of whey based beverage. Indian Journal of Dairy Science. 1994; 47: 586-590.
4. Cruz AG, Ana ASS, Macchione MM, Teixeira AM, Schmidt FL. Milk drink using whey butter cheese (Queijo manteiga) and Acerola juice as a potential source of vitamin C. Food and Bioprocess Technology. 2009; 2: 368-373.
5. Naik YK, Khare A, Choudhary PL, Goel BK, Shrivastava A. Studies on physico-chemical and sensory characteristics of whey based grape beverage. Asian Journal of Research in Chemistry. 2009; 2: 57-59.
6. Sakhale BK, Pawar VN, Ranveer RC. Studies on the Development and Storage of Whey based RTS Beverage from Mango cv. Kesar. Journal of Food Processing and Technology. 2012; 3.
7. Gupta. The scoring was done using 9-point Hedonic scale developed by Quarter Master Food and Container Institute, USA. The numerical, values were given from 1 to 9. 1976.
8. Panse VG, Sukhatma, PV. Statistical methods for agricultural workers. ICAR Publication, New Delhi. 1967.