



EFFECT OF DIFFERENT LEVELS OF STRAWBERRY FRUIT JUICE ON ACCEPTABILITY OF WHEY BEVERAGE

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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 Strawberry fruit extract juice with different levels of strawberry juice in which sugar was added and composition of whey is decreased by increasing the content of strawberry fruit extract juice on the basis of whey in the treatment T_1 , T_2 and T_3 respectively. Control treatment (T_0) was the whey. Sensory evaluation was carried out by panelists on the basis of 9 point hedonic scale. The result are compared between the treatments T_1 , T_2 and T_3 for overall acceptability.

KEYWORDS: Whey; Beverage; Strawberry juice; RTS; Sensory characteristics.

INTRODUCTION

Whey is the watery component removal after cutting of the curd in cheese manufacturing. After the drainage of curd while shrikhand making and when acid coagulated dairy products like Paneer and Channa are prepared. (Aneja et al., 2002). 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 (Goyal and Gandhi, 2009). Most of the dairy plants are draining it as a 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 (Singh et al., 1994; Cruz et al, 2009; Naik et al., 2009). There is a lot of scope to explore the possibility of its utilization in beverage industries (Sakhale et al., 2012). Beverages are very popular across the country and people from all age groups drink either hot or cold beverages regularly.

Therefore present investigation was carried out by keeping both views that utilization of whey and utilization of such for best quality production of strawberry 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 strawberry fruit and stainless steel vessel, stirrer, knife.

Methods:

Treatment combinations

For the preparation of strawberry juice based *whey beverage*, the following treatment combinations were taken for study.

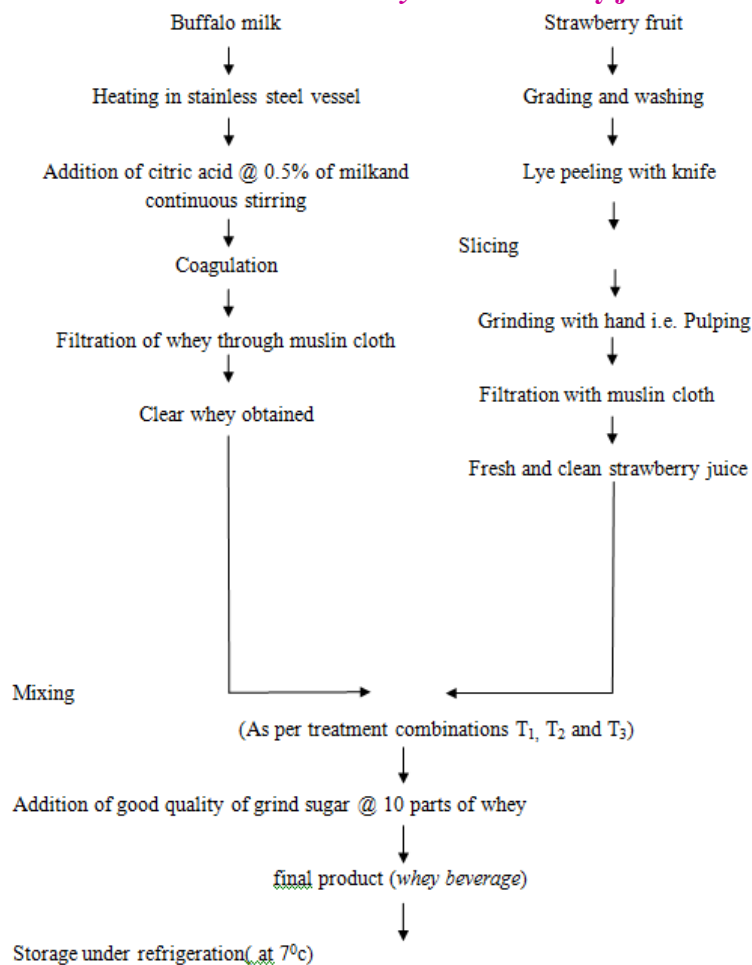
T₀= 100 Parts of whey (control sample)

T₁= 80 Parts of whey + 10 parts of strawberry juice + 10 parts of grind sugar

T₂= 60 Parts of whey + 20 parts of strawberry juice + 10 parts of grind sugar

T₃= 40 Parts of whey + 30 parts of strawberry juice + 10 parts of grind sugar

Fig. 1. Flow-diagram for manufacture of milkwheyand strawberry juice based *whey beverage*



Sensory evaluation of strawberrywhey beverage :

Sensory evaluation of strawberrywhey 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.

The scoring was done using 9-point Hedonic scale developed by Quarter Master Food and Container Institute, USA (Gupta 1976) the numerical, values were given from 1 to 9 as shown below.

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

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 (1967).

RESULTS AND DISCUSSION

Sensory evaluation of strawberrywhey beverage

The acceptability of the strawberry based *whey beverage* was measured in terms of sensory attributes such as flavour, colour 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 strawberrywhey beverage :

Table 1- Flavour score for strawberrywhey beverage

Replication Treatment	R ₁	R ₂	R ₃	R ₄	Mean
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					

Table 1 showed that, the overall score of *strawberrywhey 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 strawberry juice in whey was preferred by the judges than the control sample as far as flavour character are concerned because it contain lowest acid content in whey as increasing sugar level from strawberry.

Colour and appearance score for strawberry whey beverage :

Table 2- Colour and appearance score for strawberrywhey beverage

Replication Treatment	R ₁	R ₂	R ₃	R ₄	Mean
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 2 showed the overall acceptability of strawberrywhey beverage in terms of colour and appearance. It was observed that, the overall score of strawberrywhey 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, blending of 10 parts strawberry 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 strawberry juice affect slightly on colour but it had highly affect by treatment T₂ and T₃.

▪ **Body and texture score for strawberrywhey 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 - Body and texture score for strawberrywhey beverage

Replication Treatment	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					

▪ **Overall score for strawberrywhey beverage :**

Table 4 - Overall score for strawberrywhey 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

Table 4 shows that the mean overall score of acceptability of strawberrywhey 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 strawberry 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 strawberry juice was comparable and recommended by panelists.

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REFERENCE

- Aneja RP, Mathur BN, Chandan RC and Banerjee AK (2002).** Heat-acid coagulated products. In Technology of Indian milk products. Delhi, India.
- Cruz AG, Ana ASS, Macchione MM, Teixeira AM and Schmidt FL (2009).** Milk drink using whey butter cheese (Queijomanteiga) and Acerola juice as a potential source of vitamin C. Food and Bioprocess Technology 2 368-373.
- GoyalNupur and Gandhi DN (2009).** Comparative Analysis of Indian Paneer and Cheese Whey for Electrolyte Whey Drink, World Journal of Dairy and Food Sciences 4(1) 70-72.
- Gupta (1976).**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
- Naik YK, Khare A, Choudhary PL, Goel BK and Shrivastava A (2009).** Studies on physico-chemical and sensory characteristics of whey based strawberry beverage. Asian Journal of Research in Chemistry 2 57-59.
- Pandiyan C, Annal Villi R and Chandirasekaran V (2011).** Development of mango flavoured sweetened whey drink, JIVA 9(3) 35-37.
- Panse, V.G. and Sukhatma, P. V. (1967).**Statistical methods for agricultural workers. ICAR Publication, New Delhi.
- Sakhale BK, Pawar VN and Ranveer RC (2012).** Studies on the Development andStorage of Whey based RTS Beverage from Mango cv. Kesar, Journal of Food Processing and Technology 3(3).
- Singh S, Ladkhani BG, Kumar A and Mathur BN (1994).** Development of whey based beverage. Indian Journal of Dairy Science 47 586-590.