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Studies on sensory properties of alcoholic beverage from *Chakka* whey by using yeast culture as an adjunct

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Abstract

Alcoholic whey beverage was prepared by using yeast culture as an adjunct from *chakka* whey. Attempt has made to increase sensory properties of alcoholic beverage from *chakka* by using yeast culture as an adjunct. The product obtained was subjected for chemical analysis and organoleptic evaluation by panel of judges. The Sensory characteristics of product based on human senses ie smell, taste, touch. It was also observed that the colour and appearance score for treatment T0, T1, T2 and T3 was 7.8, 7.0, 8.0, and 7.5 respectively. Flavour score was 6.38, 8.00, 8.05 and 7.25 respectively. Consistency was 6.27, 6.77, 8.10 and 7.26 respectively. Taste score was 7.8, 7.5, 8.0, and 7.0 respectively. Overall acceptability score for treatments 7.00, 6.63, 7.50 and 6.75 respectively. The storage period on the basis of sensory score recorded during storage period at refrigerated and room temperature was found 35 and 4 days.

Keywords: *Chakka*, Whey, Sensory Properties, Chemical Properties, Beverage.

Introduction

Whey is the valuable by-product obtained during the manufacture of different fermented dairy products like *cheese*, *paneer*, *chhana*, casein and *shrikhand* in dairy industries. Whey contained 45-50 per cent of total milk solids, 70 per cent of milk sugars, and 20 per cent of milk proteins, 70-90 per cent of milk minerals and almost all water soluble vitamins present in milk. Now a day, the importance for utilization of whey gave immense pleasure to food or dairy researchers and food industry or beverages industry due to its functional properties, nutritional properties, low cost investment and as supportive avenue to main dairy products. By realizing the functional properties of whey many industries targets upon utilizing whey as the functional food ingredient.

Fermentations have crucial role in human development and are probably the oldest form of food preservation. In technically advanced societies the major importance of fermented foods has come to be the variety they add to diets. The production of alcoholic beverages from fermentable carbon sources by yeast is the oldest and most economically important of all. Biotechnologies Yeast plays a vital role in the production of all alcoholic beverages and the selection of suitable yeast strains is essential not only to maximise alcohol yield, but also to maintain beverage sensory quality.

Material and Methods

Fresh and standardized buffalo milk as SNF 9 per cent and fat 6 per cent was procured. The yeast culture was used as an adjunct culture along with yoghurt and *dahi* culture. The standard mixed *dahi* culture i.e. Standard *dahi*, NCDC-167(BD4) contained *Streptococcus thermophilus* and *Lactococcus lactis* and yoghurt culture contained *Streptococcus termophilus* and *Lactobacillus delbrueckii* sub sp. *bulgaricus* was used as a main culture to developed desired test to the beverage. The following particularly *dahi*, yoghurt and yeast cultures were collected from NDRI, Karnal and Late. Vilasrao Deshmukh Agriculture Biotechnology College, Latur. The culture procured from biotechnology college was brought from NCL., Pune.

Preparation of *chakka* whey

The *chakka* whey was prepared as per the procedure of De, (2005) as shown in following flow chart.

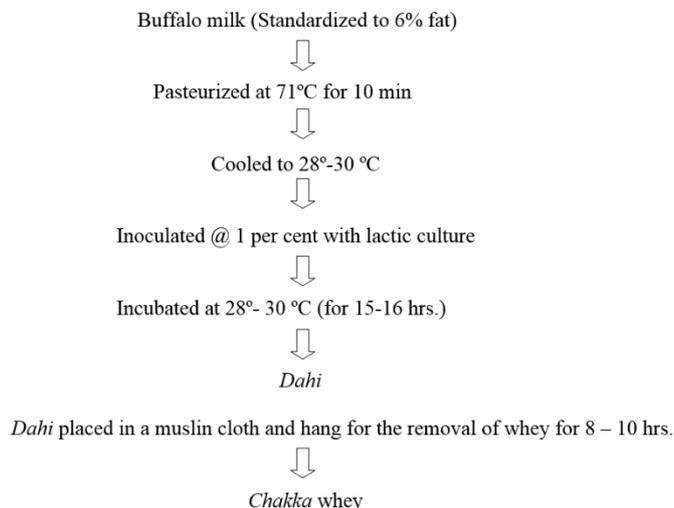


Fig 1: Flow chart for preparation of *chakka* whey

Preparation of alcoholic beverage from *chakka* whey

The alcoholic whey beverage from *chakka* whey was prepared as per the method of production of alcoholic whey beverage

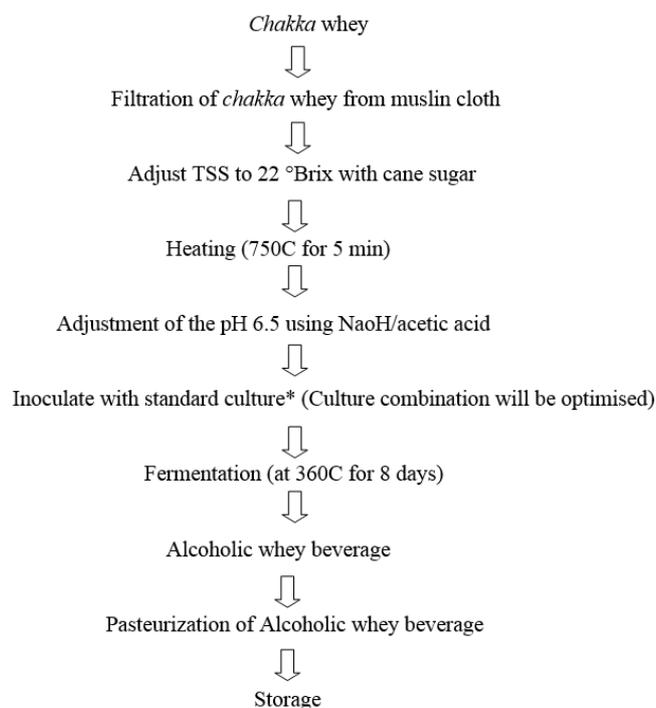


Fig 2: Flow chart for preparation of alcoholic beverage by using *chakka* whey

Treatments combination

- T0 - Suitable and available market whey beverage
- T1- *Chakka* whey + yoghurt culture + yeast culture
- T2 -*Chakka* whey + standard *dahi* culture + yeast culture
- T3 –*Chakka* whey + yoghurt culture + *dahi* culture + yeast culture

* The culture was added @ 3 per cent as 1:1 (T1 and T2) and 1:1:1 (T3)

Result and Discussion

Sensory evaluation of finished product

The acceptability of the alcoholic *chakka* whey beverage was measured in terms of sensory attributes such as, colour, flavour, consistency and taste using 9- point hedonic scale by a panel of five expert judges. The data so obtained were analyzed using Completely Randomized Block Design

(CRBD). The overall acceptability of the product was also worked out.

Colour and appearance

It was observed from Table no. 1, mean colour and appearance score of beverage in treatments T0, T1, T2 and T3 were 7.8, 7.0, 8.0, and 7.5, respectively. The treatment T3 was significantly superior over treatments T1 and T3, whereas at par with treatments T0.

Table 1: Colour and appearance of alcoholic whey beverage

| Treatment \ Replication | R ₁ | R ₂ | R ₃ | R ₄ | Mean |
|-------------------------|----------------|----------------|----------------|----------------|------------------|
| T ₀ | 8.00 | 7.5 | 8.1 | 7.8 | 7.8 ^a |
| T ₁ | 7.00 | 7.3 | 6.9 | 6.8 | 7.0 ^a |
| T ₂ | 8.00 | 7.8 | 8.3 | 7.9 | 8.0 ^a |
| T ₃ | 7.5 | 7.4 | 7.2 | 7.9 | 7.5 ^b |

S.E. ± 0.13

C.D. @ 5% 3.85

The results obtained in this study are more or less in agreement with the result obtained by Babar *et al.* (2008) [1], observed the utilization of pomegranate juice for the preparation of *chakka* whey beverage (CWB). They observed that, the mean score for colour of the product prepared were 8.71, 8.62, 8.82 and 8.35 for treatments T1, T2, T3 and T4, respectively.

Flavour

From (Table 2) revealed that mean scores for flavor of alcoholic whey beverage for treatment T0, T1, T2 and T3 were 6.38, 8.00, 8.05, and 7.25, respectively. The treatment T2 was significantly superior over treatment T0 and T3, whereas T1 and T2 were at par with each other.

Table 2: Flavour of alcoholic whey beverage

| Treatment \ Replication | R ₁ | R ₂ | R ₃ | R ₄ | Mean |
|-------------------------|----------------|----------------|----------------|----------------|--------------------|
| T ₀ | 6.00 | 6.00 | 6.50 | 7.00 | 6.38 ^a |
| T ₁ | 8.00 | 8.00 | 8.50 | 7.50 | 8.00 ^{ab} |
| T ₂ | 8.00 | 8.00 | 8.00 | 8.20 | 8.05 ^a |
| T ₃ | 7.00 | 7.50 | 7.00 | 7.50 | 7.25 ^b |

S.E. ± 0.17

C.D. @ 5% 0.53

The result obtained in the study more or less agreement with the result obtained by Bhavsager *et al.* (2010), reported the average score of pineapple flavoured beverage for flavour were 7.7, 7.6, 8.0, and 7.3 for treatment T0, T1, T2 and T3 respectively.

Consistency

It is observed from Table 3 that, the average sensory score for consistency of alcoholic whey beverage in treatments T0, T1, T2 and T3 was 6.27, 6.77, 8.10, and 7.26, respectively. It was observed that, the treatment T2 was different significantly from other treatments whereas T0, T1 and T3 were at par with each other.

Table 3: Consistency of alcoholic whey beverage

| Treatment \ Replication | R ₁ | R ₂ | R ₃ | R ₄ | Mean |
|-------------------------|----------------|----------------|----------------|----------------|--------------------|
| T ₀ | 6.50 | 6.51 | 6.10 | 6.00 | 6.27 ^c |
| T ₁ | 7.00 | 6.50 | 7.10 | 6.51 | 6.77 ^{bc} |
| T ₂ | 8.00 | 7.50 | 8.10 | 8.80 | 8.10 ^a |
| T ₃ | 7.50 | 7.00 | 7.51 | 7.05 | 7.26 ^b |

S.E. ± 0.13

C.D. @ 5% 0.564

Bhavsager *et al.* (2010), in pineapple flavoured beverage from *chhana* whey i.e consistency score recorded was the highest for T₂ as 7.8 followed by 7.7 for T₁ and lowest for T₃ as 7.4. The results and trends recorded in present investigation for consistency were in comparable with present results.

Taste

Table 4: Taste of alcoholic whey beverage

| Treatment \ Replication | R ₁ | R ₂ | R ₃ | R ₄ | Mean |
|-------------------------|----------------|----------------|----------------|----------------|-------------------|
| T ₀ | 7.8 | 7.5 | 7.9 | 8.0 | 7.8 ^{ab} |
| T ₁ | 7.5 | 7.6 | 7.0 | 7.9 | 7.5 ^b |
| T ₂ | 8.0 | 7.8 | 8.3 | 7.9 | 8.0 ^a |
| T ₃ | 7.0 | 7.2 | 7.1 | 6.7 | 7.0 ^c |

S.E. \pm 0.13

C.D. @ 5% 0.408

From (Table 4) revealed that mean score of taste for the treatments T₀, T₁, T₂, and T₃ as, 7.8, 7.5, 8.0 and 7.0 respectively. From the above observations it was clearly indicated that the taste of beverage in treatment T₂ was higher score other than T₀, T₁ and T₃. In developed treatment T₂ secured more score may be due to the production of lactic acid by standard *dahi* culture contained *streptococcus thermophilus* and *lactococcus lactis* which gave acidic pleasant test to the whey beverage.

Overall acceptability

It is observed from Table 5 shows that the mean overall score of acceptability of alcoholic whey beverage whey beverage for treatments T₀, T₁, T₂ and T₃ were 7.00, 6.63, 7.50 and 6.75, respectively. It was observed that, treatment T₂ score was observed superior over other treatments which had the highest mean score of whey beverage. The treatment T₁ had least mean overall score i.e. 6.63.

Table 5: Overall acceptability of alcoholic whey beverage

| Treatment \ Replication | Colour and appearance | Flavour | Taste | Consistency | Overall acceptability |
|-------------------------|-----------------------|---------|-------|-------------|-----------------------|
| T ₀ | 8.00 | 6.00 | 7.0 | 7.50 | 7.00 ^b |
| T ₁ | 7.00 | 6.00 | 6.50 | 7.00 | 6.63 ^b |
| T ₂ | 8.00 | 7.50 | 7.00 | 7.50 | 7.50 ^a |
| T ₃ | 7.50 | 6.50 | 6.00 | 7.00 | 6.75 ^c |

S.E. \pm 0.31

C.D. @ 5% 0.96

Satpute *et al.* (2018) [5], reported that the overall acceptability of herbal whey based beverage by using menthol for treatments T₀, T₁, T₂ and T₄ were 8.03, 8.41, 8.43 and 8.51 respectively. The Overall acceptability score of whey beverage for various treatments varied in between 6.63 to 7.50 comparable with present sensory results.

From present investigation it can be concluded that the nutritious and palatable beverage, alcoholic whey beverage can be prepared by fermenting *chakka* whey by yeast culture as an adjunct along with normal dahi culture. This may be useful to product developers for seeking functional and nutritional attributes of whey through this product developer the tremendous growth opportunities in the beverage industry.

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