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Evaluation of Chemical Properties of Egg Based Whey Beverage

Anoop Singh Chauhan*, S. P. Singh and Manoj Gupta

Department of Animal Husbandry & Dairying

C.S. Azad University of Agriculture & Technology Kanpur, U.P. India – 208002

*Corresponding Author E-mail: aschauhan7569@gmail.com

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ABSTRACT

This study was conducted to evaluate the chemical analysis of egg based whey beverage. There were paneer whey used as raw material, and there were three levels of egg percentage like 4% (A1), 6% (A2) and 8% (A3) with three different types of essence as Mango (B1), Orange (B2) and Kewada (B3) and three levels of sugar like 10% (C1), 12% (C2) and 14% (C3) added for preparation of egg based whey beverage. These samples were stored at 5^0 C as refrigerated temperature. The chemical content of whey beverage like moisture, fat, protein, lactose, sucrose, ash and total solids were determined. Highest fat and protein were found in 8% egg, Orange essence and 12% sugar, while highest percentage of lactose was noticed in 4% egg, Orange essence and 12% sugar. The percentage of sucrose was depending on added sugar for preparation of beverage. Maximum ash was found in 8% egg, Orange essence and 14% sugar. Highest total solid was found in 8% egg, Orange essence and 14% sugar. Least moisture percentage was noticed in combination of 8% egg, Orange essence and 14% sugar.

Key words: *Chemical quality, Egg, Whey beverage*

INTRODUCTION

World milk production in 2013 is forecast to grow by 1.9 percent to 780 million tonnes – a similar rate to in recent years. Asia is expected to account for most of the increase, with output in India, the world's largest milk producing country, set to grow by 5.3 million tonnes to 141 million tonnes. Rising disposable incomes and population growth are the two main dynamics behind the increase in India's production. Expansion in herd size, as well as improved productivity, is an important engine in the expansion. Increased output is also anticipated in China, Pakistan and Turkey, spurred by steady growth in consumer demand. India, world's largest milk producer, accounting for more than 16% of world's total milk production, is the world's largest consumer of dairy products. The total amount of milk produced has tripled from 23 million tonnes back in 1973 to 95 million tonnes in 2008 and expected a production level of 135 million tonnes by 2015 but the projected demand for milk by 2021-22 estimated at 180 million tonnes which implies that milk production would have to be doubled. The share of the total milk processing capacity by private sector is 44%of total installed capacity of 73 MLPD (Million Litres per Day) in the country.

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Whey or milk serum is the liquid remaining after milk has been curdled and strained. It is a by-product of the manufacture of cheese or casein and has several commercial uses. *Sweet whey* is manufactured during the making of rennet types of hard cheese like cheddar or Swiss cheese. *Acid whey* (also known as "sour whey") is a by-product produced during the making of acid types of dairy products such as cottage cheese or strained yogurt.

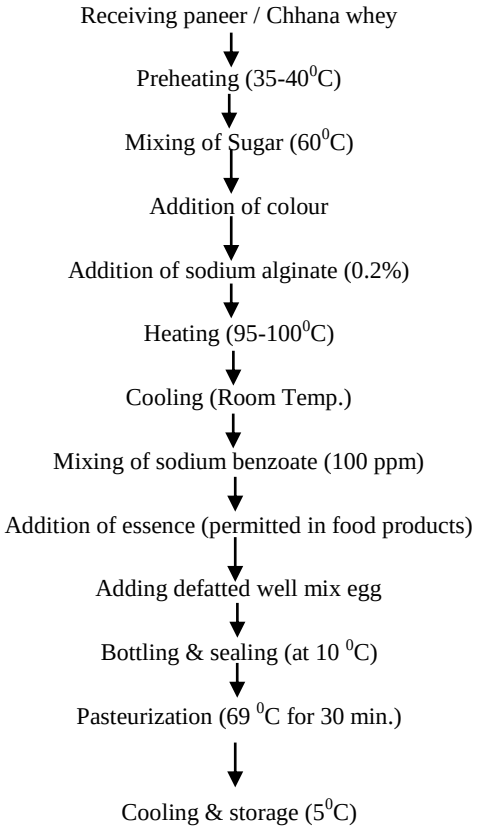
Whey proteins have a biological value (BV), of 100, which is higher than the value for casein, soy protein, beef, or wheat gluten and have a high content of sulphur-containing amino acids such as cysteine and methionine. Whey is a good source of electrolytes including sodium and potassium, which are required during diarrhoea therapy. Minerals such as calcium, magnesium, and phosphorus are present in solution and also partly bound to proteins. Zinc is present in trace amounts[10]. Lactose also promotes absorption of Mg and Zinc ions, which even in trace amount helps in better diarrhoeal management.

Where industrial whey processing or manufacture of high value consumer products is not feasible, other methods of whey disposal must be selected, based mainly on the associated cost. Eggs are used for alters the texture of the drink. Natural or artificial flavourings, thickeners, and stabilizers are often used to create the flavour and texture of the classic egg drink with the use of raw eggs. The "down-the-drain" approach is certainly the most wasteful although not always the most expensive alternative, it would be permit to economic utilisation of whey as a beverage to fulfil the nutrient demand of body and also enhancing the income.

MATERIAL AND METHODS

There were paneer whey used as raw material, and there were three levels of egg percentage like 4% (A1), 6% (A2) and 8% (A3) with three different types of essence as Mango (B1), Orange (B2) and Kewada (B3) and three levels of sugar like 10% (C1), 12% (C2) and 14% (C3) added for preparation of egg based whey beverage[3]. These samples were stored at 5^0 C as refrigerated temperature.

Manufacture egg based whey drink



The chemical content of whey beverage like moisture, fat, protein, lactose, sucrose, ash and total solids were determined by accordance of A.O.A.C.[1]. The data of chemical quality obtaining during the study were subjected for analysis of variance (ANOVA) as described by Snedecor and Cochran[8].

RESULTS AND DISCUSSIONS

The chemical compositions of the egg based whey beverage are depicted in table no. 1.

Moisture percent

The combination of A1xB1xC1 got maximum percentage (82.24) whereas the least percentage (77.47) found in A3xB2xC3. The highest moisture percentage found in the sample which was prepared by using 4% egg with mango essence and contained 10% sugar while lowest percentage found in sample which was prepared by using 8% egg with orange essence and contained 14% sugar. These results were found to be statistically significant (P<0.05). The percentage of egg was found to be inversely related to presence of moisture in the beverage. When solid matter was increased, then moisture found to be in decreasing trend. These findings are similar with the findings of Wadhawa *et al.*,[9] who reported that 5% egg superior over all other treatment combinations.

Fat Percentage

The combination of A3xB2xC2 got maximum percentage (1.40) whereas the least percentage (0.90) found in A1xB1xC1. The highest percentage found in the sample which was prepared by using 8% egg with orange essence and contained 12% while lowest percentage found in sample which was prepared by using 4% egg with mango essence and contained 10% sugar. These results were found to be statistically significant (P<0.05). All the variables were significantly differed from each other. The percentage of egg was found to be directly related to presence of fat in the beverage. When solid matter was increased, then fat found to be in increasing trend[4].

Protein Percentage

The combination of A3xB2xC2 got maximum percentage (1.55) whereas the least percentage (1.0) found in A1xB1xC1. The highest percentage found in the sample which was prepared by using 8% egg with orange essence and contained 12% sugar while lowest percentage found in sample which was prepared by using 4% egg with mango essence and contained 10% sugar. These results were found to be statistically significant (P<0.05)[7], The percentage of egg levels were found to be directly related to presence of protein in the beverage. When solid matter was increased, then protein found to be in increasing trend.

Lactose Percentage

The combination of A1xB2xC2&C3 got maximum percentage (5.24) whereas the least percentage (4.41) found in A3xB1xC2. The highest percentage found in the sample which was prepared by using 4% egg with orange essence and contained 12% & 14% sugar while lowest percentage found in sample which was prepared by using 8% egg with mango essence and contained 12% sugar. These results were found to be statistically significant (P<0.05). The percentage of egg was found to be inversely related to presence of lactose in the beverage. When ratio of whey decreases, lactose found to be also[6].

Sucrose Percentage

The combination of A2xB1&B2xC3 got maximum percentage (14.54) whereas the least percentage (10.31) found in A1xB2xC1. The highest percentage found in the sample which was prepared by using 6% egg with orange, mango essence and contained 14% sugar while lowest percentage found in sample which was prepared by using 4% egg with orange essence and contained 10% sugar. These results were found to be statistically significant (P<0.05)[2].

Ash Percentage

The combination of A3xB2xC3 got maximum ash percentage (0.51) whereas the least percentage (0.43) found in A1xB1xC1. The highest ash percentage found in the sample which was prepared by using 8% egg with orange essence and contained 14% sugar while lowest percentage found in sample which was prepared by using 4% egg with mango essence and contained 10% sugar. These results were found to be statistically significant (P<0.05). The percentage of egg was found to be directly

related to presence of ash in the beverage. When solid matter was increased, then ash found to be in increasing trend[5].

Total solids Percentage

The combination of A3xB2xC3 got maximum percentage (22.53) whereas the least percentage (17.76) found in A1xB1xC1. The highest percentage found in the sample which was prepared by using 8% egg with orange essence and contained 14% sugar while lowest percentage found in sample which was prepared by using 4% egg with mango essence and contained 10% sugar. These results were found to be statistically significant ($P<0.05$). The percentage of egg was found to be directly related to presence of total solids in the beverage. When solid matter was increased, then total solids found to be in increasing trend[2,5].

Table 1: chemical composition of egg based whey beverage

Combinations	moisture	Fat	Protein	Lactose	Sucrose	Ash	Total solids
A1B1C1	82.24	0.9	1	5.09	10.34	0.43	17.76
A1B1C2	80.05	0.95	1.05	5.14	12.37	0.44	19.95
A1B1C3	78.1	0.92	1.02	5.12	14.39	0.45	21.9
A1B2C1	82	0.95	1.1	5.19	10.31	0.45	18
A1B2C2	79.81	1	1.15	5.24	12.34	0.46	20.19
A1B2C3	77.85	0.97	1.12	5.24	14.36	0.46	22.15
A1B3C1	82.21	0.92	1.05	5.04	10.34	0.44	17.79
A1B3C2	80.02	0.97	1.1	5.09	12.37	0.45	19.98
A1B3C3	78.05	0.94	1.07	5.09	14.39	0.46	21.95
A2B1C1	82.07	1.1	1.2	4.79	10.39	0.45	17.93
A2B1C2	79.78	1.15	1.25	4.84	12.52	0.46	20.22
A2B1C3	77.81	1.12	1.22	4.84	14.54	0.47	22.19
A2B2C1	81.65	1.2	1.3	4.89	10.49	0.47	18.35
A2B2C2	79.46	1.25	1.35	4.94	12.52	0.48	20.54
A2B2C3	77.49	1.22	1.32	4.94	14.54	0.49	22.51
A2B3C1	81.96	1.05	1.25	4.79	10.49	0.46	18.04
A2B3C2	79.77	1.1	1.3	4.84	12.52	0.47	20.23
A2B3C3	77.8	1.07	1.27	4.84	14.54	0.48	22.2
A3B1C1	81.95	1.3	1.4	4.49	10.39	0.47	18.05
A3B1C2	80.04	1.2	1.45	4.41	12.42	0.48	19.96
A3B1C3	77.79	1.32	1.42	4.54	14.44	0.49	22.21
A3B2C1	81.63	1.35	1.5	4.59	10.44	0.49	18.37
A3B2C2	79.44	1.4	1.55	4.64	12.47	0.5	20.56
A3B2C3	77.47	1.37	1.52	4.64	14.49	0.51	22.53
A3B3C1	81.99	1.3	1.42	4.44	10.37	0.48	18.01
A3B3C2	79.8	1.35	1.47	4.49	12.4	0.49	20.2
A3B3C3	77.83	1.32	1.44	4.49	14.42	0.5	22.17

CONCLUSION

The findings of study imply that the chemical evaluation, significant variations had been noticed due to its factors. Highest fat and protein were found in 8% egg, Orange essence and 12% sugar, while highest percentage of lactose was noticed in 4% egg, Orange essence and 12% sugar. The percentage of sucrose was depending on added sugar for preparation of beverage. Maximum ash was found in 8% egg, Orange essence and 14% sugar. Highest total solid was found in 8% egg, Orange essence and 14% sugar. Least moisture percentage was noticed in combination of 8% egg, Orange essence and 14% sugar. On the basis of findings it was concluded that the chemical quality of egg based whey beverage depended of the chemical composition of add materials.

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