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**Nutrient content of orange flavoured whey
beverage**

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Abstract

The present study was undertaken with the objectives of developing suitable combinations of whey, orange juice and sugar for the preparation of Orange Flavoured Whey Beverage and ascertain their nutritional qualities. The orange juice and whey were used in the ration of 1:1 (T₁, T₂, T₃), 1:2 (T₄, T₅, T₆) and 1:3 (T₇, T₈, T₉) with three different sugar levels i.e. 8%, 10% and 12%. The analyses of nutrients (carbohydrate, protein, fat and ash) were done by using the methods laid down in AOAC. The maximum calories and total carbohydrate percent was obtained in T₉. Treatment T₁ shows maximum percent of protein and fat. While the highest average ash percent was in T₈. Hence, treatment T₁ is the best treatment in terms of protein and fat. Thus, orange flavoured whey beverage prepared has higher content of carbohydrate and protein, lower fat and can be useful for the people suffering from diseases such a degenerative diseases, cardio vascular diseases, pregnancy, lactation obesity etc.

Keywords: Whey, orange, juice, orange flavoured whey beverage, nutrients

Introduction

Whey is a highly nutritious by-product of paneer, cheese, chhana and casein industry. It contains about 50 percent of the milk solids, 6-7 percent dry matter which account for 45-50 percent of all the milk constituents Casein, fat and fat soluble vitamins. Whey contains 70 percent of sugar lactose, 10-20 percent of milk proteins, good source of minerals like calcium, phosphorus, magnesium etc and almost all essential amino acid. (Rani *et al.*, 2007) [6]. Whey is nutritious for people of all ages. Thus, it can be regarded as the natural supplement to have a healthy life free of deficiency diseases which may be either due to lack of essential amino acids of B-complex vitamins and minerals. It is a boom to those who suffer from obesity, cardio-vascular disease and health conscious consumers (Tomar *et al.*, 2002) [5]. Whey is an excellent beverage base as it is a genuine thirst quencher. Whey drinks are light, refreshing, healthful and nutritious. They also offer good profit margin. (Gupta, Prasad, 2000) [4]. Oranges are good source of vitamins (A, E, B6) minerals (magnesium, iron, potassium). Orange juice being favourite of consumers as a soft drink can be incorporated in whey to develop the beverages, which also enhances the nutritional as well as overall acceptability of the product (Prasad, 2004) [7]. Thus, the present study was undertaken to develop Orange Flavoured Whey Beverage with suitable combinations and ascertain their nutritional composition.

Material and Methods

Milk, Oranges, sugar, colour and essence were procured from the local market of Allahabad. Where was procure by the preparation of paneer by the researcher itself. Orange juice was procured by squeezing and straining properly. Nutritional analysis of Orange Flavoured

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Whey Beverage was done by standardized procedure laid down in AOAC (1980). Total carbohydrate was estimated by subtracting the sum of percentage of protein, fat and ash. Carbohydrate = 100- (protein+Fat+ash), formula given in ISI Methods of test for dairy industry. Protein was estimated by the Kjeldhal Method. Fat was estimated by Gerber Methods Ash percentage was determined according to the methods described in AOAC. Calories were calculated by using the Nutritive Value given by C. Gopalan (2001)^[2].

Flow Chart Showing the Developmet of Orange Flavoured Whey Beverage

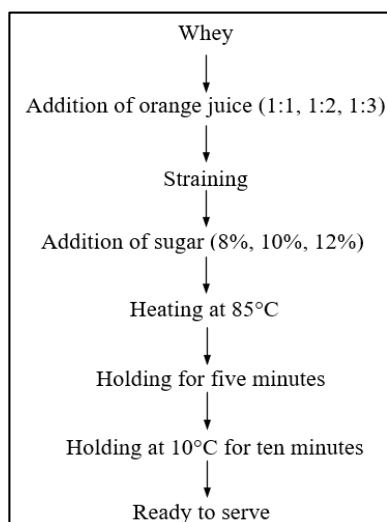


Fig 1: Preparation of Orange Flavoured Whey Beverage

Treatments and Replications: No. of treatments = 9, T₁ = O₁W₁S₁ (125ml Orange Juice, 125ml Whey, 8% sugar), T₂ = O₁W₁S₂ (125 ml Orange Juice, 125 ml Whey, 10% Sugar), T₃ = O₁W₁S₃ (125 ml Orange Juice, 125 ml Whey, 12% Sugar), T₄ = O₁W₂S₁ (83.4 ml Orange Juice, 166.6 ml Whey, 8% Sugar), T₅ = O₂W₂S₂ (83.4 ml Orange Juice, 166.6 ml Whey, 10% Sugar), T₆ = O₂W₂S₃ (83.4 ml Orange Juice, 166.6 ml Whey, 12% Sugar), T₇ = O₃W₃S₁ (62.5 ml Orange Juice, 187.5 ml Whey, 8% Sugar), T₈ = O₃W₃S₂ (62.5 ml Orange Juice, 187.5 ml Whey, 10% Sugar), T₉ = O₃W₃S₃ (62.5 ml Orange Juice, 187.5 ml Whey, 12% Sugar). No. of Replication = 4. The data collected as per the methodology were tabulated and analysed statistically.

Results and Discussion

Table 1: Average nutrient percent of orange flavoured whey beverage.

Treatment	Nutrients in %			
	Carbohydrate	Protein	Fat	Ash
T ₁	14.35	1.175	0.375	0.375
T ₂	15.45	1.2	0.325	0.2875
T ₃	17.165	1.55	0.25	0.2
T ₄	15.35	1.025	0.275	0.404
T ₅	16.35	0.85	0.2	0.159
T ₆	18.10	1.0	0.2	0.213
T ₇	15.31	0.97	0.2	0.356
T ₈	17.18	0.875	0.15	0.8235
T ₉	18.33	0.775	0.2	0.3755

Table 2: Analysis of variance for Nutritional analysis of orange flavoured whey beverage.

Sources of variation	Mean sum of squares			
	Carbohydrate	Protein	Fat	Ash
Due to treatment	8.8126125	0.0192861	0.0064125	0.0198195
Due to replication	0.1016666	0.0007361	0.0004333	0.000111
Due to error	405.50142	1.6498027	0.0569302	0.1324491

*Non-Significant at 5% level of significance

The maximum total carbohydrate percent was found in T₉ (18.33%) having highest proportion of orange juice and whey (1:3) and sugar 12 percent. It is therefore, concluded that as the level of whey and sugar increased, there was increase in total carbohydrate percent in the orange flavoured whey beverage. The calculated value of F (0.0217326) was less than table value of F (2.36) at 5 percent level of significance. This indicates that there was no significant difference in the total carbohydrate percent in orange flavoured whey beverage in different treatment combinations. The maximum protein percent was found in T₁ (1.175%) having highest proportion of orange juice and whey (1:1). Thus, as the preparation of orange juice and whey is same (1:1) there was increased protein percent in the orange flavoured whey beverage. The calculated value of F (0.0116897) was less than table value of F (2.36) at 5 percent level of significance. This indicates that there was no significant difference in the percent protein in orange flavoured whey beverage in different treatment combinations. The maximum fat percent was found in T₁ (0.375%) having same proportion of orange juice and whey (1:1) It is therefore, concluded that as the proportion orange juice and whey is same (1:1) there was increased fat percent in the orange flavoured whey beverage. The calculated value of F (0.1126379) was less than table value of F (2.36) at 5 percent level of significance. This indicates that there was no significant difference in the percent fat in orange flavored whey beverage in different treatment combinations. The highest ash percent was found in T₈ (0.8235%) having orange juice and whey in the proportion of 1:3. Thus, as the level of whey in the beverage increase there was increase in ash percent in the orange flavoured whey beverage. The calculated F value for treatment as F (0.149685) was less than table value of F (2.36) at 5 percent level of significance. Therefore the treatments had no effect on the ash content of orange flavored whey beverage. The highest calorie was obtained by T₉ (185 Kcal) having orange juice and whey in 1:3 proportion and sugar 12 percent. It is therefore, concluded that as the level of whey and sugar increased, there was increase in calories in orange flavoured whey beverage

Conclusion

It is concluded that the preparation of orange flavoured whey beverage is a feasible proposition. The maximum calories and total carbohydrate percent in obtained in T₉. Treatment T₁ shows maximum percent of protein and fat. While the highest average ash percentage was in T₈.

Thus, orange flavoured whey beverage prepared has higher carbohydrate and protein, lower fat content and can therefore be good for therapeutic uses such as in the cases of cardiovascular disease, in many degenerative disease, malnutrition syndromes, obesity, diabetes etc.

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