

Development of Chocolate- Malted Whey Beverage Using Liquid Cheese Whey

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Introduction

Cheese is one of the most popular milk products which produced by coagulating milk using rennet enzyme and microorganisms. During the cheese manufacturing yellowish liquid that contains all of the nutrition of milk except fat and casein is produced as by-product or waste material. This liquid is called as whey. Approximately ten pounds of milk are used to produce a pound of cheese and from six to nine pounds of whey is resulted. The whey contains 6-7% solids about half those in milk (Milk and whey powder, 1980). At present, whey is causing a huge problem for the cheese industry. Whey is leading cause for water pollution if whey is discharged to the water source and ultimately this ends up as a major hazard. If whey is unused, its organic nutrients make it a costly pollutant in the country's sewage and waterways. Biological oxygen demand (BOD) values for cheese whey range from 30,000 to 45,000 milligrams per liter (mg/l) (Milk and whey powder, 1980). Effective and economical methods of utilizing whey are essential if cheese plants are to remain competitive with other segments of the food processing industry. Utilization of whey for beverage production requires few energy resources. The entire whey is utilized no removal of water is necessary. Furthermore, whey can be utilized by small cheese plants for beverage production, since no elaborate or expensive equipment is required. Though the production of whey beverage is cost effective method of utilization of whey, relatively high content of minerals in whey are responsible for undesired salty-sour flavor of whey. This ultimately results with the undesired taste in final product. This can be overcome using chocolate powder and malt extract, since those compounds impart not only desirable flavor but also help to increase the nutritive value of final product.

The aim of this study was to develop chocolate-malted whey beverage as a solution for the whey disposing problem. In this research, best sugar percentage and suitable percentage of malt extract and cocoa powder were determined separately.

Methodology

Cheese whey was weighted and heated up to 60 °C by using hot water bath. Cocoa powder, sugar, full cream milk powder and malt extract was added to the preheated whey and stirred until all the compounds dissolved completely. The sample was pasteurized using hot water bath for 90 °C for five minutes. Sensory evaluation I was carried out to select best sugar percentage (T1-9%, T2-8% and T3-7% sugar) while Sensory evaluation II was carried out to select best combination of cocoa powder and malt extracts (T1- 0.8% Cocoa powder , 0.4%, Malt Extract , T2- 0.4% Cocoa powder ,0.8% Malt Extract, T3- 0.6% Cocoa powder , 0.6%, Malt Extract) Sensory evaluations were carried out using 15 semi trained penalties and data from sensory evaluation was

analyzed using MINITAB software ver. 14. Friedman statistical method was used to analyze data at the significance level of 0.05.

The samples were checked for pH changes and microbiological quality changes at 1 day interval for 10 days during cold storage (4 °C).

Results

Beverage sample that prepared using 8% of sugar was selected as the best sample from sensory evaluation I. In sensory evaluation II, T3 having 0.6% Cocoa powder was selected as the best treatment under 5% significant level.

pH changes and microbiological qualities were used as quality parameters for determination of shelf life of final product. Under the microbiological quality total plate count and Coli form count were taken into consideration. As pH of the final product and total plate count of the final product begin to reduce steadily at the 7th day. As a result of that shelf life of product were determined as 7 days under refrigerated conditions. Nutritional value of the final product is given in Table 1.

Table 1: Nutritional Value of final product

Nutrient	Amount g in 100g
Fat	1.63
Crude Protein	3.45
Ash	0.4
Carbohydrate	14.09
Total Solid	19.57

Conclusions

As a pasteurized product final product has higher shelf life than the commercially available milk based pasteurized beverages. Shelf life of the final product is 7 days and can be extended up to 9 days by applying ideal conditions

When the nutritional value of final product is considered, it has nearly equal nutritional value to the milk based beverage as shown in Table 1.

Sedimentation of cocoa powder was observed with the poor mouth feel in final product and this can be overcome by using food grade stabilizers. Since it is effective and economical solution for whey disposing problem stabilizers were not used for this experiment.

References

Atherton, H.V. and Newlander, J.A. 2000 Chemistry and Testing of Dairy products, Fourth edition, CBS publishers and distributors New Delhi, 395 .