Development of new functional beverages from milk permeate using some probiotic bacteria and fruits pulp

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Summary

In an attempt to develop new functional beverages, milk permeate was fermented with the use of 2% of a mixed starter culture (1:1:1) containing *Lactobacillus delbrueckii* subsp *bulgaricus* DSM 20080, an exopolysccharide (EPS) strain of *Streptococcus thermophilus* ASCC 1275, and a probiotic *Bifidobacterium longum* DSM 20088. Sucrose (5%) was added to the milk permeate before the heat treatment. Unheated and heated (85ºC/15min) sweetened fermented permeate were mixed separately with equal volume of fruit pulp (guava or papaya), filled in sterilized bottles and stored at ~4ºC for 30 days. Samples from the prepared beverages were analyzed chemically; microbiologically and evaluated for its sensory attributes when fresh and every 10 days of cold storage. Also, the rheological properties of fresh samples were determined. The total solid, fat, protein, ash, fiber contents and acidity increased slightly while total carbohydrate, ascorbic acid, and carotenoid contents and pH value decreased during cold storage. Addition of papaya and guava pulp increased greatly but variably the Ca, P, Na, K, Mg, Fe, Cu and Zn contents of the prepared beverages. Papaya beverage was found to be a better source for Ca, P, Na, K, Mg and Zn than that of guava beverage. No detectable counts of different lactic acid bacteria (LAB) strains or *Bifidbacterium* were found in prepared beverages from heated fermented permeate during cold storage, while the total viable bacteria, LAB, *Str. thermophilus*, *Lb. delbrueckii* subsp. *bulgaricus* and *Bif. longum* counts decreased gradually in produced beverages from unheated fermented permeate during storage. The prepared functional beverages from unheated fermented permeate retained probiotic counts higher than recommended number (6 log cfug-1) to achieve potential beneficial effect up to the end of storage. Sensory evaluation revealed that developed functional beverages were characterized by high acceptability. Addition of EPS producing strain increased the viscosity of prepared functional beverages. The prepared beverages offer feasible economic, and technological way for the utilization of milk permeate.

Key word: Functional beverages, Milk permeate, Papaya, Guava, Probibtic bacteria, Exopolysccharide.