Investigation of the Use of High Hydrostatic Pressure on Functional Whey-Based Beverage

Gulsun Akdemir Evrendilek, Esra Sırdaş
Abant Izzet Baysal University Faculty of Engineering and Architecture Department of Food Engineering Golkoy Campus 14280 Bolu TURKEY

Due to the fact that whey and whey products from cheese industry are not efficiently evaluated and used in Turkey, it causes a great economical loss. Therefore, formulation of aromated functional drink with unpasteurized fresh whey, its processing by both high hydrostatic pressure (HPP) and heat, and measurement of physical, chemical, microbiological and sensory properties in order to determine shelf life are prompted in the study. Functional drink was produced by addition of plant stanol (0.0 and 1.00%), stabilizator (0.7%), aroma (75 µL/mL), colorant (20 µL/mL) and sugar (%3), and based on the initial experiments to determine pressure and processing duration the samples were separated into three group as control, HPP processed (200 MPa-5 min, 400 MPa-5 min and 600 MPa-5 min) and heat processed (85 °C 15 min). Depending on the applied pressure and processing time, initial processing temperature of the samples, 22±2°C, increased by 10°C. After processing, the samples were inoculated with starter cultures of Lactobacillus acidophilus and Lactobacillus casei and stored at 4 ºC for 49 days after the incubation at 37 ºC for 18 h. During storage of the samples pH, water activity, titratable acidity, color (L*, a* and b*), chroma, hue, total color difference, sedimentation, FT-IR profile, reological properties, particle size, zeta potential, conductivity, SDS-PAGE, metal ion concentration, microbiological and sensory properties were analyzed. In general, no significant difference was detected among the samples ($p>0.05$), but significant differences were detected for viscosity and particle size of the heat processed samples ($p\leq0.05$). The samples processed by 600 MPa for 5 min showed differences compare to other samples in sensory attributes which some of them developed depending on the storage period ($p>0.05$). It can be concluded that the formulated functional drink is a good option to evaluate whey, and HPP processing is a viable technology to extend shelf life of the formulated functional drink.

Keywords: High pressure processing (HPP), whey, functional drink, shelf life, plant stanol