Ultrasonication of Milk from Thamankaduwa White and Holstein Friesian Cattle Breeds and Its Effects on Lactic Acid Coagulation

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The application of ultrasound technology in dairy processing is relatively a new field of study. Ultrasonication alters the properties of milk, allowing for the production of novel-textured, high-moisture dairy products. This study was conducted to assess the effect of ultrasonication on lactic acid-induced coagulation of milk from indigenous cattle, Thamankaduwa White (TW) and exotic cattle, Holstein Friesian (HF). Milk samples from pure TW and HF were subjected to ultrasonication at 3 different power levels: US 42, US 51, and US 60 with the energy densities 504 JmL^{-1}, 612 JmL^{-1}, and 720 JmL^{-1}, respectively, for 10 minute duration with temperature control (<40º C). Treated and untreated milk samples were acidified by adding lactic acid bacteria (*Streptococcus thermophilus* and *Lactobacillus delbrueckii* subsp. *bulgaricus*). Coagulation properties such as water holding capacity (WHC), syneresis and texture profile analysis (TPA) and microstructure were determined. Statistical analysis was carried out using a 2-factor factorial CRD followed by Fisher's LSD test. The main findings suggest that ultrasonication increased (p<0.05) the WHC of coagulums from HF milk and decreased (p<0.05) the WHC of coagulums from TW milk. Ultrasonication increased (p<0.05) the firmness of coagulums from both TW and HF milk. An interaction effect (p<0.05) of milk type (breed) and ultrasound energy density on WHC and firmness was observed. Ultrasonication of raw milk from HF had little effect on the final structure of the coagulum compared to that of TW. However, at a high level of treatment *(i.e.,* 720 JmL^{-1}) more porous structures of acid gels from both breeds were observed. Results of the current study indicate that ultrasound treatment improves the lactic acid coagulation properties of milk from both breeds. However, the same ultrasound energy density affects the coagulation properties of milk from both breeds differently.

Keywords: Holstein Friesian, Lactic acid coagulation, Thamankaduwa white, Ultrasonication

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