

Age Gelation of Membrane Concentrated Ultra-high Temperature-treated Milk

JE H. RYUE¹ AND PAUL A. SAVELLO²

1. Central R&D, Maeil Dairy Industry Co. Ltd.
2. Department of Nutrition and Food Sciences
Utah State University, Logan UT 84322-8700

Whole milk retentates produced by reverse osmosis and UF were UHT processed and compared for storage life at room temperature. Viscosity studies indicated that age gelation was delayed longer in reverse osmosis retentate than in UF retentate at the same total solids level (26%). At 6.4% protein (2 times concentration by reverse osmosis vs 2.2 times concentration by UF), UHT-treated retentate produced by reverse osmosis showed better shelf stability. Sodium hexametaphosphate and disodium phosphate at 1, 3, 5, 10, and 20 mM were incorporated prior to UHT processing of each sample to investigate effects on shelf-life. Sodium hexametaphosphate at 1 and 3 mM delayed age gelation but sodium hexametaphosphate at 10 and 20 mM accelerated age gelation. Sodium hexametaphosphate at 1 mM was most effective in delaying age gelation in reverse osmosis retentate than in UF retentate (22 and 26% total solids). Following UHT treatment, levels of soluble and ionic calcium were higher in reverse osmosis retentate than in UF retentate. An increase in the soluble calcium-to-protein ratio was associated with increased shelf life ($r^2 = .80$).