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ROLE OF IONIC CALCIUM IN FOULING OF HEAT TREATED MILK

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ABSTRACT

This paper investigates the role of ionic calcium in deposit formation and sediment formation in heat-treated milk. There are considerable variations in ionic calcium and alcohol stability in milk from individual cows and individual goats. In general, goat's milk has a much higher ionic calcium level and lower alcohol stability, and is much more susceptible to fouling and sediment formation during UHT processing.

Goat's milk was heat treated at 135 °C for 4 s using a miniature UHT plant and the overall heat transfer coefficient (OHTC) was monitored to estimate the extent of fouling. Goat's milk fouled very quickly and UHT run times were short. The use of sodium hexametaphosphate, trisodium citrate and cation exchange resins to reduce ionic calcium prior to UHT processing, increased the pH and alcohol stability of the milk and markedly increased the run time of the UHT plant. Cow's milk was also evaluated and addition of calcium chloride was found to increase ionic calcium, reduce alcohol stability and decrease the run time. Thus ionic calcium appears to be a good determinant of susceptibility to fouling.

Addition of stabilisers to goat's milk prior to UHT processing was evaluated. Most of the stabilisers reduced ionic calcium and there was a good correlation between ionic calcium and the amount of sediment formed in the product. Thus fouling and sediment formation appear to be part of the same problem.