Milk separation and pasteurisation: the impact of separating temperature, and order of separation and pasteurisation, on the composition of skim milk, cream and separator sludge.

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Executive Summary

A principal purpose of the present study was to determine whether the order in which separation and pasteurisation of whole milk occurs has an effect on the composition of skim milk and cream, and thus potentially of products made using these streams. The study also sought to determine the effect of separating temperature on the composition and microbiological quality of skim milk and cream.

In addition, a survey of whole milks and separator sludges at four Fonterra manufacturing sites across New Zealand was carried out to determine whether there was regional variation in minerals content. This related to the suspected involvement of sludge minerals content in the incidence of desludging port erosion found in some separators, particularly in Northland.

Trials to study the effects of order of separation and pasteurisation, and of separating temperature, were first carried out in an ideal environment in the pilot plant at what is now Fonterra Research and Development Centre. Commercial-scale trials of the same kind were then carried out at Fonterra Kauri. The minerals survey was conducted by collecting and analysing whole milk and separator sludge samples collected at Fonterra Kauri, Fonterra Whareroa, Fonterra Clandeboye and Fonterra Edendale.

This study has identified that dairy manufacturing plants have a larger operating window in terms of separating temperature and equipment configuration than previously thought. The ANOVA analysis may have found significant effects, but the compositional changes were minor.

The mineral survey work showed that there were significant batch differences for all minerals. The calcium and phosphate contents explained most of the variability in the composition. The milk at the Kauri plant was different to milk in other parts of the country. Calcium content could be used to differentiate between the different sites tested. The phosphate content could be used to distinguish between separators.

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