

## **CLEANING OF SWEETENED CONDENSED MILK DEPOSITS ON A STAINLESS STEEL SURFACE**

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### **ABSTRACT**

Formation of milk deposit on heat transfer surfaces is a major problem in dairy processing plants. Cleaning of such deposits is costly and time consuming. In this study sweetened condensed milk (SCM) is chosen as a commonly encountered proteinaceous deposit in confectionary processing. SCM is an intermediate in the manufacture of chocolate crumb, the precursor to chocolate. During processing, an adhesive deposit forms which necessitates frequent cleaning.

Cleaning studies using alkali-based cleaning solutions have been carried out, using a lab scale cleaning rig over a range of fluid temperatures (40-80°C) and flow velocities of (0.25-0.5 m s<sup>-1</sup>).

Cleaning was quantified by measuring deposit removal and the change in the thermal resistance of the deposits using a heat flux sensor. Generally the results showed that cleaning time reduces as the fluid temperature and flow velocity increases. The results are aimed to be scaled up to a cleaning-in-place (CIP) pilot plant built at the University of Birmingham, where soiling and cleaning of stainless steel geometries take place. CIP end point will be monitored and validated by a series of on-line turbidity, conductivity and IR measurements.

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