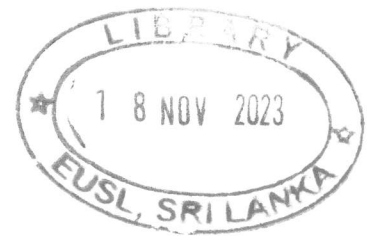
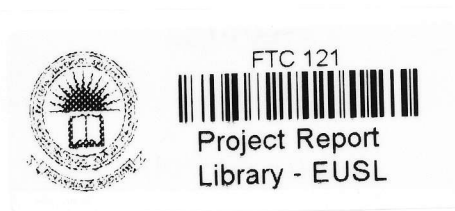


**ACHIEVING GREATER BENEFITS AND EFFICIENCY BY  
REDUCING CHEMICALS USED IN THE CLEAN IN PROCESS IN  
MILCO (Pvt) Ltd**



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## ABSTRACT

Cleaning in place (CIP) is a method of cleaning inner surfaces of piping, vessel, equipment, and associated fitting with disassembly. Although, the CIP processes have been studied continually to improve efficiency for chemical consumption, the real conventional plant operations of this process still have been considered as a large amount of consumption. The objectives of this research are to study process behaviors and to find out the optimal concentration of NaOH solution of the CIP cleaning chemicals in a milk plant. This research also discusses the challenges faced by dairy industries in implementing NaOH reduction, such as resistance from employees, and the need for new cleaning protocols. However, the research concludes that the benefits of reducing NaOH usage in the cleaning process in the dairy industry outweigh the challenges, and it is a viable option for achieving greater benefits and efficiency. The reduction in NaOH usage not only leads to cost savings and improved environmental performance but also enhances the overall sustainability of the dairy industry.

These study aim to investigate the possibility of achieving greater benefits and efficiency by reducing the amount of NaOH used in the clean-in-place (CIP) process in the dairy industry. Experiments were also carried out to investigate possible reductions in chemical use with regards to CIP, without compromising the effectiveness of the CIP performed. The research is based on laboratory experiments and industrial case studies, which provide insights into the impact of reducing NaOH on cleaning efficiency and the quality of the cleaning process. Over time, the chemical and microbiological parameters of the cleaning solutions were analyzed. The effectiveness of CIP cycles was quantified using swabs, with a relative 2000 cfu/ml indicating a clean vessel.

It is recommended that raw milk storage tank in the dairy industry use at least a 1.2% v/v dilution for caustic CIP cleaning cycles (based on a 99.9% wt caustic solid) for 400 second to ensure a thorough clean. Reductions in the usage of concentration of caustic for caustic CIP cycles could yield milk industries savings of Rs, 31089.60 over per week. (Annually Rs.1161659.20).

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