CHARACTERISING THE CLEANING MECHANISMS OF YEAST AND IMPLICATIONS FOR IMPROVING CLEANING IN PLACE (CIP)

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ABSTRACT

Industry operations require a clean plant that is hygienic to consistently make safe, quality products. Cleaning In Place (CIP) is the ubiquitous solution to plant cleanliness, therefore it is vital the system is optimal: the correct cleaning agent is delivered at the right time to the fouled geometry at the right concentration, temperature and flow velocity. With the environmental impact of processes becoming increasingly important and the ever increasing price of resources, a hygiene solution that is not detrimental to the environment yet economically viable is crucial. This work is part of the Technology Strategy Board (TSB) co-funded project ZEAL which aims to reduce cleaning times, energy, water, and improve chemical use in CIP by characterising the cleaning mechanisms of a range of key deposits.

A benchmarking study was carried out in a brewery to assess the efficiency of certain CIP operations. The study revealed that water and chemical rinses can be further optimised. As such, work has been carried out on the lab scale to

1. Develop an effective fouling strategy to generate a deposit to mimic the deposit encountered in the industry
2. Characterise the relationship between flow velocity, temperature, cleaning agent and its concentration in the removal of yeast films from stainless steel surfaces.

The yeast film represents a type 2 deposit removed in part by water rinsing and in part by chemical action (Figure 1). Initial results suggest that if the temperature of the water rinse was increased up to 50°C, the greatest amount of deposit was removed in the shortest time. This coupled with an alkaline detergent phase of 30℃ or 50°C would reduce cleaning time.

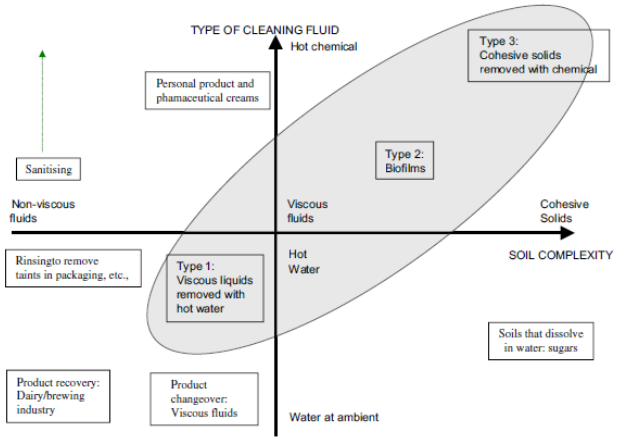

Figure 1: Cleaning map showing three critical soil types. Adapted from Fryer and Asteriadou (2009)