MONASH INDUSTRY TEAM INITIATIVE (MITI)

MONASH INDUSTRY TEAM INITIATIVE (MITI)

Water and Wastewater Stewardship at Stanhope

Investigation on water consumption and drain loss at Fonterra Stanhope

Emilia Gillian Lee - BEng (Chemicals)/ BPharm. Sci | Priyam Gupta - BEng (Aerospace)

ABOUT FONTERRA STANHOPE

Stanhope is known locally as the “Town of the Tastiest Cheese” and is where a skilled team at the Fonterra factory turn the local high-quality milk into a wide range of incredible cheese such as Cheddar, Mozzarella, Parmesan, Ricotta and more.

Stanhope also produces anhydrous milk fat, whey, ghee and milk powders. With the capacity to produce up to 80,000 metric tonnes of product, people across Australia and around the world can enjoy Stanhope’s products every day.

PROJECT BACKGROUND AND AIMS

Chemical Oxygen Demand (COD) is used as a measure of manufacturing product loss down the drain (drain loss). COD levels in wastewater effluent at Stanhope are higher than the desired site target. Stanhope also has plans to reduce water consumption on site to align with a global sustainability target for 2030.

This project focused on identifying opportunities for reducing milk loss to drain and reducing water use on site through the following:

- ❑ Examine the correlation between COD levels in effluent and drain loss
- ❑ Investigate upstream processes with the highest contribution of COD
- ❑ Explore processing areas and update the site P&ID and actions to reduce water consumption

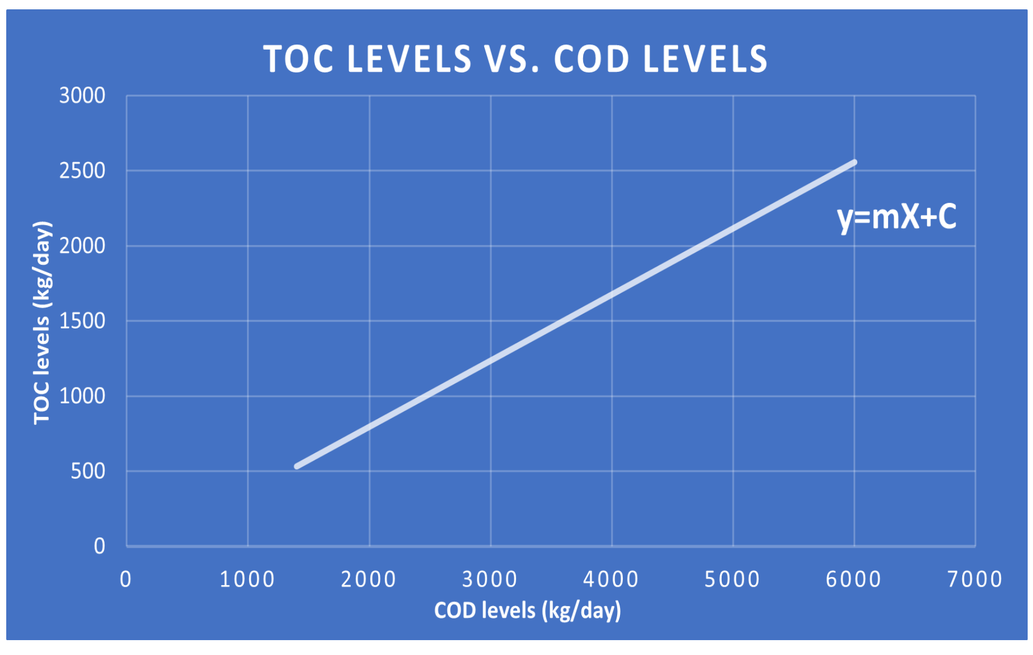

Figure 1. Illustration of data analysis done on effluent samples.

PROJECT OUTCOMES

The team recommended the installation of additional water flow meters to assist in future endeavours for measuring water conservation and assisted to draft a Water Improvement Plan for the site.

It was discovered that milk product loss down drain was not the only factor contributing to the high COD levels in effluent streams. Effluents samples were collected with laboratory analysis revealing that effluent COD levels comprised both organic and inorganic compounds, with the inorganic proportion contributed by chemicals used during cleaning in place and sanitising processes. The relationship between organic loss to drain was able to be demonstrated by comparing the Total Organic Carbon (TOC) levels with the COD levels an generating an algorithm.

Figure 2. Example of effluent stream.

Furthermore, computational analysis was developed to correlate the colour of the effluent streams with the COD levels measured. The computational analysis enabled COD levels to be estimated instantaneously which could alarm the factory operators of a potential loss and allowing quick resolution in real-time.

FUTURE RECOMMENDATIONS

- ❑ Component analysis on effluent streams can be undertaken to determine which inorganic chemicals and which processes, have the highest COD level contribution.
- ❑ The chemicals can be further reclaimed to reduce monetary losses
- ❑ Regular sampling over an interval could further verify the algorithm generated during the project, or establish one for each process area
- ❑ A system that allows data from SCADA to be directed to the computational software could be developed to allow the instantaneous estimation of COD levels.

A project initiative of the Victorian dairy industry proudly sponsored by the Gardiner Dairy Foundation in partnership with Monash University

MONASH University | GARDINER FOUNDATION | Fonterra™ Dairy for life