MONASH INDUSTRY TEAM INITIATIVE (MITI)

Finding Water Savings in Bega's Koroit Lactoferrin Plant

Emma Filgate (Bachelor of Chemical Engineering & Pharmaceutical Science)
Nithiya Pathmasiri (Master of Biological Engineering)

INTRODUCTION

BACKGROUND

Lactoferrin (LF) is a high-value protein found in milk and used in infant formula. At the Koroit LF plant, this protein is extracted from milk and purified into a fine powder. This process requires significant water input and wastewater processing. As such, the plant has a large environmental footprint and operational costs, which this project aimed to address.

OBJECTIVES

- Understand the process of LF production
- Understand water use of the LF plant
- Quantify water consumption and highlight key features
- Analyse water flows and wastewater production
- Investigate opportunities for water reduction
- Provide recommendations for water-saving changes

CHALLENGES & SOLUTIONS

CHALLENGES

1. Lack of LF process training material:
The site had limited training material to share with the wider team. While many people knew different aspects in detail, in particular the operators, this knowledge was not consolidated or documented anywhere for training, making it difficult to understand and describe the process in depth.

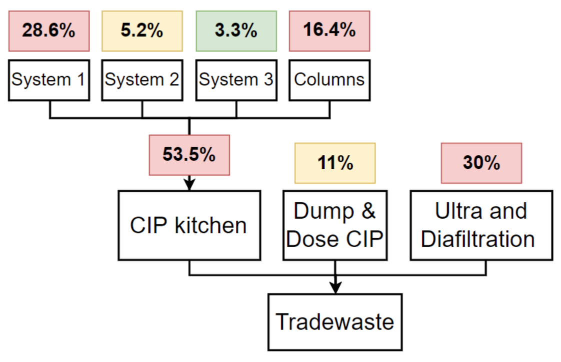
2. Complicated cleaning procedures in LF and no tracking:
The Clean-In-Place systems (CIP) of the LF plant consists of several different systems, all with different characteristics and set ups. This made it difficult to understand the CIP methods, track the systems, and quantify their water usage.

3. Unknown water and wastewater flows within the plant:
The extent of understanding of the water mass balance within LF was the inlet and outlet flows. The sections that used the most water or produced the most wastewater were unknown.

SOLUTIONS

1. Process Flow Diagrams & Explanation Documents: Consolidated site knowledge in one place to allow for easier understanding of the LF process for those on site, as well as future visitors and staff.

2. Creation of Live Dashboards: Coded dashboards that present key CIP information in a user-friendly way. These update live, with different indicators included for different users, and can be easily built upon in future.



3. Tracking of Water Flows: Quantified the mass balance of water flows in and out of the LF plant. Provided insight into water use to formulate water saving recommendations

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RECOMMENDATIONS

RECOVERY OF PRERINSE WATER

Due to quality requirements in the LF Plant, final rinse water that could be reused as prerinse is sent to drain.
Use prerinse water for intermediate rinses: Reprogram the CIP routes so that prerinse water is used for intermediate rinses between caustic and acid instead of treated water.
Re-use prerinse water elsewhere: Send prerinse water to another area of the factory to be reused.

CIP IMPROVEMENTS

CIP contributes over 60% of wastewater production in LF, and caustic contributes to its high pH
Reduce washing frequency & volumes: Some equipment in the LF plant are over washed. The frequency of washing should be reduced, and conductivity setpoints implemented rather than volume setpoints.
Use acid for refreshes: Use acid rather than caustic to do 'refresh' washes, as it is cheaper and safer.

INSTALLATION OF RO PLANT

An RO plant could treat the salty wastewater from ultrafiltration and diafiltration in the LF process, which is currently 30% of drain volume. This will allow recycling of water and salt rather than wasting it.

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