



CASE HISTORY

RECOVERY OF CANNERY WASH WATER

Introduction

Esmil Process Systems were tasked with providing a process solution to recover cannery wash water for a local can forming plant. Determinands of primary concern to the client was the maximal removal of soluble COD (Chemical Oxygen Demand) and TSS (Total Suspended Solids) which would allow re-use and recycle opportunities for the cannery as well as reducing the town water make-up volume.

The sample received at Esmil's laboratory was contaminated with different oils, cutting fluids and large globules of grease and presented as a low pH cloudy emulsion.



Process

Preliminary tests conducted in-house indicated that COD & TSS concentrations were 3x higher than client expectations. Chemical pre-treatment of the sample was indicated to remove as much of the COD and TSS as possible prior to processing through the UF (Ultrafiltration) and RO (Reverse Osmosis) membranes to prevent membrane "overload", minimise possible fouling and maximise the stream fluxes.

Case History

The sample was filtered through a 500µ bag filter to remove gross contaminants, and the pH corrected using NaOH to neutral. Various combinations of bentonite and coagulant were tried to determine the most cost-efficient method of reducing TSS and COD before membrane treatment.

The treated sample filtrate was recovered and passed through UF (Ultrafiltration, tubular membrane) and the permeate and concentrate recovered for further treatment and analysis. This UF permeate (essentially free of TSS) was then passed through a RO (Reverse Osmosis, spiral wound) membrane to strip the residual soluble COD from the sample stream.

Esmil's in-house laboratory facilities provides Esmil engineers with insights into:

1. COD reduction using chemical pre-treatment and UF membranes
2. COD and TDS reduction using RO membranes
3. Membrane flux
4. System recovery
5. Membrane fouling tendency

This process data will assist later in the subsequent site trial or plant design phases for each client.

Results

The important trial results are tabulated below.

Parameter [units]	Raw sample	Post chemical treatment	Post UF treatment	Post RO treatment
COD [ppm O ₂]	3 150	2 800	650	70
TSS [ppm]	3 410	2 700	2 270	20
pH	2.60	7.50	7.10	6.4
Conductivity [μ S/cm]	6 820	5 290	4 700	50

Table 1. Cannery water treatment laboratory trial results

It may be seen that the process designed and implemented by Esmil Process Systems yielded a 97% reduction in COD, a 99% reduction in TSS and 99% reduction in conductivity.

After processing, both membrane sets easily regained initial flux values and no impact on membrane integrity was discerned.

Conclusions

Even though this cannery wash water was significantly fouler than initially briefed, Esmil Process Systems treated this water to allow the client re-use and recycle opportunities for this stream (previously discharged to sewer) and reduce town water make-up.

