

# CASE STUDY



## Aerobic Treatment of Wastewater for Fish Flour and Fish Oil Company for Reuse

- **Project:** Tadel S.A.
- **Location:** Rocafuerte, Ecuador
- **Solution type:** Aerobic Treatment of Wastewater and Reuse
- **Technology used:** cooling tower for the condensate; rotating sieve; mixed equalization tank; nitrification - denitrification treatment with MBR; reverse osmosis.

### Background

Tadel S.A. is a fish flour and fish oil processing company located in Rocafuerte in the western part of Ecuador. It produces 100 tons of flour a day from fish waste resulting in approximately

300 m<sup>3</sup>/d of wastewater. The wastewater results from the broth concentration plant and from drying of flour, washing water, boiler blowdown and cooling towers.

### Challenges

The company needed to treat its wastewater and to reduce its water supply costs. The area of Manabì, where the company is located, lacks water, both for drinking and for irrigation purposes. Tadel was only able to obtain roughly 350-400 m<sup>3</sup>/d of water from the public network and through tankers at a cost of about \$3/m<sup>3</sup>. The little water available is also rich in salts that makes boiler blowdown very expensive. Additionally, the

reuse of wastewater from the fish processing industry is particularly complicated as these effluents are very difficult to treat, with a nitrogen content between 600-800 mg/L, phosphorus between 30 and 80 mg/L and Chemical Oxygen Demand between 5,000 and 8,000 mg/L. Another challenge for Fluence was to purify the water to a level sufficient to be demineralized and reused through a reverse osmosis system.

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## Solution

The treatment chain was developed with a cooling tower for the condensate of the evaporator plant, followed by an equalization tank. After mixing, the wastewater is subjected to an aerobic treatment through a nitrification-denitrification process with

MBR (Membrane Bioreactor).

The use of ultrafiltration membranes eliminates suspended solids and allows demineralization by reverse osmosis.

## Results

Fluence's technologically advanced solution offers significant and multiple advantages.

The use of demineralized water in the cooling circuits and for production of steam allows a significant reduction of boiler blowdown with a consequent savings in fuel and water. The use of demineralized water in the process reduces the salinity of the wastewater, making it suitable for irrigation. To produce demineralized water, the treatment plant concludes with reverse osmosis, right after the ultrafiltration membranes.

This solution permits recovery of about 240 m<sup>3</sup>/day

of demineralized water with an annual water saving of \$210,000.

Most of this water is recycled during the production process and is used to power the factory boiler, with fuel savings of \$140,000/year.

Thanks to the Fluence reuse solution, Tadel has zeroed its water footprint and the consumption of water has reduced to such an extent that the company no longer needs to buy water, but instead produces a surplus available for irrigation, reuse, or reintroduction into the environment.

## Benefits

- Production of 240 m<sup>3</sup>/d of demineralized water for reuse
- Production of 60 m<sup>3</sup>/d of excess water for irrigation
- Fuel savings: \$140,000/year
- Water savings: \$210,000/year
- Carbon Footprint reduction: 1290 tons CO<sup>2</sup> per year

