



APPLICATION REPORT Food & Beverage

Inline concentration measurement of fish tail water



- Continuous monitoring of suspended solids for evaporation control of process water from fish oil production
- Increased yield and plant efficiency by preventing over-concentration and clogging
- Process automation and standardisation using a high-accuracy Coriolis flowmeter
- Inline density measurement eliminates time-consuming laboratory analysis

1. Background

Agustiner S.A. is an Argentine company based in Mar del Plata, specialising in fish meal, fish oil, and aquaculture feed. Founded in 1965, the company operates two modern facilities to process around 600 tonnes of raw material daily. With about 80% of its production exported to markets such as Japan, China, the EU, and South Africa, Agustiner is recognised for its high-quality marine protein products. The company employs some 200 people.

2. Measurement requirements

To increase production yield and mitigate environmental impact, the company also processes fish tail water, a by-product of fish oil production. This process wastewater is rich in nutrients and proteins and is worth concentrating for use in feed production. The company uses a four-effect evaporator to concentrate the final products. A four-effect evaporator is a type of multi-effect system that uses four stages to evaporate liquid and increase concentration. These stages, or "effects", are connected in series, with the vapour from one effect used to heat the liquid in the next – maximising heat transfer and reducing energy consumption. It is essential to measure the concentration of the fish tail fluid not only to ensure uniformity of the final product, but also to avoid clogging at the various stages.

Previously, this task relied on an operator manually measuring concentration with a refractometer and performing laboratory tests. This manual process was non-continuous, time-consuming, and dependent on the operator's skill and consistency. To automate the process, the plant trialled other technologies, but without success. These alternatives did not deliver the reliable and accurate results needed to achieve the desired concentration levels of the final product.

To address these issues, the plant required continuous and reliable inline measurement of process water concentration. This would not only unify the concentration of the final product but also streamline the process, reducing the dependency on manual measurements and laboratory tests.

3. KROHNE solution

KROHNE proposed the OPTIMASS 6400 to ensure continuous measurement of suspended solids concentration in the fish tail water. This twin-bent tube Coriolis flowmeter features integrated density measurement and can therefore determine the concentration inline, without manual intervention. The readings are transmitted to the client's PLC to automate the evaporation process in real time and maintain it within defined concentration thresholds.

The Coriolis meter functions as an all-in-one device for the customer, providing not only density readings but also flow rate and temperature data. The OPTIMASS 6400 is factory-calibrated. For high-accuracy flow measurement, a zero calibration was carried out during commissioning with the flowmeter connected to the control system. No additional configuration was required.



Flow and density measurement for control of process water evaporation

4. Customer benefits

Thanks to the versatile Coriolis flowmeter, the entire fish tail water evaporation process was standardised and automated – with optimal product yield in mind. This had previously been impossible without the OPTIMASS 6400.

Continuous monitoring prevents over-concentration and consequent fouling, thereby ensuring process safety and uninterrupted equipment operation. Unnecessary cleaning shutdowns due to clogging were eliminated, and the end product now consistently meets the desired quality standards. At the same time, time-consuming manual workflows involving refractometers and laboratory analyses have become a thing of the past.



Inline concentration measurement of fish tail water with the OPTIMASS 6400

As concentration is the most critical parameter in the process – determining the quality of the final product – overall efficiency was significantly increased with the OPTIMASS 6400. Stable production also enabled the standardisation of downstream processes along the production chain. The successful automation was subsequently replicated on identical equipment across the factory, further enhancing both the efficiency and consistency of plant operations.

5. Product used

OPTIMASS 6400

- Coriolis mass flowmeter for advanced food and beverage applications
- High accuracy flow measurement of mass flow, volume flow and density/concentration
- Communication options: HART®, FOUNDATION™ Fieldbus, PROFIBUS® PA & DP, Modbus, PROFINET, Bluetooth®, EtherNet/IP
- Maintains operation even with entrained gas of up to 100% (EGM™)



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