

Increased Plant Yields and Regulatory Compliance with On-Line TOC Monitoring

Problem

Product loss to effluent was not only lowering plant yields for an international dairy processor, it was causing significant variability in the wastewater treatment process which put them at risk of violating environmental permits and added operational costs.

Solution

The Biotector B7000 analyser provided real-time, on-line total organic carbon (TOC) monitoring to help the plant identify spills and drive corrective action.

Benefits

Identifying and fixing product loss at the source increased plant yields. Eliminating the source of product loss led to reduced load variability in the treatment plant, making it easier to stay compliant with permits. The overall reduction of organic material in the treatment system reduced treatment costs, providing further savings.

Company Background

Compliance

An international food ingredients, flavors, and cheese manufacturer's primary concern in upgrading its instrumentation was to better ensure regulatory compliance while improving wastewater treatment plant (WWTP) operations. "We had environmental and commercial reasons for wanting to install Biotector," an Environmental Manager stated. "The foremost corporate objectives for this analyser are to meet our environmental requirements in our IPPC license and to increase overall plant yield by reducing product loss to effluent at the plant."

Before installing the Hach® Biotector B7000 TOC Analyser, the company previously used other analysers, labeling them as "unreliable and inconsistent" and relied on composite samples to monitor wastewater loading. However, according to an Environmental Manager, "The information was not instantaneous and was 24 hours too late." This delay in analysis and unreliable results jeopardized the plant's regulatory compliance.



CASE STUDY: IMPROVING COD/TOC ANALYSIS WITH BIOTECTOR B7000

Product Loss

Some product loss is inevitable in a processing environment. To improve its wastewater treatment plant (WWTP) operations, the company installed the Biotector B7000 at one of its sites. Prior to the Biotector B7000, the company was not able to track losses in real time, leading to higher chemical treatment dosing than necessary. "We view every kilogram of COD treated as lost product that should have gone into a packet or carton," says a site operator.

A major portion of the plant's WWTP running costs comes from the aeration required to reduce COD loadings – a very energy-intensive process. Lost product also contains P, so the wastewater can have both a high COD (as measured by TOC analysers) and high P, resulting in substantial additional treatment costs. Reducing COD at source in the production departments reduces the cost of treatment to the WWTP and helps the plant attain emission limit values for final effluent to the local river by lessening the initial effluent load.

Solution and Improvements

The company's first Biotector B7000 was installed onto the main drain to catch losses or spills. This proved very effective, very quickly. However, although they could see what was happening at the main drain, the team recognized that they needed additional analysers in order to track back any losses or incidents to the source.

The operators' confidence built with the initial analyser, and a year later the company installed 10 additional B7000 analysers on process discharge points. Each installation integrated with the SCADA system, providing at-a-glance Biotector measurements as well as various other site information. This drives the ownership of corrective action on product losses down to the plant operator level with real-time results displayed on operator dashboards.

This best practice approach resulted in strong commercial results for the company. "The difference with Biotector is that it's reliable and accurate compared to other analysers which have proven to be unreliable in the past," commented a facility manager.

A high-COD stream is fed into two anaerobic digesters – a 24/7 process with implications for the WWTP operation if overloads occur. The facility found Biotector to be particularly valuable in keeping this loading monitored and allowing improved control.

Cooling water is also analysed by the Biotector system prior to discharge on a continuous basis. Biotector information is displayed in units of TOC; process control and decision making are carried out using these units.

When asked why Biotector was the plant's analyser of choice, an operator replied, "Robustness, reliability and accuracy."

Commercial Impact

Biotector is a contributing factor in the overall increased plant yield by reducing product loss at source in the production departments. Consequently, energy costs of the WWTP are also reduced. This is the combined result of the reduced COD loading and installation of diffused air equipment at the WWTP. The aeration process is much easier to regulate with Biotector as the volumetric flow can be adjusted to achieve the optimal performance consistently with real-time TOC measurement.

All the Biotector analysers were installed with Biotector Venturi Samplers, resulting in a system that takes an accurate sample irrespective of the viscosity of the effluent sample for analysis.

Biotector has also proven very useful for total inorganic carbon (TIC) measurements. Inorganic components can sometimes come via the effluent from the IC Reactors on the waste farm, possibly bicarbonate, and this can affect the WWTP with regard to sludge volume and settlement. Monitoring TIC allows the WWTP operators to adjust their approach and to regulate the feed balance tank as required. They have been given much greater visibility – in particular wastewater leaving IC Reactors.

Conclusion

Now that the team has confidence in their TOC measurements, the plant's production departments have better visibility of their output to the WWTP and are therefore more accountable for the WWTP loading. All teams are working better together to meet overall commercial goals.

"We wouldn't go back," commented the Environmental Manager when summing up the experience with Biotector B7000. "It's very easy to use and gives us the information that we need as quickly as we need it. Also, the ability to cross check a sample on the Biotector manual sample system is excellent. Prior to installation of these Biotector analysers, it took us up to three hours to analyse a sample for COD; now TOC measurements take just seven minutes. Overall, our lost product levels are down and our plant yield is up."

Summary

The Biotector B7000 enabled this dairy facility to:

- Meet regulatory requirements regardless of COD/TOC influx
- Measure and optimise chemical dosages for COD/TOC in real time
- Increase plant yield and lessen product loss at the source

