

Conductivity system optimises production of biosurfactants

Holiferm opens commercial plant after successful pilot



Holiferm produces biosurfactants using natural raw ingredients in a patented gravity separation fermentation process. Biosurfactants have applications in a variety of products, including personal care, home care, cosmetics and agriculture. Holiferm's system uses 50% less energy and up to 3 tonnes less CO₂ per tonne of biosurfactant produced when compared to the petrochemical-derived surfactants widely in use today. After a successful pilot project, the company's first commercial plant, based at Ocean Park on the Wirral (Liverpool, UK), is due to open in 2023.

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Connor Makin
Downstream Process Engineer
Holiferm



Connor Makin



Pilot plant

The challenge Holiferm was founded to meet demand for sustainable alternatives to petrochemical surfactants, which are used in household cleaning, laundry and personal care applications. The big challenge was to make the final product competitive on cost with traditional surfactants, particularly when producing in bulk. First in a lab and then in a pilot plant, the company developed a patented gravity separation fermentation process that enables the product to be made using a semi-continuous process, rather than the more expensive batch production method more commonly used.

Phase separation is critical to the technology, and Holiferm wanted to automate the measurement of the process. "We used to have to turn a valve or operate a pump manually and watch to see the phase separation," explains Connor Makin, Holiferm's Downstream Process Engineer. "We discovered that our employees would check the remote access camera if they woke up in the middle of the night just to check the separation was still working correctly."

The solution Endress+Hauser was chosen to supply conductivity sensors to measure the phase separation automatically. The Memosens CLS82E sensor and the Liquiline CM442 transmitter were chosen because of their ease of use and scalability. "We were trying to get a proof-of-concept at the pilot stage at a reasonable cost point, but we also needed something that would work in a commercial plant," confirms Connor. Endress+Hauser was able to support Holiferm from the laboratory phase into full production.

Memosens sensors store process data directly in the sensor head, meaning calibration or adjustments can be carried out in an optimal laboratory environment rather than in the field. The probes can be swapped out quickly and easily without interrupting the process, which was a real benefit for Holiferm: "Because we're operating with live cultures it would cause an issue with sterilisation if we needed to take the probe out during the continuous process. Therefore, it is key to be able to switch the probes between batch

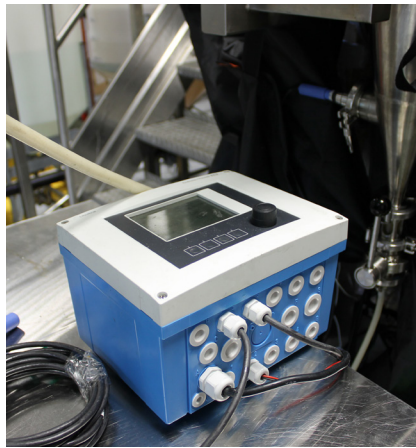


Downstream wash tanks

runs quickly, easily and with reliability of accurate readings when restarting. The maintenance with Memosens is really easy,” says Connor.

The sensors transmit their data to a two-channel Liquiline transmitter, which saves on installation costs. Connor says, “The interface on the Liquiline is really easy to use, and one of the decision-making factors for choosing Endress+Hauser was the data-logging capacity and the compatibility with Excel, which is convenient for handling the data.”

The benefits Installing the conductivity loops has allowed for smoother operation, a more sustainable work environment and less dependency on individual operators. “It’s freed us up to do much more,” confirms Connor Makin. From a process perspective, the automated system ensures that only the desired product is taken through to the next stage of the process after fermentation.



Liquiline CM442 and Memosens CLS82E

One of the biggest benefits for Holiferm has been the expertise shared by Endress+Hauser right from the start of the project. “We were given a neat solution and good advice on how to integrate it into the process,” says Connor. “Being able to rely on the support team’s experience meant that we didn’t have to work all of the electrical connection details out ourselves and so thankfully the actual installation was really smooth and straightforward.”

By reducing production costs, the viability of biosurfactants as an alternative to petrochemical-based surfactants has been proven. In 2023 Holiferm’s new commercial plant on the Wirral will be officially opened with an initial target to produce 1,100 tonnes of the renewable, biodegradable and mild biosurfactant. Thanks to its success in the pilot phase, Endress+Hauser’s equipment will be used for the same application in the commercial plant and there are plans to employ it for subsequent downstream processes as well.



Commercial plant



Memosens CLS82E is a high-end hygienic sensor for applications with widely varying conductivity values.

Its potential applications include:

- Phase separation
- Downstream processing
- Fermentation
- Chromatography
- Ultrafiltration
- Final rinse in pharma applications.

With Memosens 2.0 digital technology, CLS82E allows for extended storage of process and sensor data. This facilitates predictive maintenance and makes it possible to calibrate under ideal conditions in the lab.

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