

FOAM DETECTION & CONTROL

BIOREACTOR CASE STUDY

A long-established Northern California biotech company recently implemented a foam detection and control solution in its 24-hour-a-day research and development facility to automatically control dosing of antifoam chemicals. This has saved both labor time and antifoam material costs.



BACKGROUND

The formation of foam within bioreactors is a regular occurrence for the biotechnology industry. In particular, the foaming tendency of the nutrient medias used to cultivate bacteria, algae, and animal cells can create problematic operational issues.

The primary method of control is to add antifoam chemicals. Further, the drive to achieve higher viable cell densities and greater product yields has increased oxygen demand in some processes. To support this demand, agitation and aeration rates have also increased, leading to even greater foam generation.

Foam generation is problematic: cells become entrapped within the foam structure, cells become damaged as a result of foam bubbles bursting, there is a reduction of gas transfer from headspace, and more.

For this particular biotech company, laboratory technicians were controlling foam growth through visual inspection and manual injection of antifoam chemicals into bioreactor vessels. Controlling foam by manual injection is both inconsistent and labor

“We evaluated the Hycontrol SureSense+ [foam detection and control systems] in our fermentation reactors... This setup worked well. I would even say it... reduced the amount of time an operator spends monitoring the foam levels.”

-Research Scientist with the Biotechnology Company

intensive. It was also evident that there was a high degree of variability in foam dosing volumes from operator to operator, resulting in inconsistency in the experimental data from each batch. An automated solution was required.



RESULTS

The Hycontrol SureSense+ system proved to be effective and reliable in detecting foam generation in the bioreactors.

In conjunction with the bioreactor control system, the implementation of automated antifoam dosing has led to greater control of foam levels as well as reduced surveillance time by operators.

OUR SOLUTION

We installed Hycontrol SureSense+ foam detection systems in several bioreactors. Each SureSense+ unit was connected to three separate probes across three bioreactors and contact closures from the unit were configured to close upon foam detection, signaling the associated bioreactor control systems to automatically engage antifoam chemical pumps when needed.

The probes feature adjustable height fittings, making them ideal for R&D environments in which batch volumes vary greatly. The probes have a sanitary finish and are designed for sterilization-in-place. SureSense+ uses patented IMA technology to ignore fouling and coating on the probe so, even in extreme conditions, operation remains reliable.

Automation of foam detection and control allowed for unattended operation of the bioreactors. Direct staffing was reduced to 2 shifts, achieving significant savings in labor costs. The labor saved was then utilized in other areas of the facility, leading to even greater improvements in workflow and productivity.

**WORK WITH THE EXPERTS IN
AUTOMATED FOAM DETECTION
AND CONTROL.**

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