AUTOMATED FOAM CONTROL IN SINGLE USE BIOREACTORS USING THE SINGLE USE FOAM PROBE

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Headspace foam in bioreactors can cause significant issues to a biological process among which are unfavorable metabolic conditions for cells, increased shear from bursting bubbles, cell death/entrainment, mass transfer interference and potential fouling of exhaust filters which can allow a point of entry for contamination or lead to pressure build-up and possible failure of the bioprocess container. This study investigates the efficacy of using a single use foam probe coupled with an automated response of an antifoam addition with an integrated DeltaV controller. Two 50L S.U.B.s run in parallel clearly illustrate differences; the first employing foam control using the foam probe and the second 50L S.U.B. where foam is manually controlled via a dosing interval and manual additions when determined by the operator.

Aggressive fed-batch operating parameters show that a foam probe greatly reduced the amount of foam present and required antifoam additions. This work demonstrates the following:

- Foam probe selection and integration into the S.U.B. bioprocess container
- Optimal control parameters of antifoam addition using real-time feedback from the foam probe and integrated controller

This side-by-side study demonstrates a 47% reduction in the amount of antifoam used. It is commonly accepted that avoiding excess antifoam addition improves downstream processing minimizes risk of foam outs, and thus reduces operator stress, fatigue, and potential for unplanned process intervention Reducing risk in SUB operation includes use of an automated antifoam based on real time feedback.