531d Production of Bacillus Subtilis Enzymes in a Microscale Bioreactor

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ABSTRACT The gram-positive bacterium Bacillus subtilis is an important commercial production organism for industrial enzymes. We used this organism as a model to participate in the development of a novel automated microbioreactor. This machine is based on a 24 well membrane plate format and allows concomitant monitoring and control of dissolved oxygen, pH and other important process variables. We have measured process conditions and baseline machine parameters that enabled controlled experiments at microscale. Applying quantitative and qualitative techniques to monitor and control fermentation processes, we followed the growth and enzyme production profiles of Bacillus during fermentation. We have compared the results to conventionally obtained small scale and large scale bioreactor processes. We report on challenges to develop quantitative monitoring tools and parameters as well as developing sensitive and meaningful feedback loops to control the fermentations at this scale.