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Publication date:
2021

Document Version
Peer reviewed version

Citation (APA):
Jensen, J. W., Woodley, J. M., Nikel, P. I., & Junicke, H. (2021). *Design and Upscaling of Pseudomonas putida Fermentations for Robust Biomanufacturing*. Abstract from 6th BioProScale Symposium.

Poster presentation at the virtual 6th BioProScale Symposium, 29.03.2021 - 31.03.2021

Design and Upscaling of *Pseudomonas putida* Fermentations for Robust Biomanufacturing

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The bacterium *Pseudomonas putida* is becoming a cell factory of choice due to its versatile metabolism and high stress tolerance, the latter being of prime importance when considering production at large scale and bioconversion of harsh chemicals. These phenotypic features are interconnected through a cyclic glucose catabolism that allows the bacterium to adapt to environmental stresses by altering the production of co-factors [1]. However, glucose metabolism is linked to a high oxygen requirement as *P. putida* is an obligate aerobe. Oxygen availability has for a long time been known to be an issue in large scale bioreactors due to insufficient mixing and the resulting oxygen gradients [2]. We postulate that the presence of oxygen gradients and long mixing times in large scale bioreactors could affect the metabolism of *P. putida* and thereby the applicability and performance of this cell factory under industrially relevant conditions. We therefore aim to investigate the influence of oxygen availability on the metabolism of *P. putida* and develop a suitable bioreactor control strategy. This strategy will be based on oxygen availability in the bioreactor as well as on the parameters used to control this. An appropriate control strategy will aid to the development of scale-down models to investigate the phenomena that influence *P. putida* metabolism in large-scale bioreactors.

Literature

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