A robotic platform to screen aqueous two-phase systems for overcoming inhibition in enzymatic reactions

Aqueous two-phase systems (ATPS) can be applied to enzymatic reactions that are affected by product inhibition. In the biorefinery context, sugars inhibit the cellulosytic enzymes in charge of converting the biomass. Here, we present a strategy to select an ATPS (formed by polymer and salt) that can separate sugar and enzymes. This automated and miniaturized method is able to determine phase diagrams and partition coefficients of solutes in these. Tailored approaches to quantify the solutes are presented, taking into account the limitations of techniques that can be applied with ATPS due to the interference of phase forming components with the analytics. The developed high-throughput (HT) platform identifies suitable phase forming components and the tie line of operation. This fast methodology proposes to screen up to six different polymer-salt systems in eight days and supplies the results to understand the influence of sugar and protein concentrations on their partition coefficients.

General information
Publication status: Published
Organisations: Novo Nordisk Foundation Center for Biosustainability, Research Groups, Biomass Conversion and Bioprocess Technology, Delft University of Technology, Universidade Estadual de Campinas, University of Limerick
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Number of pages: 14
Pages: 37-50
Publication date: 2019
Peer-reviewed: Yes

Publication information
Journal: Bioresource Technology
Volume: 280
ISSN (Print): 0960-8524
Ratings:
BFI (2019): BFI-level 2
Web of Science (2019): Indexed yes
Original language: English
Keywords: Aqueous two-phase system (ATPS), Glucose partitioning, High-throughput screening, Product inhibition, Protein partitioning
DOIs: 10.1016/j.biortech.2019.01.136
Source: Scopus
Source ID: 85061322677
Research output: Contribution to journal › Journal article – Annual report year: 2019 › Research › peer-review