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 cellulolytic 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.

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