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On a novel strategy for water recovery and recirculation in biorefineries through application of forward osmosis membranes

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Abstract

A great amount of research has been performed during the last 10 years focusing on forward osmosis (FO) processes. The main driving force is to find an effective and low energy demanding methodology for water recovery as well as up-concentration of valuable products. Nevertheless, the energetic and financial benefits of this technology can be undermined from the fact that FO should be usually coupled with reverse osmosis (RO) for subsequent water purification and draw solution regeneration. Hence, a different approach was applied in order to omit the RO step. Crude glycerol and enzymatically pretreated wheat straw, which are common 2nd generation biorefinery feedstocks, have been evaluated as possible draw solution. In this way, water can be directly recovered and transferred back into the fermentation loop without further purification. Applying the Aquaporin InsideTM Forward Osmosis system, crude glycerol and wheat straw hydrolysate have demonstrated

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