

Simulated moving bed (SMB) process for potential application of xylitol purification in industrial processes

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The 2nd generation of biorefinery processes uses lignocellulosic biomass such as straw or wood that is not competing with human nutrition as i.e. cane sugar is doing. KNAUER participated in the Valor plus project that aimed to valorise side products from the main product stream. One of these processes was the microbial conversion of xylose to xylitol by yeast. It was shown that simulated moving bed chromatography (SMB) can be used to purify xylitol from such fermentation mash in continuous mode. SMB is a continuous chromatography technique that enables binary or pseudo-binary mixtures to be separated into pure substances or fractions. Compared to traditional batch chromatography this process leads to higher yields of purified substances while consuming less eluent and packing material.

Xylitol is the sugar alcohol of xylose which is mainly used in food industry as glucose replacement. The first results of xylitol purification by SMB in laboratory scale revealed that xylitol was purified with nearly 100% purity and recovery from fermentation mash. These promising first results for xylitol purification by SMB are now used for a more detailed investigation within the IMPRESS (Integration of efficient downstream ProcessEs for Sugars and Sugar alcohols) project. This project will demonstrate and validate a new hybrid biorefinery process for the first time. The aim is to find ways to produce sustainable chemicals and materials.

The separation and purification of xylitol by SMB is optimized in laboratory scale with the aim to increase yield and throughput. The application of a simulation software to ease and accelerate the optimization process will be investigated.

Later, the resulting parameters will be transferred to the KNAUER SMB Pilot system and tested on test site of a consortium partner.

This project has received funding from the European Union's Seventh Framework Program for research, technological development, and demonstration under grant agreement no FP7-KBBE-2013-7-613802 (Valor plus) and the HORIZON 2020 framework No 869993 (IMPRESS).

