



Purification of fructo-oligosaccharides

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Fructo-oligosaccharides (FOS) have gained large commercial interest due to its beneficial properties in the human health as prebiotics. When a fermentative process is used to produce FOS, the removal of salts and low molecular weight sugars from the fermentation broth is required. In this work some of the techniques used to separate FOS from low molecular weight sugars were evaluated and compared.

The application of size exclusion chromatography with Bio-gel P2 allowed the complete fractionation of all sugars enabling the chemical, clinical and nutritional characterization of each single FOS; however, very low recovery yields were obtained. On the other hand, an efficient demineralization of the broth and a recovery of 80% of FOS with 89% of purity were obtained when the separation was conducted in an activated carbon column, operated in batch mode, using ethanol gradients.

Although the mentioned processes proved to be efficient and simple, both are laborious and time consuming if implementation in an industrial scale is envisaged. Therefore, other techniques ought to be explored. Simulated Moving Bed (SMB) appears to be an alternative due to its great productivity and continuous mode of operation. Accordingly, experiments were conducted in order to choose an adequate and efficient resin. Based on the experimental determination of the adsorption isotherms of several resins, Dowex Monosphere 99K/320 was selected. This resin was tested in a SMB unit and, experimental and *in silico* data were compared. The obtained results suggest that SMB is a useful technology for purifying FOS from fermentation mixtures at an industrial scale.

- [1] Nobre C, Santos MJ, Dominguez A, Torres D, Rocha O, Peres AM, Rocha I, Ferreira EC, Teixeira JA, Rodrigues LR, "Comparison of adsorption equilibrium of fructose, glucose and sucrose on potassium gel-type and macroporous sodium ion-exchange resins," *Anal.Chim. Acta* (2009) 654: 71-76.
- [2] Nobre C, Vaňková K, Peres AM, Polakovič M, Teixeira JA, Rodrigues LR, "Equilibrium studies for the adsorption of fructo-oligosaccharides from a pure mixture and a fermentative broth on a Dowex Monosphere calcium resin" *J. Chromatogr. A* (submitted)