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Removal of organic acids from fermentation broth by pertraction hollow fiber membrane module

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Organic acids are a class of chemical compounds characterized by a carboxyl group and possess acidic properties. They are typically weak acids and are often involved in various biological and industrial processes. Succinic acid, also known as butanedioic acid, is a naturally occurring dicarboxylic organic acid and it is produced by some organisms during anaerobic fermentation and can be found in both plant and animal tissues. Nowadays, as a key platform chemical it is widely used in the chemical, cosmetic, pharmaceutical or food industries. An environmentally friendly alternative to its petrochemical production is the application of microbial fermentation using bacteria such as *Actinobacillus succinogenes* or *Escherichia coli*, which has the potential to reduce its production costs and decrease the environmental impact as they can utilizes renewable sources like lignocellulosic biomass, waste streams, or even glycerol. Separation from the fermentation medium and its purification to high purity is also an important part of its biological production as it is often produced together with other organic acids as formic acid, acetic acid or lactic acid. In the process of separation it is beneficial to use several membrane separation techniques such as microfiltration, pertraction, membrane crystallization.

In this work a set of equilibrium experiments in system organic acid/water/organic solvent was performed to gave us the information about partition coefficients of separated organic acids. Several pertraction experiments were realized in pertraciton unit equipped with hollow fiber membrane contactor Liqui-Cel with the cross flow between shell and fibers. In this system pertraction kinetics of succinic acid or its mixture with other organic acids from the model fermentation medium to the water stripping phase were measured. As immobilized liquid membrane in the pores of the fibers a 20 % mass trioctylamine in octanol was used. To better understand the process of pertraction of organic acids from aqueous phase the individual pertraction experiments were performed at different pH values of the feed and stripping phase and compared also with the prediction of mathematical model.

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