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## **Purification of succinic acid from fermentation medium using membrane separation**

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**Key words:** succinic acid; trioctylamine; membrane module; competitive extraction; pertraction.

Succinic acid (SA) represents a key raw material for the production of biodegradable polymers and pharmaceuticals. Its biotechnological production via fermentation is a sustainable alternative to petrochemical processes. However, it faces technological barriers during product purification. In the solution, the target acid coexists with by-products such as formic acids (FA) and acetic acids (AA), making product isolation the most economically demanding part of the entire production cycle.

This work focuses on the systematic study of the equilibrium and kinetic characteristics of the reactive extraction and transport of these organic acids using the extractant trioctylamine (TOA) in a 1-octanol medium. Primary attention was devoted to the measurement of equilibria in single-component systems, confirming a strong dependence of extraction yield on the pH of the aqueous phase. The highest efficiency was achieved in the acidic region (pH 2–4), corresponding to the predominant undissociated form of the acids, providing a fundamental quantitative basis for understanding the acid-carrier interactions.

The core of the research involves the kinetics of single-component pertraction performed via capillary membrane module, where the time-dependent transport of each individual acid across a liquid membrane immobilized in the pores was systematically monitored. The measured kinetic curves of concentration changes in the feed and stripping phase provide essential data on mass transfer rates, diffusion and transport properties, and the intrinsic selectivity of the membrane system for each component. The obtained experimental data from these equilibrium and single-component kinetic measurements serve as the critical foundation for the formulation and validation of a mathematical model used to precisely predict system behavior and optimize the parameters of the separation process.

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