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**Characterization of an Enzymatic Packed-Bed Microreactor: Experiments and Modeling**

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**Abstract**

A micro packed-bed reactor ( $\mu$ PBR) based on two-parallel-plates configuration with immobilized *Candida antarctica* lipase B in the form of porous particles (Novozym<sup>®</sup> 435) was theoretically and experimentally characterized. A residence time distribution (RTD) within  $\mu$ PBRs comprising various random distributions of particles placed in one layer was computationally predicted by a mesoscopic lattice Boltzmann (LB) method. Numerical simulations were compared with measurements of RTD, obtained by stimulus-response experiment with a pulse input using glucose as a tracer, monitored by an electrochemical glucose oxidase microbiosensor integrated with the reactor. The model was validated by a good agreement between the experimental data and predictions of LB model at different conditions.

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