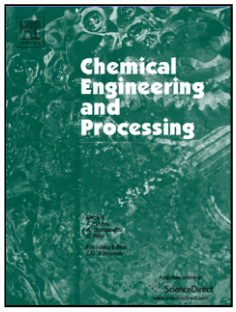

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Simulated Moving Bed Reactor for Butyl Acrylate Synthesis: from Pilot to Industrial Scale

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Graphical abstract

Highlights

- A SMBR unit was sized at IS and the ideal design and operating parameters were found.
- Increasing the temperature improved the separation process.
- Separation unities to treat raffinate and extract streams were sized.
- Almost all the n-butanol used as eluent was recycled.
- The final global process showed a very competitive production capacity.

Abstract

The feasibility of butyl acrylate synthesis process in a simulated moving bed reactor packed with Amberlyst 15 resin was studied at different temperatures (323 and 363 K). For that, a mathematical model was developed to describe the dynamic behaviour of the simulated moving bed reactor considering internal and external mass-transfer resistances and velocity variations due to changes in the bulk composition. The effect of operating conditions, as the SMBR configuration (columns arrangement) and switching time, on the performance parameters was studied at isothermal operation. It was determined the reactive separation region for the