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Authors: Afshin Amani, Elham Jalilnejad, Seyyed Mohammad Mousavi



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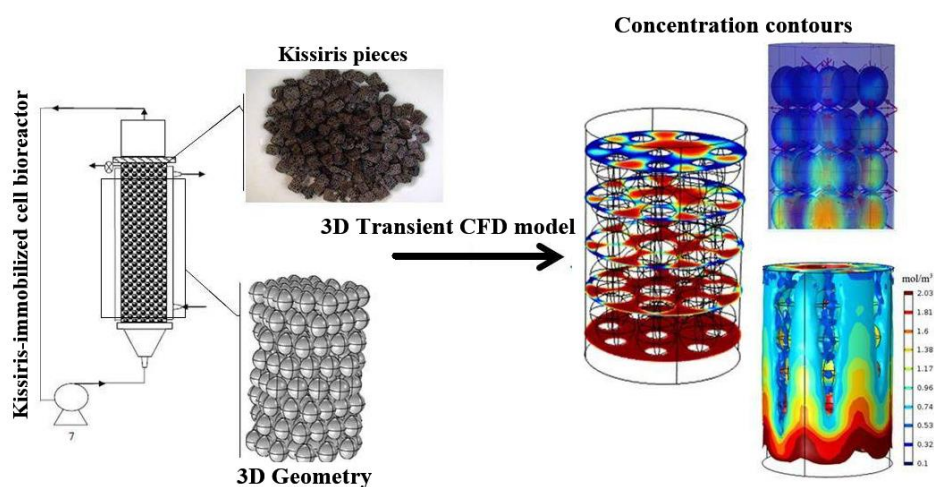
Afshin Amani¹, Elham Jalilnejad^{1*}, Seyyed Mohammad Mousavi²

¹ Faculty of Chemical Engineering, Urmia University of Technology, Urmia, Iran

² Biotechnology Group, Chemical Engineering Department, Tarbiat Modares University, Tehran, Iran

* Corresponding author: Tel.: +98-4431980229, fax: +98-4431980251, E-mail address: e.jalilnejad@uut.ac.ir

Graphical abstract



Abstract

Packed-bed reactors are widely used in biological treatment processes. The complete simulation of the reactions and concentration profiles of the reactors, which are necessary for a successful reactor design, operation, and scale-up, are now possible due to extensive improvements of numerical methods and computational power. In the present work, phenol biodegradation was studied in a packed-bed bioreactor operating in the recycling batch mode using the

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