

Computational Fluid Dynamic Study of Fixed Bed Reactor of Hydrotreating of Vegetable Oil

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Abstract

Hydrodynamics of fixed bed reactors involve complex interactions of gas and liquid phases with packed solids. Such complex interactions manifest in different flow regimes occurring in trickle-bed reactors. A comprehensive CFD model was developed to predict measured hydrodynamic parameters in a laminar and turbulent regime. The model was evaluated by comparing predictions with the experimental data. The CFD model was then extended to predict the holdups of phases. The simulations were carried out in a column (Diameter 0.7937cm and Height 20 cm) in high severity operating conditions using the CFD module in the COMSOL Multiphysics® software.

There is a few information available in literature using used cooking oil in research and the importance on the re-refining of used cooking oil will help in keeping natural resources and help to preserve the environment.