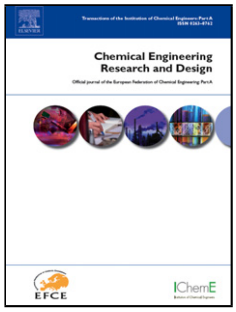

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Author: Yong Wang Kathryn H. Smith Kathryn A. Mumford Heng Yi Lina Wang Geoffrey W. Stevens

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Prediction of drop size in a pulsed and non-pulsed disc and doughnut solvent extraction column

Yong Wang[1], Kathryn H. Smith[1], Kathryn A. Mumford[1], Heng Yi[1], Lina Wang[1,2], and Geoffrey W. Stevens[1,*]

1 Particulate Fluids Processing Centre, Department of Chemical and Biomolecular Engineering, The University of Melbourne, Parkville, Victoria 3010, Australia.

2 Key Laboratory of Green Process and Engineering, Institute of Process Engineering, Chinese Academy of Sciences, Beijing 100190, P, R, China

Abstract

Recently a number of industrial scale pulsed disc and doughnut (PDD) solvent extraction columns have been operating with no pulsation. However most of the published research studies in the literature that describe and predict the performance of PDD columns were developed for pulsing conditions. In this study the sauter-mean drop diameter, d_{32}, was measured and correlated under pulsing and non-pulsing conditions using a 75 mm diameter PDD column. Under non-pulsing conditions, the results show that the d_{32} slightly decreased with increasing dispersed phase velocity, while there was no noticeable change in d_{32} with continuous phase velocity. Under pulsing conditions, the d_{32} decreased with increasing pulsation intensity from zero. The cumulative drop size distribution in disc and doughnut columns was found to be predicted well using the Weibull function. A new unified correlation was proposed in this study to predict the experimental d_{32} data of the PDD column used in this study, as well as published experimental data which was obtained using different systems and column geometries, over a wide range of pulsation rates including no pulsation.

Key words:

Drop size

Sauter mean diameter

Pulsed disc and doughnut column

Weibull function

Solvent extraction

* Corresponding author: Tel: +61 3 83446621
E-mail address: gstevens@unimelb.edu.au (G. W. Stevens).