Maximization of recovery of Spirulina Platensis in a staged process based on inertial migration

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1 Abstract

Branched tubes have been employed to concentrate dilute solid-liquid suspensions. They utilize the non-uniform radial particle distribution resulting from lateral particle migration under laminar flow conditions to concentrate the suspension by directing the portion of the flow field near the main tube wall through a branch. Branched tube separation devices can be used in a continuous mode, and by employing a staged system, where each stage is made up of a set of branched tubes, it is possible to achieve high recovery, good concentration factors, and large throughput. Initial studies were directed towards obtaining large concentration factors, ie., higher separations. This work examines the maximization of recovery, which is defined as the fraction of inlet particles recovered in the concentrated stream. Suspensions of Spirulina Platensis, a microalgae, were concentrated using a single-branch system, and it was found that by using a 600 μm diameter main tube, the suspension could be concentrated 36 times using 7 stages with an overall recovery of 92.1%.