

# Potential use of pulsed electric fields for mass transfer intensification of drops in liquid–liquid extraction

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## Abstract

Mass transfer intensification of circulating drops, in liquid–liquid extraction, was investigated using pulsed electric field in an extraction column equipped with parallel electrodes. The kerosene–acetic acid–water chemical system was employed in which mass transfer resistance exists mainly in the organic phase. The low electric field strengths of 2 - 16 V/cm and frequencies of 100 - 1000 Hz were applied. Results showed no sensible change in the hydrodynamics of drops and terminal velocities were precisely close to the Grace model, implying that the system physical properties remained constant. It was while electric field had significant impact on the mass transfer with the average and maximum enhancements of 30.3 and 70.5%. The experimental data were nicely reproduced based on the Kumar and Hartland correlation and in relation to a developed correlation for the enhancement factor in terms of Reynolds number, strength and frequency of the pulsed electric field.

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