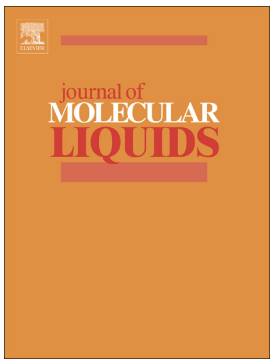

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Characteristic of aroma compounds recovery from binary and ternary (alcohol-ester-water) aqueous solutions with use of pervaporation

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Abstract:

The aim of this study was to examine and quantitatively describe how the coupling phenomenon affects the pervaporation. In the first stage ~~two-component~~ binary water-alcohol (ethanol; isopentanol) and water-ester (methyl butyrate; butyl acetate) mixtures were examined. In the second stage ~~four~~ three different ternary water-ester-alcohol solutions have been separated with the use of commercially available PDMS (polydimethyl siloxane) membrane and the effect of separation was expressed with the semi-empirical Arrhenius-like equation and strictly empirical Response Surface Methodology (RSM). Modelling results show that the coupling phenomenon is very case-specific, and the addition of another species to the separated solution could have both a negative and positive impact on the productivity and ~~selectivity of the separation~~ separation efficiency, depending on the characteristic of penetrant-penetrant and membrane-penetrant interactions. The relationship between process parameters and coupling effects strongly affects pervaporation performance, and yields dissimilar results for various concentrations of feed components in multicomponent systems.