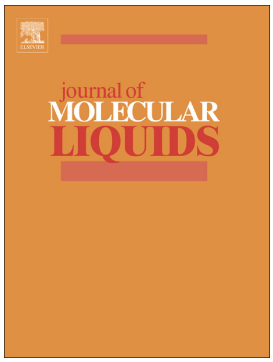

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Enhanced partitioning of Tryptophan in Aqueous Biphasic Systems formed by Benzyltrialkylammonium based Ionic Liquids: Evaluation of thermophysical and phase behavior

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ABSTRACT

Ionic liquids (ILs) based aqueous biphasic systems (ABS) are envisioned to be promising separation and environmentally benign extraction media. In this context, novel ternary phase diagrams were determined for two ILs namely, Benzyltrimethylammonium chloride and Benzyltributylammonium chloride in presence of various potassium salts, K_3PO_4, K_2HPO_4, K_2CO_3 and KOH at 298.15 K. The influence of benzyl group substitution on the cation of IL and nature of various potassium salts on the phase behavior were analyzed. Experimental binodal data were fitted to Merchuk's equation and tie line compositions and tie line length were also determined. Further, these IL based ABS in presence of various potassium salts have been systematically scrutinized for their efficiency to extract Tryptophan. For the better understanding of the role of thermophysical properties on phase behavior and extraction capability, density and viscosity of coexisting phases were measured at various compositions in the temperature range from 293.15 to 328.15 K. Enhanced extraction coefficients achieved for the studied combinations of ILs and inorganic salts indicate the possible use of these ABS as efficient extraction systems. Further, the study of thermophysical properties suggested that selected ternary systems present more desirable features in terms of density and viscosity as compared to traditional polymer based ABS.

Key Words: Liquid-Liquid Extraction; Aqueous Biphasic System; Ionic Liquid; Hofmeister series; Partition Coefficient.