

**SALTING-OUT IN AQUEOUS SOLUTIONS
OF AMINO ACID IONIC LIQUIDS WITH DIFFERENT ADDITIVES***Safonova E.A., Yarchenko P.S., Korchak P.A., Gotlib I.Yu., Victorov A.I.*

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Amino acid ionic liquids (AAILs) attract special attention among the structurally modified ionic liquids (ILs) due to their low toxicity and likely biocompatibility. Biocompatible chiral AAILs show a high efficiency of extraction of biomolecules and a high potential in the chiral ligand-exchange separation. Aqueous biphasic systems (ABSs) containing AAILs have been considered as eco-friendly and bio-friendly extraction media [1]. In context of the counter-ion effects, we have analyzed our data on phase behavior of ABSs containing AAILs together with available literature.

In last decades, polymerized ionic liquids (PILs) have attracted growing interest. PILs are water-soluble polyelectrolytes that contain ILs ions as their monomer units. An addition of salting-out agents results in the formation of ABSs. For specific applications such as extraction of biomolecules, an appropriate choice of ion pairs comprising new PILs is required. Thus, ABS with poly(1-butyl-3-vinylimidazolium bromide) and K_3PO_4 has a low extraction efficiency towards L-tryptophanate anions in comparison with non-polymerized ILs. A relationship between reduced extraction efficiency and competitive phosphate binding was supported by MD simulations [2]. To enhance the extraction efficiency, we studied other amino acid PILs based on poly(diallyldimethylammonium) cation as components of ABSs. The counter-ion effect on phase behavior is similar to the one in ABSs with non-polymerized AAILs. As found, an affinity of the IL/PIL-rich phase towards the model solute (deprotonated in basic media L-tryptophan or vanillin) is pronounced for ABSs with amino acid ILs/PILs as compared to halides.

In this work, we have also considered the counter-ion effects on the micellar aggregation of 1-dodecyl-3-methylimidazolium AAILs in aqueous-salt solutions. Sodium chloride, choline chloride and choline chloride+L-proline were chosen as additives. Surface properties, critical micellar concentrations and micellar size distributions are studied and discussed in terms of salting-out as well as chaotropy/cosmotropy of the ions.

1. Sadeghi R., Coutinho J.A.P. Advances in amino acid-derived aqueous biphasic systems for eco-friendly separation processes. *Journal of Molecular Liquids*. 2025. Vol. 439, P. 128904. <https://doi.org/10.1016/j.molliq.2025.128904>

2. Korchak P. A. et al. The Effect of Polymerization of Ionic Liquid [C₄Vim]Br on Phase Behavior and Partitioning of L-Tryptophan: Experimental and Molecular Dynamics Study. *Chinese J. Polym. Sci.* 2026. In press

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