

# Extraction and Purification of Value-Added Biomolecules using Ionic Liquids

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Aqueous biphasic systems (ABS) consist of two immiscible aqueous-rich phases based on polymer–polymer, polymer–salt or salt–salt combinations. Although both solutes tend to be water-soluble, above a given concentration, they inevitably separate into two coexisting phases. Over the conventional systems that usually require the presence of a polymer, in 2003, it was shown that ionic liquids (ILs) are also capable of forming ABS with inorganic salts.<sup>1</sup>

ILs are typically categorized as salts with melting temperatures below 100 °C with a large variety of compounds liquid at temperatures close to room temperature. Due to the ionic nature of ILs, they present two outstanding properties: negligible volatility and non-flammability. These two characteristics have contributed to their common epithet as “green solvents”, and ILs have been viewed as alternative replacements for the volatile and hazardous organic solvents presently employed in a wide range of separation processes. Nevertheless, one of the main advantages regarding their application in the extraction, separation and purification of high-value compounds relies on the ability to tailor their polarities and affinities by a proper manipulation of the cation/anion design and their combinations. Contrarily to typical ABS composed of polymers, and commonly used as liquid-liquid extraction platforms, IL-based ABS can “ideally” cover the whole hydrophilicity–hydrophobicity range and which allowed their successful application as extractive systems.<sup>2</sup> Based on the IL-based ABS outstanding performance, the results obtained in the past few years for the extraction/purification of value-added biomolecules, such as alkaloids, antioxidants, pharmaceuticals, proteins, dyes, among others, will be presented and discussed. Finally, their more recent application in the purification of biopharmaceuticals, and in particular of immunoglobulins, will be also presented.

## References:

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