

# Micelle-Mediated Extraction of Caffeine and Nicotine from Aqueous Solutions using Tetradecyltrihexylphosphonium-Based Ionic Liquids

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Both caffeine and nicotine are among the most used licit drugs in many societies and their consumption is often characterized by concurrent use. Diverse debates are towards the idea that caffeine can potentiate the reinforcing properties of nicotine, thus highlighting the human chronic “need” of concomitant consumption. Hence, both products have been the subject of intensive pharmacological research. On the other hand, both alkaloids, caffeine and nicotine, are natural insecticides, and their extraction from natural sources and subsequent purification are still a challenge.<sup>1</sup> Selective extraction of high value commercial products can be achieved, improved and/or manipulated by the use of micelle-mediated extractions. Coupled with this high selectivity, the inclusion of relatively benign compounds such as ionic liquids as extraction media - and where these can operate as surfactants - is of foremost interest.<sup>2</sup> Therefore, in this work, the extraction efficiency of caffeine and nicotine from water, using tetradecyltrihexyl phosphonium-based ionic liquids, was evaluated. Inter alias the partitioning of caffeine and nicotine was further investigated according to the aqueous solution ionic strength. Both the salt nature and its concentration were evaluated through the solutes partition coefficient employing several potassium-based salts. The partition coefficients of the solutes have shown to be strongly dependent on the ionic liquid hydrophilic character and significantly increased in the presence of added salts.

[1] Visak, Z. P.; Yague, S. L.; Canongia Lopes, J. N.; Rebelo, L. P. N. *J. Phys. Chem. B* **2007**, *111*, 7934-7937.

[2] Blesic, M.; Lopes, A.; Melo, E.; Petrovski, Z.; Plechkova, N. V.; Canongia Lopes, J. N.; Seddon, K. R.; Rebelo, L. P. N. *J. Phys. Chem. B* **2008**, *112*, 8645-8650.