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Enhancing Artemisinin Solubility in Aqueous Solutions: Searching for of Ionic Liquids Hydrotropes

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PURPOSE OF THE ABSTRACT

Malaria is an infectious disease caused by the Plasmodium parasite and transmitted by Anopheles mosquitoes. It is estimated that by 2016 this disease reached 216 million people worldwide, accounting for around 445000 deaths. Artemisinin is a sesquiterpenoid lactone peroxide known for its potent antimalarial activity, extracted from the Artemisia annua. Nevertheless, the conventional extraction of artemisinin presents high cost and low efficiency, being its poor solubility in water considered a strong obstacle to its widespread use.[1]

Hydrotropes are a class of compounds with the ability to considerably increase the solubility of hydrophobic solutes in aqueous solutions. Recently, ionic liquids (ILs) have been reported as a promising class of hydrotropes able to enhance the solubility of several hydrophobic compounds in aqueous solution. [2-3] Thus, hydrotropic solutions with ILs may contribute not only to improve the efficiency of artemisinin extraction from biomass, but also to increasing its bioavailability. With these goals in mind, the aim of this work is to study the impact of the IL chemical structures, namely the anion nature and the cation core, and their concentration, on the solubility of artemisinin in water. For that propose, the solubility of artemisinin was determined in several aqueous solutions of ILs at various concentrations, at 303 K. The results obtained so far, clearly evidence the exceptional capacity of ILs to enhance the solubility of artemisinin in aqueous media, which is compared to that obtained when using organic solvents. Furthermore, solvatochromic parameters of the ILs aqueous solutions investigated were determined aiming at correlating the solvent properties with artemisinin solubility data. The best options will be ultimately employed in the extraction of artemisinin from plant matrices.

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FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

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