

N°473 / OC

TOPIC(s) : Alternative solvents

SUPRADES: new generation of solvent based on supramolecular entities

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PURPOSE OF THE ABSTRACT

In the last decade, deep eutectic solvents (DES) have emerged as a promising alternative to conventional solvents used in different areas [1]. DES have been described as a result of intermolecular hydrogen bonds between two or more compounds, which at an adequate molar ratio lead to a strong depression in the melting point when compared with the ones of the individual components. Furthermore, DES are cheap to produce, their synthesis is quite simple and compounds with high purity and no by-products are obtained. Nonetheless, some recent publications reported that DES appear to have some toxicity, therefore, the use of natural origin molecules to produce DES has been proposed and called natural deep eutectic solvent (NADES) [2]. NADES are mostly composed of natural primary metabolites such as sugars, sugar alcohols, organic acids, amino acids and amines. In this study, we characterized and investigated the solubilisation properties of newly discovered DES composed of one supramolecular entity (SUPRADES). These new solvents are liquid at room temperature. The newly prepared SUPRADES were characterized by measurement of density and viscosity. Differential Scanning Calorimetry was used to obtain the glass transition temperature. Nuclear magnetic resonance analyses were performed in order to prove the existence of hydrogen bonds in SUPRADES.

Finally, the solubilisation properties of these solvent were evaluated toward various organic compounds (aroma, essential oil and active pharmaceutical ingredient). For example, SUPRADES are able to lower the vapour/liquid partition coefficient (C_g/C_l) of trans-anethole by 1000 and to enhanced the solubility of fluticasone propionate by a 20000 factor.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

green solvent | supramolecular chemistry | characterization | solubilisation

BIBLIOGRAPHY

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