

Natural Deep Eutectic Solvents for sustainable cosmetic emulsions: assessment of different stabilization strategies

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Natural Deep Eutectic Solvents (NaDES) are a new class of sustainable solvents formed through weak interactions between natural compounds. Their biocompatibility, renewability, and unique properties make them a promising alternative to traditional solvents, particularly in cosmetic applications [1]. This study explores the possibility of integrating a NaDES as a core component of emulsions. We formulated innovative emulsions where a hydrophobic NaDES (octanoic acid and lauric acid C8:C12), chosen for its physicochemical and sensory properties, replaced the oily dispersed phase. We assessed several stabilization strategies, including conventional surfactants, biopolymers with interfacial properties (Gum Arabic, GA) or thickening properties (Xanthan Gum, XG), as well as stabilization by cellulose nanocrystals (Pickering emulsions) (Figure 1). Emulsion structure and stability were studied over one month. The low interfacial tension between the NaDES and water favored the formation of emulsions with small droplet sizes. GA adsorbed at the interface and further decreased the interfacial tension. This biopolymer allowed both steric and electrostatic stabilization. However, a thickener is required in the aqueous phase to prevent creaming. Interestingly, we obtained emulsions with good physical stability and creamy textures without surfactants, using solely XG or cellulose nanocrystals.

Keywords: emulsion; interfacial properties; natural deep eutectic solvent; stabilization mechanisms

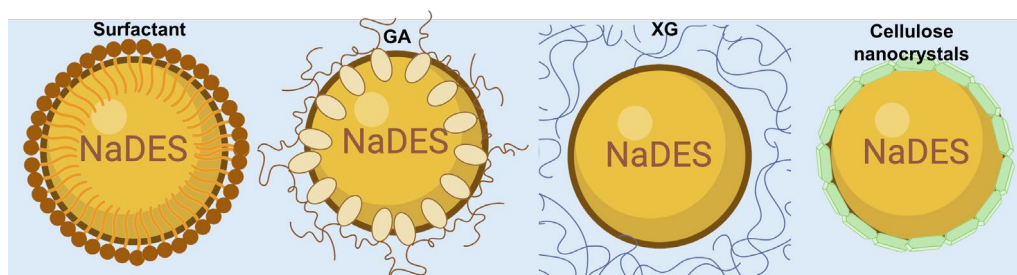


Figure 1. Different strategies used to stabilize NaDES/water emulsions.

References

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