

New and Original Strategies for Environmentally Friendly Solvent Media without Surfactants

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Surfactants are the matter of choice when hydrophobic, poorly water-soluble substances must be solubilised in or at least made compatible with an aqueous phase. However, surfactants can have some drawbacks, e.g., they may remain on surfaces or in the final product, induce or stabilise foaming, be environmentally undesirable etc. Then hydrotropes may do the job. Hydrotropes are small amphiphilic molecules that can also solubilise hydrophobic chemicals in water, however often at concentrations much higher than those of surfactants.

Nevertheless, they can have various advantages and hence are widely used in industry either as single solubilisers or in combination with surfactants.

We recently found that classical, healthy and even cheap natural oxidants can play the role of such hydrotropes. Further, they can even significantly enhance the solubility of molecules that are poorly soluble in water, not because they are oily, but rather because they tend to stack, e.g. indigo, caffeine, or several pesticides and pharmaceutical substances.

In this contribution, I will show various examples of such hydrotropes (and also solvotropes that solubilise molecules in oily environments) and their advantages in formulation. In this context, I will also discuss surfactant-free microemulsions and the value of the concept of so-called Natural Deep Eutectic Solvents that can be applied in an original way to fulfil the duty of enhancing solubilities.

Keywords:

Hydrotropes, Solubilisation, surfactant-free microemulsions, polyphenols

References:

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