

GREEN CHEMISTRY & SUSTAINABLE COSMETIC BIOTECHNOLOGY & COSMETIC APPLICATIONS

A. Rossignol-Castera OLEOS, France

A new "Oleo-Eco-Extraction" using natural fats & oils as green solvents for efficient organic cosmetic actives

Vegetable oils and fats are well-known for their nutritional and biological activities mainly depending on the levels of poly-unsaturated fatty acids and minor unsaponifiable components. Their rheological, texture and physical properties have also large food applications and their chemical reactivity is the basis of lipochemistry. In opposite, their solvent potentiality is less valorized though it is larger than a simple lipo-solubility with a real capacity to extract or to transfer apolar molecules (waxes, carotenoids, phytosterols..) but also more polar or amphiphilic compounds (phenols, organic acids, chlorophyll, glycolipids..). Depending on their composition, on the presence of minor compounds and low concentration of water, on the temperature, on the type of industrial production, each natural oil or fat could have modular solvent properties. For instance in a crude oil or virgin oil like olive oil, we can find phospholipids and phenolic acids organized in stable colloidal structures: direct micelles, reverse micelles, vesicles, lamellar structures, aggregates [1]. Furthermore, the theory of the polar paradox of the antioxidants is based on the fact that polar antioxidants like ascorbic acid or rosmarinic acid, are more effective in bulk oils, while nonpolar antioxidants, like tocopherols or phenol-esters, are more effective in relatively more polar media, such oil-in-water emulsions or liposomes[2][3]. Consequently, it's useful to extract with oil, biomolecules form a large rank of polarity to get a more efficient antioxidant system. Based on the both knowledge, the "Oléo-eco-extraction" is an innovative technology using natural oils and fats as green and bioactive solvents that are safe, food grade, selective, organic certified and with guaranties of traceability and quality. Oléo-eco-extraction is a dynamic multi-step patented [4] process conducted under nitrogen to avoid the oxidation of the solvent and the extracted biomolecules. The plant or the material is firstly dehydrated and cryo-grinded at -80°C, then extracted with an oil in a closed batch reactor under high density focused micro-wave system at 2450 MHz during a short time. Coupled with an ultrasonic dispersion at low frequency (25 kHz), phenolic antioxidants and other vegetable biomolecules are solubilized in oil as stable micro-structures. The extracts named "Oléoactifs®" are proposed as green actives for cosmetic or food applications.