

CITRUS ESSENTIAL OIL DETERPENATION BY LIQUID-LIQUID EXTRACTION

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The object of the present work is to evaluate the possibility of carrying out the deterpenation of the citrus essential oil by using a mixture of ethanol and water as a solvent for liquid-liquid extraction. Liquid-liquid equilibrium has been determined for limonene + linalool + ethanol + water quaternary system at 298.15 K. Partitioning and selectivity of extraction were analyzed. Experimental data were correlated using the UNIQUAC and NRTL equations and the energetic parameters of these models at this temperature are determined.

Keywords: LLE, limonene, linalool, ethanol, deterpenation, essential oil

Essential oils are vegetable products, which are basically a mixture of terpenic hydrocarbons and oxygenated derivatives such as aldehydes, alcohols and esters. Citrus essential oil is used as a flavouring agent in pharmaceuticals as well as a fragrant ingredient in soaps, detergents, creams, lotions and perfumes. From its components, oxygenated compounds are mainly responsible for the aroma and flavour, and their content has become a definitive parameter in establishing the price of the oil and representing a reference of quality.

In a previous work (Arce et al., 2004), we have showed the possibility of carrying out the citrus essential oil deterpenation using a mixture of ethanol and water as a solvent for liquid-liquid extraction. In that work, the citrus oil was considered as a binary mixture of limonene and linalool, and we studied liquid-liquid equilibrium (LLE) for ternary systems involved in the process. However, only the study of quaternary LLE would allow the knowledge of the influence of limonene/linalool proportion

in essential oil, the percentage of water in the solvent, and essential oil/solvent ratio, on the partitioning and selectivity of extraction.

With this in mind, liquid-liquid equilibrium has been determined for Limonene + Linalool + Ethanol + Water quaternary system at 298.15 K. Partitioning and selectivity of the extraction were analyzed. Experimental data were correlated using the UNIQUAC and NRTL equations and the energetic parameters of these models at this temperature were determined.

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The Biochemistry and Physiology of the Lemon and Other Citrus Fruits Walton B. Sinclair, 1984 Food Science and Technology Abstracts, 1978 **Science and Practice of Liquid-liquid Extraction: Process chemistry and extraction operations in the hydrometallurgical, nuclear, pharmaceutical, and food industries** John D. Thornton, 1992 This work presents an up to date account of some of the fundamental aspects of liquid liquid extraction technology together with an account of extraction processes in a number of important industries The 8th International Symposium on Supercritical Fluid Chromatography and Extraction, 1998 Pakistan Journal of Scientific and

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