

Application of Liquid-Liquid Extraction and Adsorption on Activated Carbon to the Determination of Different Forms of Metals Present in Edible Oils

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Different analytical pre-treatment procedures for determination of metals present in edible vegetable oils have been studied. The aim of liquid-liquid extraction with inorganic acids was to separate and enrich the total amount of analytes, independently of their form. In this case similar behaviour of different analyte forms was required. In the second case the adsorption on activated carbon was performed in order to differentiate the behaviour of particular analyte forms during fractionation. It was found that the efficiency of the liquid-liquid extraction depended on the extractant used and on extraction conditions, and, in general, it was lower for organic forms of analytes than for inorganic ones. The efficiency of the applied extraction procedures using HNO₃ extractant for Fe and HCl extractant for other elements was close to 100% for all investigated forms of metals. The preconcentration allowed achieving low detection limits (0.04, 0.01, 0.01, 0.03, 0.001 and 0.006 mg kg⁻¹ for, Fe, Ni, Cu, Pb, Cd and As, respectively), although the most of determinations were done by applying flame atomic absorption spectrometry (As was determined by AAS coupled with hydride generation). The experiments with activated carbon have revealed very similar behaviour of either the same or similar forms of different analytes. In contrast, the behaviour of different forms of the same analyte could be very distinct. Adsorption on activated carbon seems to be a promising approach towards fractionation of metals in different types of oils.