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Assessment on Carotenoids Profile Extracted from Mango Peel via Accelerated Solvent Extraction and Ultrasound Assisted Extraction

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Abstract

Mango (*Mangifera indica* Linn) is an important tropical fruit and is associated with civilisation due its nutritional and sensory properties. Phytochemical composition of mango has shown the presence of up to 25 different carotenoids, with a total concentration of around 200 μg/g DW and α and β-carotene the most representative ones. The identification of technologies capable of isolation this valuable compounds is key for the valorisation of natural resources in a clean, efficient and low-cost manner. Therefore, the aim of this work was to evaluate the effect of Accelerated Solvent Extraction (ASE) and Ultrasound Assisted Extraction (UAE) on the extraction of carotenoids from three varieties of mango peel, an industrial waste presenting a potential source of interesting valuable compounds.

n first instance, five different solvent systems were screened in a two step extraction: (1) methanol, (2) hexane:ethanol (50:50; *v:v*), (3) hexane + ethylacetate, (4) hexane:ethylacetate (50:50; *v:v*) and (5) acetone:methanol (70:30; *v:v*) + methanol:dichloromethane (50:50; *v:v*); in all systems the mango:solvent ratio was 1:10 (*m:v*). The last solvent system, based on acetone:methanol, followed by methanol:dichloromethane was found to result in the highest total carotenoid extraction and was selected for the comparison of ASE and UAE. In order to extract up to completeness, both extractions were carried out for 45 min; after that, the solvents were evaporated and the carotenoids were re-dissolved in DCM prior to analysis. The results obtained through Ultra Performance Liquid Chromatography-accurate mass-mass spectrometry (UPLC-am-MS) showed that both methods are useful for extracting the same concentration of carotenoids; nevertheless, UAE allowed the quantification of a higher number of compounds.

Overall, the results obtained provide a basis for the potential application of UAE as extraction technique for carotenoids, since it allows the use of a lower concentration of solvents, giving a character of "green technique".

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