

ABSTRACT

An Analysis of the Supercritical Extraction of Orange Oil and the Subsequent Effect on its Quality

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The objective of this study was to examine the feasibility of extracting the essential oil from orange peels by the use of supercritical fluid extraction using carbon dioxide as the extractant. This study was carried out using a small-scale extraction system (100 ml extractor vessel).

Extractions were performed on six types of peel material: dried milled peel, wet diced peel, dried milled flavedo, wet diced flavedo, dried milled albedo and wet diced albedo. The effect of operation conditions on extract yield and composition was analysed in a series of experiments at temperatures and pressures between 30 to 80°C and 80 to 330 bar respectively. The composition and quality evaluation of each extract were determined by gas chromatography.

The results indicated that the best conditions to obtain a combination of a high quality extract and favourable yield were found to be at 40°C and 280 bar from dried milled peel. At these conditions, the levels of both decanal and linalool, two major flavour contribution components of orange oil, were at their maximum. On the basis of these results, it was concluded that orange oil extracted with supercritical carbon dioxide was found to be comparable with the most widely used technique of extraction i.e. cold expression. A process flow model was therefore proposed.

Keywords: Orange oil; Supercritical fluid extraction; Gas chromatography