

Effects of Modifier Polarity on Extraction of Limonene from Citrus Sinensis L.Osbeck Using Supercritical Carbon Dioxide

ABSTRACT

Limonene constitutes 98% of the essential oil obtained from orange peel. Besides being used as fragrances and flavours in the food, perfume and cosmetic industries, limonene is also a good degreasing agent. Supercritical carbon dioxide is an excellent solvent for non-polar compound like limonene but poor solvent for polar compound like α -terpineol. Common practice in supercritical fluid extraction is to change the polarity of supercritical carbon dioxide by employing polar modifiers to increase its solvating power towards polar analytes. Base on this, in the attempt to extract more limonene in orange essential oil, less polar modifiers were added instead. In this study, effects of adding modifiers with different polarity on extraction of aroma compounds (limonene, linalool and α -terpineol) from Citrus Sinensis L. Osbeck or sweet orange peel were investigated. Supercritical extraction was carried out at defined pressure and temperature for duration of 45 minutes. Concentration of aroma compounds extracted was analysed using GC-MS. The optimum conditions for extraction were observed at 318K and 12MPa. The concentrations of limonene increased significantly by the addition of methanol and slightly with n-heptane. It was also found that n-heptane is effective on supercritical CO₂ extractions of linalool and α -terpineol.