

Comparative Study of Essential Oils Extracted from Algerian Citrus fruits Using Microwaves and Hydrodistillation

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Abstract : Solvent-free-microwave-extraction (SFME) is a combination of microwave heating and distillation, performed at atmospheric pressure without added any solvent or water. Isolation and concentration of volatile compounds are performed by a single stage. SFME extraction of orange essential oil was studied using fresh orange peel from Valencia late cultivar oranges as the raw material. SFME has been compared with a conventional technique, which used a Clevenger apparatus with hydro-distillation (HD). SFME and HD were compared in term of extraction time, yields, chemical composition and quality of the essential oil, efficiency and costs of the process. Extraction of essential oils from orange peels with SFME was better in terms of energy saving, extraction time (30 min versus 3 h), oxygenated fraction (11.7% versus 7.9%), product yield (0.42% versus 0.39%) and product quality. Orange peels treated by SFME and HD were observed by scanning electronic microscopy (SEM). Micrographs provide evidence of more rapid opening of essential oil glands treated by SFME, in contrast to conventional hydro-distillation.

Keywords : hydro-distillation, essential oil, microwave, orange peel, solvent free microwave, extraction SFME

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