

عنوان مقاله:

Response Surface Methodology for Optimization of Supercritical Fluid Extraction of Orange Peel Essential Oil

محل انتشار:

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نویسندگان:

Kiana Ghadiri - *Active Pharmaceutical Research Center (APIRC), Pharmaceutical Science Branch, Islamic Azad University, Tehran, Iran*

.Farhad Raofie - *Department of Chemistry, Faculty of Science, Shahid Beheshti University, Tehran, Iran*

Mahnaz Qomi - *Active Pharmaceutical Research Center (APIRC), Pharmaceutical Science Branch, Islamic Azad University, Tehran, Iran*

Ali Davoodi - *Department of Pharmacognosy and Biotechnology, Faculty of Pharmacy, Mazandaran University of Medical Sciences, Sari, Iran*

خلاصه مقاله:

Background: Orange peel essential oils were obtained using supercritical fluid extraction. This method is an important high scaling extraction method used for the extraction of plant and animal extracts. Objectives: The aim of this study was the optimization of the extraction of the orange peel essential oil. Methods: The experimental parameters of Supercritical Fluid Extraction (SFE) such as temperature, pressure, and extraction time, and modifier volume were optimized using a central composite design after a 2^{4-1} fractional factorial design. Orange peels were collected from ripe orange and were washed, air dried, and milled. Then, a Suprex MPS/۲۲۵ system in the SFE mode with a maximal operating pressure of ۳۹۵ bars was used for essential oil extraction. Moreover, GC-MS and GC-FID were used for the identification and determination of oil compounds, respectively. Results: Eight compounds have been identified based on their retention indices and mass spectra. According to the results, α -pinene, β -pinene, myrcene, d-limonene, terpinolene, C₈-aldehyde, citronellol, and linalool were identified in orange peel essential oil. The optimum SFE conditions were obtained at a pressure of ۳۴۷.۰۷ atm, temperature of ۵۵° C, extraction time of ۳۰.۱۶ min, and ethanol volume of ۱۴۷.۰۵ μ L. Moreover, extraction yields based on SFE varied in the range of ۰.۰۴% to ۱.۱۸% (w/w). Conclusion: The Results showed supercritical fluid technology as the best alternative technique for the extraction of pure and high-quality essential oil from orange peel. It is a green method and does not have any environmental impact.

کلمات کلیدی:

Essential oils, Extraction, Supercritical fluid extraction, Volatile compounds

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