Extraction of fatty acids from sunflower seed (*Helianthus annuus*) using supercritical CO$_2$ in green and high-tech separation process with response surface methodology

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Background and Aims: In this present study, Supercritical fluid extraction (SFE) was developed for extraction of seeds oils from Sunflower. This method was used on a large scale for the production of essential oils and pharmaceutical products from plants.

Methods: The experimental parameters of SFE such as pressure, temperature, modifier volume, static and dynamic extraction time were optimized by using a central composite design after a 2n–1 fractional factorial design. The chemical compositions of the SFE extract were identified by GC–MS. A SFE model suprexmts/225and a GC-MASS 5890 hp was used in this study.

Results: The major components of SFE extracted oils in optimum conditions were: Hexadecanoic acid, 9, 12-Octadecadienoic acid, 9, 12, 15-Octadecatrienoic acid, 11-Eicosenoic acid, Eicosenoic acid, Docosanoic acid, Heneicosanoic acid. Extraction recovery based on the SFE varied in the range of 0.02–9.25% (w/w) under different conditions.

Conclusions: These results confirm supercritical fluid extraction compared with other extraction method is relatively rapid because of the low viscosities and high diffusivities associated with supercritical fluids. In this work, under the optimum conditions several fatty acids from sun flower seeds with high recovery were extracted and identified by using SFE-GC-MASS.

Keywords: Supercritical fluid extraction (SFE); GC-MS; *Helianthus annuus*