Title: Supercritical fluid extraction followed by nanostructured supramolecular solvent extraction for extraction of levonorgestrel and megestrol from whole blood samples

Author: Fatemeh Rezaei Yadollah Yamini Hamid Aseiabi Shahram Seidi Maryam Rezazadeh

PII: S0896-8446(15)30150-9
DOI: http://dx.doi.org/doi:10.1016/j.supflu.2015.10.005
Reference: SUPFLU 3474

To appear in: *J. of Supercritical Fluids*

Received date: 2-8-2015
Revised date: 6-10-2015
Accepted date: 6-10-2015

Please cite this article as: F. Rezaei, Y. Yamini, H. Aseiabi, S. Seidi, M. Rezazadeh, Supercritical fluid extraction followed by nanostructured supramolecular solvent extraction for extraction of levonorgestrel and megestrol from whole blood samples, *The Journal of Supercritical Fluids* (2015), http://dx.doi.org/10.1016/j.supflu.2015.10.005

Supercritical fluid extraction followed by nanostructured supramolecular solvent extraction for extraction of levonorgestrel and megestrol from whole blood samples

Fatemeh Rezaei[a], Yadollah Yamini[a*] yyamini@modares.ac.ir, Hamid Aseiabi[a], Shahram Seidi[b], Maryam Rezazadeh[a]

[a] Department of Chemistry, Tarbiat Modares University, P.O. Box 14115-175, Tehran, Iran

[b] Department of Analytical Chemistry, Faculty of Chemistry, K.N. Toosi University of Technology, Tehran. Iran

* Corresponding author. Tel: +98-21-82883417, fax: +98-21-88006544.

Abstract

Supercritical fluid extraction (SFE) followed by supramolecular solvents microextraction (SUPRAS) has been developed for extraction and determination of levonorgestrel (LeV) and megestrol acetate (MA) in blood samples. LeV and MA were employed as model compounds to assess the extraction procedure and were determined by high performance liquid chromatography coupled with ultraviolet detection. SUPRAS is a nano-structured liquid, generated from the amphiphiles through a sequential self-assembly process occurring on two scales; molecular and nano. SUPRAS tests were generated from solutions of reverse micelles of decanoic acid (DeA) in tetrahydrofuran (THF) by addition of water, which acted as the coacervating agent. In SFE-SUPRAS procedure, the blood sample were mixed with anhydrous sodium sulfate and loaded into SFE extraction vessel and extraction was performed in a predetermined time. The DeA solution and SFE (THF) collecting solvent were immediately injected into water for SUPRAS formation. The effective parameters on the SUPRAS efficiency were studied and optimized utilizing rotatable central composite design (RCCD). The Taguchi orthogonal array (OAD) experimental design with an OA_{16} (4^5) matrix was employed to optimize the SFE conditions. The calibration plots were linear in the range of 0.5–7.0 mg kg^{-1} and the limits of detection (LODs) were 0.1 and 0.2 mg kg^{-1} for MA and LeV, respectively. Analysis of drugs in different blood samples showed that the improved technique has great potential for extraction and determination of LeV and MA in blood samples.