



Identification and determination of Phytosterols in dairy produces by magnetic nanoparticle functionalized with n-octadecyltriethoxysilane and GC-mass analysis for identification of palm oil

Davood Bigdelifam *, Mahdi Hashemi

Department of Chemistry, College of Chemistry, Bu-Ali Sina University, Hamedan

E-mail: davoodbigdeli1988@gmail.com

A simple and sensitive extraction procedure based on the magnetic solid phase extraction with modified magnetic nanoparticles followed by gas chromatography with mass spectrometric detection has been developed for extraction and determination of sterols composition in dairy products. The aim of the present study is quantitative and qualitative identifications of palm oil with using, determination of vegetable sterols (sitosterol, Campesterol and Stigmasterol) found in dairy products, and compare amount of these sterols with amount of animal sterol (cholesterol). For this purpose, a new magnetic solid sorbent was synthesized using magnetic nanoparticles (MNPs) coated by n-octadecyltriethoxysilane and this sorbent used as solid phase for adsorption and preconcentration of sterols. The size and properties of prepared adsorbent were characterized by X-ray diffraction (XRD), Fourier Transform Infrared Spectroscopy (FT-IR), Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM). The main factors affecting extraction efficiency such as extraction/desorption time, adsorbent amount, extraction solvent and sample volume were evaluated and optimized. Mass fraction of each sterol expressed as a percentage of the total sterols mass fraction. Under the optimum conditions the proposed method Relative standard deviation (RSD) of five separate determinations by the method was found to be 0.89%, 0.45%, 0.68% and 1.1% for cholesterol, Campesterol, Stigmasterol and sitosterol, respectively. The obtained recoveries were in the range of 99.8–100% and indicate good accuracy and applicability of the proposed method for the analysis of dairy products.

References

- [1] G. Contarini, M. Povolo, E. Bonfitto and S. Berardi, *Inter.Dair. J.* 2002, 12, 573–578.
- [2] R. Santos, E. Limas, M. Sousa, M. C. Castilho, F. Ramos and M. I. N. Silveira, *Food. Chem.* 2007, 102, 113–117.
- [3] B. C. Díaz, A. S. Carretero, A. F. Gutierrez, A. B. Vega, A. G. Frenich, J.L. M. Vida and J. D. Martos, *Food. Chem.* 2007, 102, 593–598.
- [4] J. Shen, W. Huang, L. Wu, Y. Hu and M. Ye, *Mater. Sci. Eng, A*, 2007, 464, 151–156.