

УДК: 543.544.5.068.7

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY FOR VEGETABLE OIL'S XENOBIOTICS LABORATORY CONTROL

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Abstract: Vegetable oils (sunflower, coconut, rapeseed) contains xenobiotics from different groups. Our focus was on two main groups: polycyclic aromatic hydrocarbons and pesticides. Analysis was provided by high-performance liquid chromatography with fluorescent detector and mass spectrometer (HPLC/FLD and HPLC/MS/MS) after extraction of xenobiotics from oils with n-hexane and re-extraction with acetonitrile. The minimum total amount of xenobiotics in unrefined oils was 14.5 mg / kg. This reveals the fact that, the unrefined oils contain xenobiotics. This procedure can be used in technology and scientific studies.

Keywords: high-performance liquid chromatography, pesticides, polycyclic aromatic hydrocarbons, extraction, n-hexane, acetonitrile.

High-performance liquid chromatography (HPLC) is used as a method for laboratory analysis of various substances. Standardized and certified methods are used in the laboratory for the detection by two types of detectors: fluorescent detector (FLD) and mass spectrometer (MS/MS) of various substances in the trace amounts [1]. Pesticides and polycyclic aromatic hydrocarbons (PAHs) is two groups of the group of dangerous xenobiotics, which are exhibit high toxicity and carcinogenicity and are resistant to degradation in environment. The control of their levels in vegetable oils is established by standard methods of laboratory control, at the same 254

time, methods was developed by researchers and certified by them for solving specific problems in different laboratories can be used too [2]. Assays for lipophilic substances are often based on extraction of analytes [3,4].

The aim of this work is to study the features of the content of xenobiotics in vegetable oils and test new methods of highly efficient liquid chromatography.

As a result of laboratory control tests, which was carried out with 15 samples of vegetable oils, we found that all tested oils contain xenobiotics. Investigation, was provided by HPLC/FLD techniques (after extraction of xenobiotics with n-hexane and re-extraction with acetonitrile. Thanks to specific detectors (FLD and MS/MS) even trace amounts can be detected. For the analysis of pesticides, we recommend using a MS/MS detector, the detection concentration limit is 0.01 mg/kg. To control PAHs is FLD the detection concentration limit is 0.3 mkg/kg. This procedure can be used in monitoring studies in food production, for separation and purification production technology control.

REFERENCES.

1. EN 15662:2008. Foods of plant origin. Determination of pesticide residues using GC-MS and/or LC-MS/MS following acetonitrile extraction/partitioning and clean-up by dispersive SPE. QuEChERS-method.
2. Grybova, N. Y., Nesterova, L. O., Khyzhan, O. I., Ushkalov, V. O., & Maksin, V. I. (2018). Determination of Polycyclic Carbohydrates in Atmospheric Water by the Method of Chromatography. *Journal of Water Chemistry and Technology*, 40(5), 297-301.
3. Filippenko, T. A., & Gribova, N. Y. (2012). The antioxidant effect of medicinal plant extracts and fractions of phenolic compounds. *Chymiya rastitel'nogo syriya*, (1), P77-81.
4. Melnychuk, S., Lohanska, V., Baranov, Y., Zemtsova, O., Maksymchuk, I., & Hribova, N. (2013). MONITORING IN OILS PESTICIDES RESIDUES AND POLYCYCLIC AROMATIC HYDROCARBONS FOR SAFETY OF VEGETABLE OILS. *Potravinarstvo: Scientific Journal for Food Industry*, 7(Special Issue), 45-52.