MODERN METHOD BY NMR ^{1}H SPECTROSCOPY FOR THE IDENTIFICATION OF FATTY ACIDS IN TEKHNOKONTROL INOPERATIVE PRODUCTION

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The most important condition of production high-quality peanut butter is conducting fundamental research properties of raw materials and products from it. Production of high-quality oil products are possible on a strict basis compliance with technical and technological regulations, recipes, sanitary hygiene norms and rules and implementation multi-parametric monitoring of indicators of quality of raw materials and finished products. The technological and nutritional value of sunflower oil is determined by esters of oleic (Omega-9) and linoleic (Omega-6) acids. Sunflower oil with a high content of oleic acid (Omega-9) and a sufficiently low content of polyunsaturated lenoleic acid (Omega-6) is characterized by a lower nutritional value but greater chemical stability at high temperatures and in the presence of oxidizing agents. Therefore, that type of oil, especially refined, is more suitable for high temperature processing of food and can be stored longer saving its properties. The purpose of this work was to study the TAG composition of sunflower oil samples by ^{1}H-NMR spectroscopy [1, 2]. The interpretation of the spectral data by the different authors' reports is different, so there are no valid reliable characteristics that could be relied on.

This method based on estimation and comparison the proton integral intensities of allyl and diallyl CH_2 groups with intensity of glycerol protons in ^{1}H-NMR spectra that allows determining the amounts of each of these unsaturated fatty acids.

Integral intensities hydrogens can be compared with intensity of the tertiary hydrogen in the glycerin moiety (H_g). That allows making a conclusion about fatty acids composition of the oil samples.

The oil samples were solved in deuterated chloroform. The spectra of prepared solutions were recorded on a Varian VXR-300 spectrometr (300 MHz). Despite the fact that the data obtained do not allow the exact integration of the tertiary hydrogen of the Hg of the glycerol moiety, it is possible to determine the quantitive ratio of oleic and linoleic esters based on the comparison of integral intensities of typical signals. The proton resonances of the TAG acyl chains were assigned according to the literature data [3, 4].

Data on the content of oleic (Omega-9) and linoleic (Omega-6) acids in sunflower oil of domestic brands and, for comparison, data on fatty acids composition of olive oil and High-oleic oil obtained as a result of analysis of their spectra, are represented in Table 1.

		Oleic/linoleic acids ratio	Percentage, %	
			Oleic acid	Linoleic acid
1	Chumak	1:2	32.06	63.64
2	Maslinka	5:7	40.05	55.65
3	Shchedriy Dar	5:7	40.05	55.65
4	Oleyna	1:1	48.03	47.67
5	Olive oil	9:1	86.19	9.51
6	High-oleic oil	200:1	95.23	0.47

Table 1. Data on the content of fatty acids in the sunflower oil samples

The method can be used to determine the wanted components over a wide range of concentrations for the analysis of numerous samples. It is shown the highest content of oleic acid and the lowest content of linoleic acid among the oil sample of domestic brand are found in the oil «Oleyna». Therefore, that oil is the most suitable to be used for high temperature processing of food.

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