

Identification of ω -3 Fatty Acids Using GC-MS Analysis in Extruded Spelt Product

Authors : Jelena Filipovic, Marija Bodroza-Solarov, Milenko Kosutic, Nebojsa Novkovic, Vladimir Filipovic, Vesna Vucurovic

Abstract : Spelt wheat is suitable raw material for extruded products such as pasta, special types of bread and other products of altered nutritional characteristics compared to conventional wheat products. During the process of extrusion, spelt is exposed to high temperature and high pressure, during which raw material is also mechanically treated by shear forces. Spelt wheat is growing without the use of pesticides in harsh ecological conditions and in marginal areas of cultivation. So it can be used for organic and health safe food. Pasta is the most popular foodstuff; its consumption has been observed to rise. Pasta quality depends mainly on the properties of flour raw materials, especially protein content and its quality but starch properties are of a lesser importance. Pasta is characterized by significant amounts of complex carbohydrates, low sodium, total fat fiber, minerals, and essential fatty acids and its nutritional value can be improved with additional functional component. Over the past few decades, wheat pasta has been successfully formulated using different ingredients in pasta to cater health-conscious consumers who prefer having a product rich in protein, healthy lipids and other health benefits. Flaxseed flour is used in the production of bakery and pasta products that have properties of functional foods. However, it should be taken into account that food products retain the technological and sensory quality despite the added flax seed. Flaxseed contains important substances in its composition such as vitamins and minerals elements, and it is also an excellent source of fiber and one of the best sources of ω -3 fatty acids and lignin. In this paper, the quality and identification of spelt extruded product with the addition of flax seed, which is positively contributing to the nutritive and technology changes of the product, is investigated. ω -3 fatty acids are polyunsaturated essential fatty acids, and they must be taken with food to satisfy the recommended daily intake. Flaxseed flour is added in the quantity of 10/100 g of sample and 20/100 g of sample on farina. It is shown that the presence of ω -3 fatty acids in pasta can be clearly distinguished from other fatty acids by gas chromatography with mass spectrometry. Addition of flax seed flour influence chemical content of pasta. The addition of flax seed flour in spelt pasta in the quantities of 20g/100 g significantly increases the share of ω -3 fatty acids, which results in improved ratio of ω -6/ ω -3 1:2.4 and completely satisfies minimum daily needs of ω -3 essential fatty acids (3.8 g/100 g) recommended by FDA. Flax flour influenced the pasta quality by increasing of hardness (2377.8 ± 13.3 ; 2874.5 ± 7.4 ; 3076.3 ± 5.9) and work of shear (102.6 ± 11.4 ; 150.8 ± 11.3 ; 165.0 ± 18.9) and increasing of adhesiveness (11.8 ± 20.6 ; 9.98 ± 0.12 ; 7.1 ± 12.5) of the final product. Presented data point at good indicators of technological quality of spelt pasta with flax seed and that GC-MS analysis can be used in the quality control for flax seed identification. Acknowledgment: The research was financed by the Ministry of Education and Science of the Republic of Serbia (Project No. III 46005).

Keywords : GC-MS analysis, ω -3 fatty acids, flax seed, spelt wheat, daily needs

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