The effect of fish oil addition on the fatty acid profile and consumer acceptability of poultry sausages

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Introduction: All over the world, there is a clear trend of consumers looking for food that, apart from satisfying basic nutritional needs, has a positive effect on the health and functioning of the human body. Therefore, a rapid development of the functional food market has been observed in recent years. Meat is a nutritious component of diet rich in highly digestible protein, essential amino acids, vitamins (especially B vitamins) and minerals (zinc and iron), therefore it is a good matrix for designing innovative products. Consumers now expect functional meat products that are reduced in salt, nitrates (III and V), cholesterol, and fat. There is also a steadily increasing consumer demand for meat products with incorporated ingredients. Such ingredients include, among others, fish oil, the beneficial effect of which on the human body has been confirmed in many studies and is known as a rich source of n-3 long-chain polyunsaturated fatty acids.

The aim and research methods: The aim of the study was to produce finely ground poultry sausages with the addition of liquid refined fish oil (MEG-3® 30% 8a Food Oil; © DSM Nutritional Products Ltd, Basel, Switzerland) which are sensory desired by consumers. Given the data on the raw material composition and the manufacturer's declaration of the EPA + DHA content in the oil preparation, the MEG-3® 30% 8a was added in amount of 7.1 g kg−1. The inclusion of EPA and DHA in oil formulation resulted in 1.83 g kg−1 of fatty acids in the finished products. Two samples were carried out: control (CO) and with the addition of fish oil (O), which differed only in the addition of fish oil.

Analysis of the fatty acid profile was performed and oxidative changes (TBARS analysis) during 21-day storage of the produced sausages were assessed. In addition, the microstructure of the products was examined using scanning electron microscopy. A panel sensory assessment was carried out by a 10-member trained sensory panel in accordance with the requirements of PN-EN ISO 8586: 2014–03, as well as consumer research (260 participants) aimed at checking how such products are perceived by consumers

Results: Based on the research, it was found that the addition of fish oil did not significantly affect the fat content in the finished product, which was 11.7% and 12.0% respectively for CO and O samples ($p<0.05$). Moreover presence of fish oil did not affect the degree of lipid oxidation. The fatty acid profile tests confirmed the presence of EPA and DHA acids at a level that allows their high content to be declared in accordance with the EC regulation. Based on the analysis of the Cryo-SEM image, in the case of the samples with oil, a large number of oil particles ranging in size from a few to about a dozen micrometres were noted, which were relatively evenly dispersed in the batter, as well as the presence of large fat particles from the raw meat. The produced sausages were positively assessed both by a trained panel and in consumer research. There was no occurrence of negative fish flavour in the sausages. It was probably the effect of the use of refined fish oil in the study and it could also be related to the use of protective additives (sodium ascorbate) and flavouring, spices and aromas.