

ABSTRACT

In view of the intensive development of research on functional food production and the growing interest of consumers in this type of food, it seems advisable to look for new ingredients and products with pro-health properties. The paper attempts to produce and then biologically verify the antiatherosclerotic properties of eggs obtained from laying hens fed with feed containing pomegranate seed oil as a source of CLnA and linseed oil as a source of α -linolenic acid. As many studies show, along with the change of feed components for laying hens and enrichment of egg content, their organoleptic quality and/or technological properties are often adversely affected. With this in mind, the aim of the study was also to assess the technological suitability of enriched eggs.

The following research hypotheses were put forward in the paper: 1/ as a result of modification of the feed composition of laying hens, eggs will retain their organoleptic properties and high nutritional value while at the same time changing the profile of fatty acids; eggs with modified composition will have an antiatherosclerotic effect; 3/simultaneous presence of pomegranate seed oil and linseed oil in the feed of laying hens will have a positive effect on the above mentioned properties.

In order to verify the first hypothesis, the chemical composition, including the fatty acid profile, was determined and selected structure-forming properties of eggs were evaluated. In order to verify the second and third research hypothesis, a dietary experiment with apoE/LDLr^{-/-} mice was conducted. Antiatherosclerotic properties of eggs were checked by evaluation of blood biochemical parameters (glucose concentration, lipid profile, activity of liver enzymes); fatty acids profile in fatty tissue and liver. On the other hand, the surface of atherosclerotic lesions was evaluated using the "*en face*" and "*cross-section*" methods.

On the basis of the conducted studies it was found that as a result of the modification of feed composition of laying hens, eggs retained their organoleptic properties and high nutritional value while at the same time changing the profile of fatty acids. Thus, the first research hypothesis was confirmed. The simultaneous addition of linseed oil and pomegranate seed oil in most cases did not affect the physicochemical, organoleptic, hardness and technological usefulness of eggs. Its positive influence on the fatty acid profile of egg yolk was shown. Due to multidirectional changes in individual parameters, the nutritional experiments did not allow to confirm or reject the second research hypothesis. The area of atherosclerotic lesions in the initial part of the ascending aorta was significantly smaller in

mice fed on a diet with eggs from hens receiving feed with linseed oil or linseed oil with pomegranate seed oil, which confirms the third research hypothesis.

The presence of conjugated linoleic acid trienes - obtained by nutritional modification of laying hens' feed - in fresh and cooked eggs makes it possible to use them as a source of these compounds in the diet. The conducted studies indicate the need for their continuation in order to confirm the pro-health effects of eggs enriched with CLnA and CLA at the same time.

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