Interaction of dietary unsaturation level with linolenic acid and α- tocopherol deposition in poultry meat

Cortinas L.[1], *Barroeta A.C.*[1], *Villaverde C.*[1], *Baucells M.D.*[1] *and Jensen S.K.*[2]

[1]*Department of Animal and Food Science, Facultat de Veterinària, Universitat Autònoma de Barcelona. E-08193 Bellaterra, Spain. Ana.Barroeta@uab.es*
[2]*Department of Animal Nutrition and Physiology, Danish Institute of Agricultural Sciences, Research Centre Foulum, DK-8830 Tjele, Denmark.*

Over recent years consumers are more aware of the direct repercussion of food on their health. Some works have been studing the meat ω3 polyunsaturated fatty acids enrichment, like linolenic acid (C18:3 ω3), associated with prevention of cardiovascular diseases. However, the higher unsaturation level in meat leads to an increase in the susceptibility to lipid oxidation. In order to improve oxidative stability of such products, inclusion of tocopherol in animal feeds has been successfully used. Moreover, this supplementation increases the meat vitamin E content. Nevertheless, there are few data regarding the optimum dietary polyunsaturated fatty acids and vitamin E to achieve nutritional benefits in meat.

The present study was carried out to evaluate the effect of dietary unsaturation level and supplementation with α- tocopheryl acetate on linolenic acid and α-tocopherol content in raw poultry breast.

One hundred and ninety-six female broiler chickens were randomly distributed into 16 experimental treatments resulting from the combination of 4 levels of dietary polyunsaturated fatty acids (15, 34, 45, 61 g/kg) and 4 levels of supplementation with α- tocopheryl acetate (0, 100, 200 and 400 mg/kg). The unsaturation degree was achieved by replacing linseed and fish oil to a basal diet enriched with 9% tallow. Linolenic acid content for feed and breast was determined as previously described by Sukhija and Palmquist (1988) and Carrapiso et al. (2000), respectively, using C19:0 as internal standard for the quantification. α-Tocopherol from feed and breast meat was analysed using the method described by Jensen et al. (1999).

The dietary polyunsaturated fatty acids clearly affected the linolenic acid content of raw breast meat. Linolenic acid content in breast increased linearly with dietary polyunsaturated fatty acid inclusion of poultry feed ($y = 0.1106x - 0.0021$, $R^2 = 0.73$). However, the suplementation with α-tocopheryl acetate did not modify the linolenic acid content in raw breast.

α-Tocopherol content of breast meat increased linearly with dietary α-tocopherol supplementation ($y = 0.0412x + 1.1498$, $R^2 = 0.70$). Moreover, α-tocopherol content of breast meat was reduced as the inclusion of dietary unsaturation increased. Thus, increasing of 46 g dietary polyunsaturated fatty acid, significantly, decreased 1.86 fold α-tocopherol content in breast of poultry feed with diets supplemented with α-tocopheryl acetate.

References:

Carrapiso A.I. et al., 2000. Meat Sci 56: 159-164.
Jensen S.K. et al., 1999. J Nutrition 129 : 1355-1360.
Sukhija P. and Palmquist D.L., 1988. J Agric Food Chem 36: 1202-1206.