Effect of Antioxidants on Cholesterol Oxidation in ω-3 Enriched Chicken Meat
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The influence of vitamin E (VE) and seleniometionine (SM) on cholesterol oxidation in raw and cooked ω-3 enriched dark chicken meat was evaluated. Two levels of VE and SM were supplemented in broiler diets. Extruded linseed was used as a source of ω-3 fatty acids (ω-linolenic acid; LNA). Cholesterol oxidation products (COPs) were analyzed in raw and cooked chicken thigh meat (boiled, pan-fried and roasted) with GC-MS. High level of antioxidants in the diet did not show any significant reduction in COPs formation in raw meat compared to low levels. However, during boiling COPs formation was inhibited by high level of VE and SM. Contradictory results were found during roasting; high VE levels prevented cholesterol oxidation while high SM did not show any protective effects. Unexpectedly, pan frying did not increase the level of COPs in any of the dietary treatments. These results proved that VE seems to protect cholesterol against oxidation more efficiently than SM.

Identification of COPs by GC-MS

25-hydroxycholesterol, which is considered most cytotoxic, was not detected. The average level of total COPs in raw ω-3 enriched dark chicken meat was 19.05 μg/g of fat which is almost 7 times higher than total COPs in not enriched breast chicken meat (2.88 μg/g of fat). The low levels of COPs in pan-fried meat may indicate that some compounds are showing an antioxidant effect during pan-frying, probably released peptides from either proteins or collagen.

What does this mean?

- SM had limited potential for increasing the oxidative stability of meat compared to VE in some of the samples. Selenium works as an antioxidant by using the glutathione peroxidase enzyme which is part of an in vivo mechanism and it is also inactivated at temperature above 80°C.
- The generation of COPs on the cooking conditions. In fact, pan-frying generated less oxidation products compared to roasting and boiling.
- Further research is needed to quantify toxicological effects of COPs on value-added food products especially after cooking and their evolution after storage.

Funding for this project was provided by Canadian Food Safety and Quality Program: Food Safety Initiative. Linpro was provided by O&T Farms.

Acknowledgements

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