

[P1.31]

Enrichment of chicken meat with omega-3 in tropical conditions

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Reunion Island is a French department located in Indian Ocean and suffering from a great occurrence of metabolic disorders such as obesity and diabetes. Actually, chicken is the main meat consumed in Reunion Island (42 kg/year/inhabitant against 23 kg/year/inhabitant in metropolitan France), thus enriching it in poly-unsaturated omega-3 fatty acids (n3-PUFAs) should improve Reunionese's health.

In the present trials, chickens (JA757 strain) were raised in an experimental poultry house for 56 days. The experimental diets were modified over 2 criteria: flax seed content (0, 3, 6 and 9%) and level of vitamin E supplementation (0 and 150 ppm). After slaughter, thigh meat was analyzed to determine fatty acids composition, vitamin E content and lipid oxidation susceptibility by measuring malondialdehyde (MDA) content.

Results showed that meats were enriched in n3-PUFAs proportionally to the flax seed content of the diet which is directly linked with the n3-PUFAs content of the diet. The quantity of n3-PUFAs found in meat is positively correlated with the quantity of n3-PUFAs ingested by the chickens. The transfer efficiency can be calculated by dividing the n3-PUFAs content in meat by the quantity of n3-PUFAs ingested. This efficiency decreases when the amounts of n3-PUFAs consumed increase, leading to a negative correlation between the transfer efficiency and the consumed n3-PUFAs quantity. The vitamin E supplementation did not play a role in the n3-PUFAs enrichment but meats issued from animals fed with these supplemented diets have exhibited higher vitamin E contents. Oxidation was lower in meats enriched with omega 3 and vitamin E than in those just enriched in omega 3. This difference in oxidation level was maintained during the meat storage at 4 °C for several days and even after cooking.

Keywords: Omega-3 enrichment, Chicken meat, Diet, Flax seeds