

Enrichment of Eggs with Omega-3 Fatty Acids by Dietary Supplementation with Algal Biomass

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Omega-3 polyunsaturated fatty acids (PUFA) are effective in preventing or treating several diseases. Unfortunately, in many Western countries, the average intake is below the recommended level, raising interest in food enrichment. In this regard, the fatty acid composition of eggs can be modified by feed adaptation. Nowadays, enriched eggs are mostly produced through feed supplementation with flaxseed, and are thus mainly enriched in ALA. However, in humans, the conversion from ALA to EPA and DHA is rather limited, whereas the health promoting effects are mostly ascribed to EPA and DHA. To that end, the aim of this research was to study the impact of algal feed supplementation with autotrophic algal biomass on enrichment of eggs with omega-3 PUFA on the one hand, and the zoo technical performance of the hens on the other hand.

After a two week adaptation period, 72 hens were randomly assigned to one of the nine dietary treatments in which two different levels of omega-3 PUFAs from four different algal species were incorporated in a regular wheat-corn-soybean diet. This feed supplementation period of 28 days was followed by a two week wash-out period. The eggs were collected, the yolk color was measured, the lipids were extracted and their fatty acid composition was determined at different days during the feed supplementation period and the wash-out period. There was no significant impact of algal feed supplementation on body weight, feed intake, egg production and egg weight. However, depending on the algae species added to hens' diet, the yolk color shifted from yellow to a more orange-red color due to enrichment of certain carotenoids derived from algae. Moreover, egg yolk could be enriched with different levels of omega-3 PUFAs, mainly DHA, depending of the supplemented algae species.