Omega-3 enrichment of chicken

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Attempts to enrich meat, eggs and processed foods with very long chain omega-3 (VLC ω3) fatty acids are being encouraged by the recent introduction of a nutrition claim allowing foods containing at least 60 mg of VLC ω3 per serve and no more than 5% saturated/trans fatty acids to be labelled as a 'good source of ω3'. However, ω3 enrichment may affect sensory qualities of foods, thus reducing their consumer acceptability.

The VLC ω3 content of pork, chicken and eggs can be increased by adding PorcOmega™ (POM), a docosahexaenoic acid (DHA) rich fishmeal from Bartlett Grain P/L, to pig and poultry feeds (1). However, the ω3 content and sensory qualities vary with the level and duration of supplementation, necessitating a compromise between enrichment and acceptability. In the present study, we tested whether chicken meat qualifying for the ω3 nutrition claim with acceptable sensory qualities and shelf life could be produced under commercial conditions by inclusion of 7.5% POM for 3 weeks.

Groups of 200 control fed and 400 POM fed birds were processed at 6 weeks of age. Randomly selected whole portions of breasts, thighs and sausages were homogenised for fatty acid analysis or stored at 0–4°C then cooked by grilling for repeated sensory evaluation by 12 trained panellists at 1, 3–4 or 6–7 days after processing (corresponding to normal shelf life of the products).

Total VLC ω3 content was significantly higher in breasts, thighs and sausages (2.6, 4.2 and 2.2 fold respectively) of POM fed birds (see table), with DHA increased far more than EPA or DPA (5.4, 1.8 and 1.3 fold respectively). Interestingly, as with fish oil feeding (2), saturated fatty acid contents were substantially reduced. Thus both thighs and sausages produced under commercial conditions could be expected to qualify as 'good sources of ω3' with respect to both ω3 and sat/trans contents.

Table: Concentrations of total VLC ω3 (EPA+DPA+DHA) and saturated fatty acids (mg/100 g of meat, n = 6)

	control breast	treated breast	control thigh	treated thigh	control sausage	treated sausage
VLC ω3	19.3 ± 1.2	50.2 ± 2.0	30.5 ± 3.5	126.8 ± 9.9	35.7 ± 1.2	78.2 ± 4.2
Sat. f.a.	520 ± 70	300 ± 30	2980 ± 280	2510 ± 270	2360 ± 75	1520 ± 100

There were small differences in sensory characteristics (e.g. colour, texture, odour, juiciness, overall liking) between control and POM treatments which varied with the different meats and duration of keeping, and stronger flavours were noted with POM treatment. However, there were no overall effects of treatment or duration of storage on quantitatively assessed sensory parameters.

Thus inclusion of 7.5% POM in commercial broiler feeds from 3–6 weeks of age appears to be a cost-effective strategy for producing DHA-enriched chicken products with satisfactory sensory and keeping characteristics which qualify for the new ω3 nutrition claim.

References

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