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Dietary alpha-linolenic acid enhances omega-3 long chain polyunsaturated fatty acid levels in chicken tissues ☆

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Abstract

The effects of enriching broiler chicken diets with a vegetable source of *n*−3 fat in the form of alpha-linolenic acid (ALA, 18:3*n*−3) on the accumulation of *n*−3 long chain polyunsaturated fatty acids (LCPUFA) in chicken meat were investigated. Sixty unsexed one-day-old broiler chickens (Cobb 500) were randomly allocated to one of six diets (*n*=10 birds/diet) for 4 weeks. The ALA levels varied from 1 to 8% energy (%en) while the level of the *n*−6 fatty acid linoleic acid (LA, 18:2*n*−6) was held to less than 5%en in all diets. At harvest (day 28) the levels of *n*−3 LCPUFA including eicosapentaenoic acid (EPA), docosapentaenoic acid (DPA) and docosahexaenoic acid (DHA) in breast and thigh meat increased in a curvilinear manner as dietary ALA increased, reaching 4- to 9-fold above the levels seen in control birds. In contrast, arachidonic acid (AA) was reduced in response to increasing dietary ALA.

Abbreviations

AA, arachidonic acid; ALA, alpha-linolenic acid; DHA, docosahexaenoic acid; DPA, docosapentaenoic acid; EPA, eicosapentaenoic acid; FAME, fatty acid methyl ester; MUFA, monounsaturated fatty acid; LA, linoleic acid; LCPUFA, long chain polyunsaturated fatty acid; %en, percent of energy; PL, phospholipids; TL, total lipid; SFA, saturated fatty acid.

Keywords

Omega-3 enrichment; Docosahexaenoic acid; Eicosapentaenoic acid; Chicken meat; Alpha-linolenic acid