

Lipid Oxidation in Lamb Meat Enriched in Polyunsaturated Fatty Acids

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The dietary recommendations appoint as favorable to human health the increased consumption of polyunsaturated fatty acids (PUFA), which has motivated an extensive research in order to enhance PUFA levels in ruminant products. Supplementation of diets with PUFA-rich lipid sources are used as a strategy to increase PUFA levels in ruminant meat, particularly in conjugated linoleic acid isomers (CLA) and n-3 PUFA. However, PUFA are highly prone to oxidation and the susceptibility to oxidation increases with the degree of unsaturation. So, meat enrichment in PUFA may compromise its quality. However, meat oxidative stability depends on the balance between prooxidant and antioxidant components and adequate levels of antioxidants in diet may prevent excessive lipid oxidation. The impact of dietary supplementation with PUFA-rich lipid sources with different degrees of unsaturation on lipid oxidation of meat and the efficacy of alpha-tocopherol supplementation was evaluated in six productive experiments with lambs. Lambs were fed diets with forage: concentrate ratio ranging from 60:40 to 20:80, supplemented with lipid sources rich in PUFA (vegetable and fish oils and algae extract). All diets contained alpha-tocopherol (22.5 mg/kg). Meat samples were cold stored during 11 days. Meat lipid oxidation ranged from 1.08 to 1.94 mg malondialdehyde (MDA)/kg meat in diets supplemented with vegetable oils rich in linoleic acid (18:2n-6). Dietary enrichment in n-3 PUFA, resulted in higher lipid oxidation values averaging 2.58 mg MDA/kg meat in diets enriched in linseed oil rich in linolenic acid (18:3n-3) and 2.48 mg MDA/kg meat when fish oils or algae rich in long chain n-3 PUFA were used. The level of alpha-tocopherol used, was not enough to prevent the quality loss of meats enriched in n-3 PUFA, as the lipid oxidation values were above the threshold value of 2 mg MDA/kg for consumer acceptability of beef. So, particularly in n-3 PUFA enriched diets, higher alpha-tocopherol levels or combination with other antioxidants should be considered.