

Factors influencing fatty acids in meat and the role of antioxidants in improving meat quality.

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Meat has been identified, often wrongly, as a food having a high fat content and an undesirable balance of fatty acids. In fact lean meat is very low in fat (20-50 g/kg), pork and poultry have a favourable balance between polyunsaturated and saturated fatty acids (P:S) and grazing ruminants produce muscle with a desirable n-6:n-3 polyunsaturated fatty acid ratio. In all species, meat fatty acid composition can be changed via the diet, more easily in single-stomached pigs and poultry where the linoleic, alpha-linolenic and long-chain polyunsaturated fatty acid content responds quickly to raised dietary concentrations. Recent work in pigs has attempted to manipulate the n-6:n-3 ratio by feeding higher levels of alpha-linolenic acid (e.g. in rapeseed) or its products eicosapentaenoic acid (20:5) and docosahexaenoic acid (22:6) present in fish oils. In ruminants the challenge is to increase the P:S ratio whilst retaining values for n-6:n-3 found in cattle and sheep fed on forage diets. The saturating effect of the rumen can be overcome by feeding polyunsaturated fatty acids which are protected either chemically, by processing, or naturally e.g. within the seed coat. Some protection occurs when grain-based or grass-based diets are fed normally, leading to relatively more n-6 or n-3 fatty acids respectively. These produce different flavours in cooked meat due to the different oxidative changes occurring during storage and cooking. In pigs and poultry, high n-3 fatty acid concentrations in meat are associated with fishy flavours whose development can be prevented with high dietary (supranutritional) levels of the antioxidant vitamin E. In ruminants, supranutritional vitamin E delays the oxidative change of oxymyoglobin to brown metmyoglobin and may also influence the characteristic flavours of beef and lamb.

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