

ABSTRACT

Effects of fatty acids on meat quality: a review

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Interest in meat fatty acid composition stems mainly from the need to find ways to produce healthier meat, i.e. with a higher ratio of polyunsaturated (PUFA) to saturated fatty acids and a more favourable balance between n-6 and n-3 PUFA. In pigs, the drive has been to increase n-3 PUFA in meat and this can be achieved by feeding sources such as linseed in the diet. Only when concentrations of α -linolenic acid (18:3) approach 3% of neutral lipids or phospholipids are there any adverse effects on meat quality, defined in terms of shelf life (lipid and myoglobin oxidation) and flavour. Ruminant meats are a relatively good source of n-3 PUFA due to the presence of 18:3 in grass. Further increases can be achieved with animals fed grain-based diets by including whole linseed or linseed oil, especially if this is "protected" from rumen biohydrogenation. Long-chain (C20-C22) n-3 PUFA are synthesised from 18:3 in the animal although docosahexaenoic acid (DHA, 22:6) is not increased when diets are supplemented with 18:3. DHA can be increased by feeding sources such as fish oil although too-high levels cause adverse flavour and colour changes. Grass-fed beef and lamb have naturally high levels of 18:3 and long chain n-3 PUFA. These impact on flavour to produce a 'grass fed' taste in which other components of grass are also involved. Grazing also provides antioxidants including vitamin E which maintain PUFA levels in meat and prevent quality deterioration during processing and display. In pork, beef and lamb the melting point of lipid and the firmness/hardness of carcass fat is closely related to the concentration of stearic acid (18:0).