

Vitamin E Content of Meat from Lambs Grazing Perennial or Annual Pasture with Supplementary Rations Containing Linseed

V.F. Burnett^A, G.R. Seymour^A, S. Norng^B and E.N. Ponnampalam^C

^A Department of Primary Industries, RMB 1145 Chiltern Valley Road, Rutherglen Victoria 3685

^B Department of Primary Industries, 621 Burwood Highway Knoxfield, Victoria 3180

^C Department of Primary Industries, 607 Sneydes Road Werribee, Victoria 3030

Vitamin E is important in protecting meat from oxidation caused by oxygen radicals and lipid peroxides (Rice and Kennedy, 1988). A high Vitamin E content in meat can prevent the development of rancid flavours and odours associated with the oxidative products of polyunsaturated fatty acids (PUFA) (Pearce *et al.*, 2008). In comparison to feedlot diets, fresh pasture has high levels of Vitamin E but these levels depend on the nutritive characteristics of the pasture and the growth stage of the plants (Descalzo and Sancho, 2008). When finishing lambs outside the peak pasture growth period, (spring in temperate zone), access to fresh pasture may be limited and grazing of dry pasture with supplementation may be necessary. Previous research has shown that supplementation with linseed can improve the PUFA content of meat (Delmotte *et al.*, 2007). However, feeding PUFA (eg. linseed) to livestock to improve fatty acid content can increase susceptibility to peroxidative damage so increases in dietary PUFA must be balanced with enhancing defence mechanisms like Vitamin E (Rice and Kennedy, 1988). The aim of this research was to compare the Vitamin E content of meat from lambs grazing either perennial (lucerne/phalaris) pasture or annual pasture with linseed.

Fifty-four second cross lambs were allocated to 4 treatments comprising; 1, perennial pasture; 2, annual pasture with hay/oat ration; 3, annual pasture with hay/oat/whole bruised linseed; and 4, annual pasture with hay/oat/linseed meal. The experimental design comprised 18 groups of 3 lambs, with 3 groups for treatment 1 and 5 groups each for treatments 2, 3 and 4. Treatment 2, 3 and 4 lambs were fed 500g/hd/day for 2 weeks and 700g/hd/day for 6 weeks. A 25g sample of the *longissimus dorsi* muscle was sampled for Vitamin E analysis.

Table 1. Vitamin E (α tocopherol) content (mg/kg fresh weight) of meat from treatment lambs

Treatment	α -tocopherol concentration
1. Perennial control	5.88
2. Annual pasture with hay/oat ration	3.47
3. Annual pasture with hay/oat/whole bruised linseed	3.10
4. Annual pasture with hay/oat/linseed meal	3.63
l.s.d. P=0.05 Pasture type	1.51
l.s.d. P=0.05 Comparison between treatment means 2,3,4	1.03

Meat from lambs in treatment 1 had higher ($P < 0.05$) levels of Vitamin E than lambs in treatments 2, 3 and 4 (5.88 vs 3.40 (average)) (Table 1). There was no difference between treatments 2, 3 and 4 for Vitamin E content. The α -tocopherol content of the perennial and annual pasture was 34 and 9.8 mg/kg respectively. Assuming daily intake of 1.4 kg DM/day, treatment 1 lambs consumed 48 mg α -tocopherol/day whilst treatments 2, 3 and 4 lambs consumed an average of 13.0 mg indicating that the conversion of dietary Vitamin E in the supplemented lambs was more efficient than in treatment 1. Arnold *et al.*, (1993) suggested that 3.0 – 3.5 μ g/g of α -tocopherol was required in beef *longissimus lumborum* tissue to achieve protection against oxidation but levels can be lower than this in sheep (Kasapidou *et al.*, 2001). This data indicates that all treatments were within the range suggested by Arnold *et al.*, (1993) to achieve protection from oxidation.

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Email: viv.burnett@dpi.vic.gov.au