N-3 AND N-6 POLYUNSATURATED FATTY ACIDS IN LAMB MEAT SUPPLEMENTED WITH FISH MEAL AND ITS IMPACT ON HUMAN HEALTH

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Concern among Australians about their intake of animal fats has changed the consumption of lamb and beef meat products. However lean lamb and beef has been promoted by Heart Foundation and the Australian Meat and Livestock Corporation as a healthy product (Hearnshaw et al. 1994), leading to increased demand for large, lean carcasses. While reducing carcass fatness through modifications to production strategies it is also necessary to maintain the essential polyunsaturated fatty acids (PUFA) in meat. The n-3 PUFA play an important role in the regulation of plasma triglyceride levels and NHMRC (1992) have recommended that the Australian diet should contain an increased level of n-3 PUFA to maintain human health and prevent disease. Fish meal (FM) and lupins (LUP) supplements fed with or without the addition of barley (BAR) grain were examined as one strategy for changing on carcass fatness (GR), intramuscular fat (IMF) content, PUFA, n-3 and n-6 PUFA levels.

Lambs were randomly allocated to one of the six treatments by live weight (LW) and offered a basal diet consisting of 80%: 20% oaten hay: lucerne hay ad libitum alone (BAS) or supplemented with either BAR (400 g/d), LUP (400 g/d), FM (184 g/d), BAR+LUP (BL, 200+200 g/d) or BAR+FM (BFM, 200+84 g/d) over an eight week period. Muscle longissimus dorsi (LD) sample from 30 crossbred cryptorchid lamb carcasses (chilled) were taken over the 12th rib, after 24 hr post-mortem. Meat samples (intramuscular) were analysed for total lipid content and fatty acid composition using the method given by Sinclair and O'Dea (1987).

	BAS	LUP	FM	BAR	BL	BFM	SEM
n	6	6	6	6	6	6	-
GR (mm)	10.3 ab	15.7 b	10.0 a	10.4 ab	13.6 b	10.2 a	1.13
IMF (%)	3.3	4.2	3.6	3.6	4.1	4.0	0.52
PUFA mg/100 g meat	241	277	245	245	262	267	15.2
n-3 PUFA mg/100 g meat	66 a	68 a	104 b	71 a	68 a	105 b	6.5
n-6 PUFA mg/100 gmeat	165 abc	209 d	141 a	174 bc	194 cd	162 ab	10.6

Within rows, means without a common superscripts are significantly different (P<0.01).

All lambs, except BAR supplemented, had heavier (P<0.01) carcass weight than the lambs fed BAS diet, but there were no differences observed in IMF% or total PUFA level among treatments. Inclusion of FM in the diet either alone or in combination with barley grain resulted in meat with 53% greater level of n-3 PUFA and 25% lower level of n-6 PUFA than with the inclusion in the diet of LUP alone or in combination with barley grain. There were no differences observed in n-3 and n-6 PUFA levels of meat between those lambs fed FM and BFM or between LUP and BL, indicating that adding barley grain to LUP and FM supplements can lower the daily supplementary feed cost by 30% and 37% respectively, without changing the n-3 and n-6 PUFA levels in meat.

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