

NSA Poster Presentations: Thursday 12 August 2004

Levels of n-3 enrichment and Australian consumer sensory panel ratings of lamb meat from sheep supplemented with protected tuna oil for different numbers of weeks

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Background- Cost-effective strategies to further enhance the levels of n-3 polyunsaturated fatty acids in red meat require determination of the optimum period of supplementation with dietary lipid supplements and the sensory characteristics of meat from animals under different periods of supplementation.

Objective- To determine the optimum period of supplementation required to enrich lamb meat with eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) through dietary tuna oil supplementation and the consequent effect on the sensory characteristics of lamb meat.

Design- Fifty weaner lambs of similar liveweight and condition were drafted from the Yalanbee Research Station (Bakers Hill, WA) flock. They were randomly divided into 5 groups and assigned to the treatments of 0, 3, 6, 9 and 12 weeks of protected tuna oil supplementation (PTO) (3% dry matter). The trial was arranged to have all sheep slaughtered on the same day. Accordingly, the 10 lambs assigned to 12 weeks of supplementation were removed from pasture on the date the trial commenced and fed hay-grain mixture plus PTO indoors. Every three weeks after that, the next group of 10 lambs was moved indoors. At slaughter, both back straps (*Longissimus dorsi*) from each animal were obtained; one was used for total fat and fatty acid analysis and the other for sensory evaluation using a 48-member consumer panel at Food Science Australia, Werribee.

Outcomes- The concentrations of EPA and DHA in muscle reached plateau after 3 weeks of supplementation. However, the yield in mg per 100g muscle increased with increase in the duration of supplementation over the whole period. Consumer panel acceptability ratings for most sensory attributes were not different between muscle from unsupplemented sheep and those supplemented with tuna oil for the number of weeks used in this study.

Conclusions- This study suggests that for a given level of dietary inclusion, there may not be continued gain in the concentration of EPA and DHA in muscle beyond three weeks of supplementation. The ratings for juiciness, tenderness, odour, flavour and aftertaste were similar for all groups of lambs.

Effects on plasma lipids when plant sterol enriched fat spread or carbohydrate provide replacement energy for saturated fatty acids

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Background - Clinical practitioners often inquire whether patients who need to lower plasma cholesterol are better served by consuming a plant sterol-enriched fat spread or reducing fat intake by consuming no spread.

Objective - To determine the effects on plasma cholesterol of replacing a plant sterol enriched fat spread with carbohydrate.

Design - Twenty-nine healthy volunteers with raised low density lipoprotein cholesterol concentrations were assigned to follow in random order three diets; a typical New Zealand diet high in total (34%kJ) and saturated (15%kJ) fat, a cholesterol-lowering diet reduced in total (30%kJ) and saturated fat (8%kJ) but including a plant sterol spread, and the same cholesterol-lowering diet with the plant sterol spread isocalorically replaced with carbohydrate (total fat, 26%kJ; saturated fat 7%kJ). All foods were provided and each diet was followed for four weeks.

Outcomes - Mean (SD) plasma low density lipoprotein cholesterol concentration declined from 4.68 (0.92) mmol/L on the high saturated fat diet to 4.12 (0.83) mmol/L ($P<0.001$) on the carbohydrate diet and 3.76 (0.84) ($P<0.001$) on the plant sterol diet. The 20% decrease on the plant sterol diet was significantly greater ($P<0.001$) than the 12% decrease on the carbohydrate diet. Relative to the high saturated fat diet, mean (95%CI) plasma high density lipoprotein cholesterol concentration declined by -0.11 (-0.16 to -0.06) mmol/L on the carbohydrate diet but changed little on the plant sterol diet, -0.03 (-0.09, 0.02).

Conclusions - Including a plant sterol fat spread in a cholesterol-lowering diet produces a more favourable plasma lipid profile than replacement of the spread with carbohydrate.