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Effects of feeding pasture grass and linoleic acid supplementation on growth performance, anti-oxidant status and meat conjugated linoleic acid (CLA) content of Awassi, Anarom[®] and Saroman[®] lambs

Summary

A series of *in vivo* studies have performed to investigate and compare the effects of feeding basal conventional diets and linoleic acid supplementation on performance, atherogenicity index (anti blood vessel clots) and anti-carcinogenic compound (CLA) in meat of growing lambs. Two diets namely control (diet including grass+basal diet) and omega-6 enriched (control + soybean oil as a source of linoleic acid) have fed for 126 days to 30 male lamb that blocked in basis of their breed in three classes of *Turkish native* (Awassi), *Turkish native X Romanov* (Anarom[®]) and *Turkish native X Charollais X Romanov* (Saroman[®]).

Growth and carcass performance

In current research *L. dorsi* muscle area index, DMI, FCR and EF were not affected neither by SO* nor breed type. Unlike this, in non-fat tailed sheep fat deposits mainly in intermuscular tissue and results in a higher marbling score. Form this point of view, non-fat tailed sheep (Anarom[®] and Saroman[®]) tended to have a higher significant marbling score that fat tailed sheep (Awassi) (P<0.05). The general pattern of marbling score increment between genotypes in both groups of control and So fed sheep was as Saroman>Anarom>Awassi. Regarding ADG (g/day) Saroman and Anarom have the highest ADG in compare with Awassi in both feeding schedules (266 and 242 g/day vs 216, respectively).

Meat quality and oxidation stability

Regarding the Turkish market demand which prefer pale pink colored meat, such improvements in L and b* parameters and observed reduction in a* and C* parameters would be beneficial. Data of present study are the first reports for Anarom and Saroman in the world. In the capacity of current research, SO supplementation resulted in a significant pink color assay in Anarom[®] and Saroman[®] in compare to Awaasi and control diets (P<0.01). Also, SO supplementation resulted in a significant decrease of meat samples TBARS values (oxidative instability) in either muscles of *M. longissimus dorsi* and *M. semitendinosus* (P<0.01).

Meat fatty acids profile and human health indexes

In terms of selected ratios and sum of FA, SO supplementation resulted in a decrease in SFA, MUFA, n-6/n-3 and Atherogenicity index ($P < 0.05$) and an increase in PUFA, n-6, n-3 and P/S ratio significantly ($P < 0.01$). In current study a 400% increase of total **CLA** in *M. longissimus dorsi* and a **250% increase** of total **CLA** in *M. Semitendinosus* may effectively unfold the anti-carcinogenic and anti-obesity properties of produces lambs' meat.

Atherogenicity index indicates the relationship between the sum of the main saturated fatty acids and that of the main classes of unsaturated, the former being considered proatherogenic (favoring the adhesion of lipids to cells of the immunological and circulatory system), and the latter anti atherogenic (inhibiting the aggregation of plaque and diminishing the levels of esterified fatty acid, cholesterol, and phospholipids, thereby preventing the appearance of micro and macro coronary diseases). Supplementation of SO altered Atherogenicity index in which in both of control diet and SO supplemented diets Saroman[®] and Anarom[®] have a lower Atherogenicity index than Awassi due to their fatty acids profile. Regarding CLA content of Anarom[®] and Saroman[®] as well as observed Atherogenicity index for these two, we assume that they are producing “**heart friendly**” and **anti-cancer** lamb meat in the condition of current study's feeding approaches.