Betaine supplementation vs. exercise: effects on glucose, protein, urea and lipid plasma parameters from Alentejano pigs

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Swine, due to their physiologic and anatomical similarities to humans, are considered as good models for cholesterol metabolism studies. The Alentejano (AL) pig is a breed from the south of Portugal with a higher lipogenic activity than European breeds. The present study aimed to investigate the effects of betaine (a methyl donor and an osmoprotectant, with contradictory effects on backfat thickness) supplementation and of exercise in some plasma parameters of AL pigs.
Weaned female and male AL pigs were castrated, allocated to individual pens and fed a commercial (C) diet offered at 85% of *ad libitum*. The pigs were slaughtered (~100 kg BW) in 3 groups: Group C (n=6), consuming the C diet; Group CB (n=8), consuming the C diet with betaine (1g/kg); and Group CE (n=5), consuming also the C diet, but with access to an exercise area. Fasting plasma concentrations of glucose, protein, urea, triacylglycerols, phospholipids, total and LDL- and HDL-cholesterol were determined.
When compared to C and CE pigs, CB pigs presented higher concentrations ($P<0.05$) of triacylglycerols, phospholipids, cholesterol and lipoprotein cholesterol. As to CE pigs, they presented lower total cholesterol ($P=0.08$) and higher HDL-cholesterol and HDL:total cholesterol ratio ($P<0.05$) than C ones.
These data suggest that betaine increases dyslipidemia. Furthermore, exercise had a beneficial effect on plasma cholesterol levels and on the cholesterol deposition in adipose tissues and muscles of CE pigs (lower than the ones observed in the subcutaneous fat and *m. semimembranosus* of C and CB pigs – preliminary data).

Keywords: betaine, exercise, cholesterol metabolism, lipoproteins, pigs.

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