

Effect of reducing dietary crude protein on growth performance of fattening pigs: a meta-analysis

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Reducing dietary crude protein (CP) is a nutritional strategy implemented to improve the sustainability of pig production. Its effect on growth performance has been broadly studied in fattening pigs but the literature is lacking a quantitative summary of the knowledge acquired. A meta-analysis was performed to assess the effects of reducing dietary CP on pig growth performance. Articles included in the meta-analysis studied effects of CP reduction, with at least three CP levels, on the growth performance of fattening pigs (20-115 kg) and were published from 1990 to 2019. The database contained 42 articles, which correspond to 67 trials. Diet composition was recalculated with INRA-AFZ (2004) tables. Trials using iso-digestible lysine and iso-net energy diets with constant or above requirements levels of essential amino acids (EAA, METEX NØØVISTAGO recommendations) were selected for the final analysis, with a 5% acceptance limit. The final selection contained 11 trials and 44 treatments. The general linear model procedure of MINITAB (2019) was used to build regression models, including a fixed trial effect. Dietary CP reduction tested ranged between 1.6 and 7.5 percentage points (%pt) and was performed by reducing soybean meal and increasing cereals inclusion in all trials except one using rapeseed meal. Reducing dietary CP did not significantly impact feed intake, average daily gain or feed conversion ratio when EAA were adequately supplied. Nitrogen efficiency was improved by 2.7 % pt per % pt of CP reduction ($P < 0.001$). No statistical analysis could be performed on carcass composition data as there were only six trials remaining after selection for these parameters, but fatter carcasses were observed in half of the trials. This study highlighted that few CP reduction studies have been performed while controlling energy and EAA levels. There was no effect of reducing dietary CP on growth performance when those parameters were controlled but more research is needed on very low CP diets for fattening pigs.

Keywords

crude protein; pig nutrition; meta-analysis