Effect of dietary crude protein on water intake and manure production by pigs

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The aim of this study was to evaluate the effects of a nutritional program with reduced crude protein (CP) content on water use and manure production. Forty gilts and 40 barrows (24.5±1.8 kg) were distributed in a randomized block design with two treatments, 10 replications per treatment and four animals per experimental unit. The feeding program was in four phases. Two diets were formulated for each feeding phase. The ¿rst one was adjusted by using InraPorc® model (LP) to adjust nutrient supplies to animal's requirements, and the second was formulated according to standard Brazilian nutritional levels (SP). Water was supplied ad libitum and consumption was measured by using a water meter for each pen. The volume of the manure was calculated for every pen by measuring its height in the collector rails with a graduated ruler. The average protein content was 145 and 168 g/kg for LP and SP treatments, respectively. Nutritional adjustment allowed a reduction of protein intake by 13, 20, 14 and 15% in grower I, grower II, ¿nisher I, and ¿nisher II phases, respectively. There was no effect of treatments on water use (6.17 and 5.84 l/d for LP and SP respectively, P=0.78), and volume of manure produced (4.05 and 3.70 l/d for LP and SP respectively, P=0.61). It is reported in literature that, for each percentage point of reduction in CP, water intake is reduced by 2% and slurry volume is reduced by 4%. However, this effect was not observed in this trial, probably because the difference in protein content was not enough to inÀuence water intake. Another reason could be the high ambient temperature (average 22 °C) which is also known to affect water consumption. The results of this trial indicate that water use and volume of manure produced by growing-¿nishing pigs are not affected in the range of protein levels evaluated in this study, at hight temperature.

Synchronous least-cost ration formulation using nonlinear programming

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Least-cost procedures do not always produce the most practical rations for ruminants. The aim of this work was to reduce the cost of feeding by achieving the highest ef¿ciency of utilization from the diet at the lowest possible cost through incorporating the concept of synchronizing ruminal energy and protein digestion into the traditional least-cost ration model. In a preliminary study, degradation kinetics of seven commonly used feedstuffs were estimated by the nylon bag technique. The observed patterns of N and OM degradability of feedstuffs were largely varied and greatly depend on the rumen outÀow rate (fraction/h). The synchrony index (SI) was calculated based on the OM and N fractions of each ingredient and their degradation rates. A new user-friendly software application 'Lacto-sheep' was being developed based on the C# language and the .NET Framework 4.0 to facilitate the processes of ration formulation. Simplex and Hybrid local search (HLS) solvers in Microsoft Solver Foundation 3.1 have been used to solve both linear and nonlinear programming models, respectively. Example synchronous least-cost ration (SLCR) and least-cost ration (LCR) formulations of 50-kg lactating ewe based on the 1975 NRC recommendation is presented. SLCR and LCR showed two different patterns of N/OM release within a day. SI was about 0.87 and 0.60, respectively. As cost is often a limiting factor in the traditional least cost ration formulation therefore, LCR did not contain any source of protein-rich sources. Synchronous least-cost procedure was more appropriate to produce practical rations.