MINERAL SUPPLEMENTATION OF WHEAT/SOYBEAN MEAL DIETS FOR GROWING PIGS AND RATS

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The adoption of intensive systems of pig production has increased the probability of mineral and vitamin deficiencies occurring. The pigs are deprived of access to soil, grass and, largely, to dung, all good sources of minerals and vitamins. With these sources no longer available the pigs are solely reliant on the feed for their mineral and vitamin requirements. In addition, due to the greater stress of production on the pig, the requirements for minerals and vitamins may be increased by intensification. I have earlier found that the addition of a complex mineral supplement to a wheat/soybean meal (W/ SBM) diet markedly improved the performance of growing pigs. The contributions to this response by the three groups of minerals used has been examined in an experiment with growing pigs, Additional experiments to further clarify the situation were conducted with white rats.

The three groups and levels of minerals used in the $2 \times 3^2$ factorial pig experiment were: calcium/phosphorus (Ca/P) at nil; 0.290/0.198 g per MJ digestible energy; or 0.580/0.397 g; salt at nil; or 34.141 mg sodium/52.733 mg chlorine; and trace minerals (Mn, Zn, Fe and Cu) at nil; 1.386, 10.397, 10.397 and 8.664 mg; or 1.386, 10.397, 10.397 and 17.328 mg respectively. A base diet of 80 per cent wheat and 20 per cent soybean meal supplemented with vitamins A and D was used. The pigs commenced at 20 kg live weight (LW) and were fed once daily at a rate of 4.12 per cent of LW, attaining maximum intake at 45 kg LW. This rate was calculated to provide 25,732 kJ digestible energy per day to a pig of 45 kg LW and proportionately less to pigs of lower LW. Pigs were slaughtered at 73 kg LW.

Salt was found to make a major contribution to the improvement in performance obtained with complex mineral supplementation of the W/SBM diet. The response to salt was seen as early as three weeks and at nine weeks the increase in LW gain with salt was approximately 55 per cent. Up to this time pigs receiving only salt grew faster than the unsupplemented controls but then began to lose weight and die. I attribute this to the rapid depletion of body Ca/P reserves as control pigs, growing slower, did not begin to die until 13 weeks whereas pigs receiving Ca/P continued to grow.

Ca/P were also important contributors to the response to complex mineral supplementation but a response did not become apparent until eight to nine weeks when body reserves of these elements in pigs not receiving Ca/P had been depleted. At this stage the improvement in LW gain with Ca/P was approximately 20 per cent. Pigs receiving Ca/P grew faster than the unsupplemented controls but not as fast as those receiving both salt and Ca/P. The difference between the two supplementary Ca/P levels was small.

Responses to trace mineral supplementation were minor.

White rats have been found to have a similar response to pigs to both complex mineral and salt supplementation of a W/SBM diet. With rats the response to salt was due to sodium and not chlorine while potassium supplementation had no effect on the response to either sodium or chlorine. These results suggest the response of pigs to salt may be due to sodium.

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