

Utilization of industrial lysine to study the effect of delayed supplementation of a diet deficient in this amino acid

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The purpose of this experiment was to examine the variation in the efficiency of an amino acid (lysine) supplementation of a diet, depending on the frequency and chronology of its administration. The study was made on 48 growing-finishing *Large White* pigs (24 castrated males and 24 females), between 20 and 90 kg live weight, divided into 4 groups of 12 animals (6 castrated males and 6 females). The model used for this study was a semi synthetic lysine deficient diet (maize starch, purified crude fiber, maize oil, sesame oil-meal, minerals, vitamins). Three other diets added with increasing doses of L. lysine were prepared from this diet: T: 0.4 p. 100; S: 0.8 p. 100; L: 1.6 p. 100. The animals received according to a restriction schedule depending on live weight, a combination of the different diets in form of pellets (5 mm) offered twice per day. Within an experimental block, the animals were fed equal amounts of feed in order that the quantity of lysine ingested should be the same for a total of 4 meals. The lysine supplement was allotted to the different groups as follows: twice per day (group 1), once per day in the morning (group 2), in the evening (group 3) or once per 48 hours (group 4).

During the growing period, between 20 and 60 kg live weight, the basal diet (group 1) gave a satisfactory growth rate (660 g/day). The alternation in the administration of the lysine supplement led to a non significant growth reduction: 612 g/day (group 2), 651 g/day (group 3). It is to be noted that the animals showed a tendency to react less favourable upon supplementations made in the morning (group 2). Furthermore, administration of the lysine supplement in one meal out of 4 brought about a significant reduction of the growth rate (563 g/day). The differences were generally much more marked in females which were definitely more susceptible to the chronology of the nitrogen supply. Thus, in the latter, there was no significant difference between the animals receiving their supplement once per day, either in the morning (group 2) or in the evening (group 3), but such a difference existed between those receiving only one supplement in the morning (group 2) and those fed the balanced diet (group 1). In addition, the animals receiving their supplement only every two days exhibited poorer performances.

Such differences were not recorded any more during the finishing period. As regards the growing-finishing period, the same trends as during the growing period were found in the growth rate, but differences depending on the administration of the supplement once or twice daily were smaller.

In conclusion, supplementation of a protein source by the limiting amino acid appears to be less efficient when the administration is delayed by at least 10 hours. Reduction of the performances increases with the interval between the ingestion of the meal to be supplemented and that of the supplement. These phenomena observed in our experimental conditions were particularly obvious in females which are more susceptible to the supply of protein.