Comparative utilization of horse-bean and soyabean oil-meal by lactating sows

II. — DIGESTIBILITY AND METABOLIC UTILIZATION OF AMINO ACIDS

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A study was conducted on 10 multiparous sows of the *Large White* breed from day 19 of lactation. The animals were distributed into two groups of 5 and placed in digestibility cages. They received a diet based on barley supplemented with protein either in form of soyabean oil-meal 45 or horse-bean of the variety « Pavane » with addition of DL-methionine (ÉTIENNE *et al.*, 1975).

On account of the mean feeding level at this stage of lactation (5 kg/day), the mean intake of crude protein, lysine and sulphur amino acids were 701.6 g, 32.1 g, 26.3 g respectively per day.

The apparent digestibilities of amino acids in the two diets were evaluated and it appeared that the apparent digestibilities of arginine, histidine, glutamic acid and proline were higher than that of nitrogen; conversely, threonine, lysine, tyrosine and alanine showed lower apparent digestibilities.

Measurement of the blood level of free amino acids, 4 hours after the first meal did not show any important difference between the two groups, confirming the good digestibility and metabolic utilization of the horse-bean diet as compared with the soyabean oil-meal diet (ÉTIENNE *et al.*, 1975).

Estimation of the daily amounts of amino acids available to satisfy maintenance and production expenditures of the animal, except milk production, is discussed. According to this calculation, it appears that the maternal benefit is low or inexistant as regards lysine, which remains the first limiting amino acid of these diets for lactating sows.

Protein supply of piglets weaned at three weeks

I. — EFFECT OF INCORPORATING A SOLUBLE FISH PROTEIN CONCENTRATE (SFPC) INTO THE WEANING DIET ON NITROGEN BALANCES AND ZOOTECHNIC PERFORMANCES

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Two trials were performed on the floor or in balance cages with 84 and 30 piglets, respectively between the age of 3 and 9 weeks, to determine the conditions of skim-milk suppression and utilization of a soluble fish protein concentrate in 21-days-weaning diets. The control diet (group 1)

contained barley associated with skim-milk powder (15 p. 100), Norwegian herring meal (9 p. 100) and soybean oil-meal (15 p. 100). Replacement of the skim-milk by an association of 5.8 p. 100 soluble fish protein concentrate (SFPC 90) and manioc (group 2) did not lead to any change in the zootechnic performances (352 and 314 g/day) and nitrogen retention coefficient (NRC = 61.8 and 58.7 p. 100). Increase of the SFPC 90 level to 15 p. 100 as a replacement of two protein sources in the control diet, skim-milk and herring meal (group 3) or herring meal and soyabean oil-meal (group 4) tended to reduce by 16 to 17 p. 100 the feed intake level and growth performances of the animals kept on the floor. Conversely, when these two diets were offered to piglets kept in cages and receiving equalized quantities of the feeds, the growth performances and nitrogen retention recorded (NRC = 60.4 and 59.4) were the same as those of the controls. At the same level of replacement (15 p. 100), the association of SFPC and Norwegian herring meal led to a supplementary lowering (21 p. 100) of the growth rate on the floor, the nitrogen retention coefficient (NRC = 50.8) being then significantly lower than that of the control diet.

The growth rate and nitrogen retention in the animals kept on the floor were minimum when SFPC 90 constituted the sole protein supplementation of barley. It may be concluded that the results confirm the excellent digestibility of soluble fish protein, but total replacement of the skim-milk seems only to be possible if a sufficient amount of tryptophan is supplied. Thus, soyabean oil-meal can only be used in limited amounts because of its depressive effect on digestibility, but appears to be necessary for the amino acid balance of the diet.

Protein supply of piglets weaned at three weeks

II. — Effect of incorporating a maize protein concentrate on the apparent digestibility of the diet and the nitrogen balance of the piglet

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Utilization conditions of a maize protein concentrate (MPC) in a 3 weeks-weaning diet were determined according to nitrogen balance data of 30 animals from 5 different litters, *i. e.* 5 replications of 6 treatments. On the basis of a control diet based on barley and containing skim-milk (15 p. 100), Norwegian herring meal (9 p. 100) and soyabean oil-meal (15 p. 100), 5 experimental isonitrogenous diets were composed : two diets including 5 and 10 p. 100 of MPC, the protein of which replaced that of the skim-milk (groups 2 and 3) and three diets containing 5, 10 and 15 p. 100 MPC in replacement of herring meal protein. In each replication the piglets received equal amounts of the different diets. The digestive and metabolic balances concerned six consecutive periods of 5-7 days each and located between the ages of 21 and 58 days.

When the MPC replaced skim-milk protein, the apparent digestibility of the diet was not affected, but a linear lowering of the nitrogen retention coefficient (NRC 66.6, 65.1 and 61.6 for the groups 1, 2 and 3) and of the amount of nitrogen retained per day was noted, although the growth rates did not significantly differ from that of the control group.

When the MPC replaced herring protein, the apparent digestibility of the diet significantly