ABSTRACT

The objective of the study was to assess the effects of feeding potato protein concentrate (PPC) and potato fibre preparation (PF) on digestive processes and selected morphological parameters of the gut in young pigs, and of PPC and its antinutrients in broiler chickens.

Two experiments with pigs and two with chickens were performed. In experiment 1, apparent ileal digestibility (AID) of protein and amino acids of PPC as compared with casein, was measured in cannulated castrates of initial body weight 21 kg, and the effect of PF on AID of the PPC and casein combined in proportion 1:1, was determined. In experiment 2, performed on the castrates of initial body weight 15 kg, in a two-factorial arrangement of treatments, the effects of feeding PPC vs casein, supplemented with PF vs cellulose, on growth performance, nitrogen balance, biochemical parameters, weight of the gut and internal organs, viscosity of digesta and morphology of the small intestine, were assayed. In experiment 3, performed on the broiler chickens, the effects of diets containing O, 5, 1O and 15% of PPC, fed from the 1st to 35th day of life, on growth performance, biochemical parameters, weight of the gut and internal organs, and on digesta viscosity, were determined. In experiment 4, five diets containing 10% of PPC of different glycoalkaloids (GA) content (from 863 to 3185 mg/kg) and antitryptic activity (TIA) (from 0.9 to 4.1 mg/g), were fed from the 1st to 23rd day of life. Growth performance, AID of dietary protein, trypsin activity in the pancreas, weight of internal organs and morphology of jejunum and ileum, were assessed.

In piglets AID of PPC protein was 11 percent units lower than that of casein while PF depressed AID of some amino acids only to a small extent. Feeding piglets on diets containing 17.5% of PPC instead of casein and containing 118 mgGA/kg and 0.68 mgTWg diet, did not affect growth performance, induced small depression of protein digestibility and minor increase of the weight of liver, pancreas and ileum. The effects of PPC on the morphology of small intestine were most evident in ileum and depended on type of fibre (interactive effects).

In broilers the increase of dietary PPC content to 10% (corresponding to 68 mgGA and 0.39 mgTWg diet) depressed slightly feed utilization while the increase up to 15% (1 mgGA/kg and 0.60 mgTIA/g) depressed feed intake and body weight gain considerably depression can be ascribed neither to GA, nor, probably, to TIA, since in the next experiment (exp.4) growth performance of chicken was not affected negatively by GA contents than 318 mg/kg diet and by TIA amounting 0.41 mg/g diet. However, even small increase GA and TIA affected negatively morphology of jejunum while it <lid not depress AID protein.

Neither in piglets nor in chicken any apparent toxicological effects of PPC w observed. It seems, however, that the negative impact of PPC antinutrients on the structure small intestine may increase the susceptibility of young animals to infections. The proportion of PPC in chicken diets are limited by the likely amino acid imbalance in relation to ileal amino acid pattern for chicken, comprising deficiency of arginine and excess of leucin proportion to lysine and by its GA content, as it seems that PPC should not contribute than 200 mgGA/kg of the diet.

Key words: potato protein concantrate, potato fibre preparation, solanidine glykoalcaloi trypsin inhibitor, pigs, broiler chickens