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Digestion of allergenic soya protein in the preruminant calf

C Duvaux¹, JW Sissons², HE Pedersen², P Guilloteau¹, R Toullec¹

¹ Laboratoire du Jeune Ruminant, INRA, 65, rue de Saint-Brieuc, 35042 Rennes Cedex, France;

² Pigs Division, AFRC, IGAP, Church Lane, Shinfield, Reading RG2 9AQ, UK

Introduction — Previous studies have shown that preruminant calves given a series of liquid feeds containing high levels of antigenic heated soya flour (AHSF) develop gut disorders in digesta movement and nitrogen absorption which are thought to be due to an allergic reaction to soya protein (Sissons, 1982). The aim of this work was to examine the origin of undigested protein at the distal ileum of calves showing hypersensitive reactions to soya.

Materials and Methods — Four calves were equipped with cannulas in the abomasum and distal ileum. They were fed cows' milk or given, by abomasal infusion, a series of liquid feeds containing protein as casein (CAS) or AHSF. After 4 or more feeds of AHSF (sensitization), a feed containing a non-antigenic soya concentrate (NASC) was given. Total collections of ileal digesta were made for 0 to 3 h and 3 to 21 h after arrival of feed residues as indicated by a phenol red marker in the effluent. Amino acid (AA) composition was determined on diet samples and on digesta collected after a CAS feed, the first AHSF feed (AHSF(1)), an AHSF feed after sensitization (AHSF(S)) and a NASC feed. The proportions of dietary and non-dietary proteins in digesta were estimated using an iterative procedure for minimizing the distance of χ^2 between the observed and the theoretical AA profiles (Guilloteau *et al*, 1986). The AA composition of non-dietary protein (mixture of endo-

genous and bacteria) escaping digestion in the small intestine was taken as reported by Guilloteau *et al* (1986).

Results and Discussion — Feeds of CAS, AHSF(1), AHSF(S) and NASC resulted in mean rates of digesta flow between 0 and 21 h of 36, 70, 119 and 48 g/h respectively. The estimated proportions of dietary protein in digesta protein were 0.58, 0.88, 0.72 and 0.35 between 0 and 3 h and 0.22, 0.70, 0.67 and 0.32 between 3 and 21 h. The distances of χ^2 between theoretical and observed AA profiles were low (4–26) except for CAS 0–3 h (100), NASC 0–3 h (55) and 3–21 h (120). Thus the diet and the undigested dietary protein probably had a very similar AA composition for AHSF but not for CAS or NASC. Also true digestibility of protein was lower for AHSF than for CAS or NASC. Sensitization to AHSF feeds appeared to provoke an increase in endogenous losses resulting from the alteration of the intestinal wall.

Guilloteau P, Toullec R, Grongnet JF, Patureau-Mirand P, Prugnaud J, Sauvant D (1986) *Br J Nutr* 55, 571-592
Sissons JW (1982) *Proc Nutr Soc* 41, 53-61