Ann Zootech (1993) 42, 151

Soya protein antigenicity and small intestinal motility in preruminant calves

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In 2 calf feeding trials using 2 batches of the same heated soya product (AHS1 and AHS2, *in vitro* antigenicity Ag 7-8), Lallès and Toullec (unpublished results) showed that AHS1 had high *in vivo* antigenicity (plasma soya antibody titre Ab 7.8) and low nitrogen digestibility (0.61) while AHS2 had low *in vivo* antigenicity (2.8) and higher nitrogen digestibility (0.71). Since preruminant calves sensitive to soya protein develop digestive disturbances associated with gut motility disorders (Sissons *et al*, 1987), the effect of these 2 products on intestinal motility were studied.

After oral sensitization to soya, 3 calves were sensitive (Ab 5.7) and 3 were not (Ab 1.2). They were fitted with abomasal and distal ileal cannulae and duodenal electrodes. At intervals of 3–7 d they received abomasal infusions of liquid test feeds in which protein was either provided by milk or AHS or non-antigenic soya concentrate (Ag and Ab 0.0; NASC) or milk plus untreated soya flour (Ag 12-13; SBF). Motility and intestinal transit time (TT estimated by the arrival of phenol red at the ileal cannula) were recorded.

Preliminary results (table I) given as percentage of milk values (mean ± SEM: TT, 187 ± 40 min; number of migrating myoelectric complexes per h (MMC/h), 1.02 ± 0.28; duration of first postprandial irregular spike activity (PPISA), 133 ± 30.6 min) showed that TT in insensitive calves was minimally affected by the soya diets. TT in sensitive calves was highly reduced after SBF and AHS1 (often associated with diarrhoea) while TT was reduced to a lesser extent after NASC and AHS2 (no diarrhoea). These observations were supported by the motility results, mainly after SBF and AHS1 (increased MMC/h and reduced PPISA in sensitive calves) and suggest that AHS2 had less effect *in vivo* than AHS1.

In conclusion, giving antigenic soya to sensitive calves led to drastic motility changes. Products with high *in vitro* antigenicity can behave differently *in vivo* and motility and transit measurements may be more effective in discriminating between these products.

Sissons JW, Pedersen HE, Duvaux C, Thurston SM, Starkey S, Wass JAH (1987) *Food Allergy* (Chandra RK, ed). Nutr Res Educ Fdn, St Johns, Newfoundland, 95-108

Table I. Mean (% of milk values) for motility parameters in calves.

Protein source	*Insensitive calves*			*Sensitive calves*		
	MMC/h	*PPISA*	*TT*	*MMC/h*	*PPISA*	*TT*
SBF	92	92	70**	177	16**[ab]	32**
ASH1	126	103	81[a]	194**	39**[ac]	40**
AHS2	58*	145*	93	140**	89[bd]	60*
NASC	79*,**	76*,**	103*[b]	121*	64[cd]	60*
(SEM)	(8.2)	(9.9)	(5.1)	(16.8)	(8.3)	(6.2)

* 1 or 2 values only, ** different from milk values ($P < 0.05$); [a, b, c, d] differences between means within columns ($P < 0.05$).