

Effects of various salts of lignosulphonate on the colon of the rabbit

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THE occurrence of ulcerative lesions in the colon of rabbits fed calcium lignosulphonate in the drinking fluid has previously been reported (Marcus and Watt 1974). Calcium lignosulphonate is widely used as a foodbinder in pellets, cakes, and cubes supplied to animals. There is evidence that in the guinea pig the ulcerative effects on the colon are dependent to some extent on the particular salt of lignosulphonate supplied in the drinking fluid. Thus, ulceration is more severe with the sodium salt than with the calcium salt, and when magnesium lignosulphonate is administered over the same period, there is no ulceration of the colon (Watt and Marcus 1976). We have, therefore, investigated in the rabbit the effects of the sodium, calcium and magnesium salts of lignosulphonate to compare their ulcerogenicity on the colon of this species.

Adult Dutch rabbits of mixed colours (average body-weight 1923 g) were fed a lignosulphonate-free standard cube diet (SGI Nutrients Ltd). They were randomised into four groups of seven animals each. Three groups were given an aqueous solution (40 g/litre) of sodium, calcium and magnesium lignosulphonate respectively as drinking fluid over a period of eight weeks. The lignosulphonate solutions were freshly prepared each day, and the daily fluid intake of each animal was measured. A control group of rabbits received water without added lignosulphonate. The animals were weighed at weekly intervals, and were killed by intravenous pentobarbitone sodium (Nembutal) at the end of the eight weeks feeding experiment. The large bowel was emptied of faeces and carefully examined by transmitted light.

The results are summarised in Table 1. Two animals in the group receiving sodium lignosulphonate died as a result of ulceration of the large bowel on the 24th and 47th days of the experiment. One animal in the group receiving calcium lignosulphonate died on the ninth day of the experiment having bled from ulcers in the caecum and colon. The average weight gain (\pm SE) of the animals in the experimental groups was 129 ± 71 g and in the control group 293 ± 73 g, the difference not significant ($P > 0.2$). An equal incidence of colonic ulceration occurred in the sodium and calcium lignosulphonate-fed animals; ulceration was more severe in the group receiving sodium lignosulphonate. No ulceration of the colon was found in any of the animals which had been fed magnesium lignosulphonate in their drinking fluid, nor in the control group of animals.

From these observations, it would appear that, as in the case of the guinea pig (Marcus and Watt 1974), the rabbit is susceptible to colonic ulceration on feeding the sodium or calcium salts of lignosulphonate in their drinking fluid. In both species, the severity of ulceration is greater when the animals are fed the sodium salt. As in the case of the guinea pig, the rabbit colon is unaffected by the feeding of magnesium lignosulphonate over an eight week experimental period. Although the average daily intake of lignosulphonate was least in the rabbits receiving the magnesium salt, it is unlikely that

TABLE 1: Mean body weight change and colonic ulceration in rabbits fed 4 per cent aqueous solutions of sodium calcium and magnesium lignosulphonate as drinking fluid for eight weeks

Groups fed salts of lignosulphonate (no of animals)	Mean body weight		Mean daily intake of lignosulphonate per animal (g per kg)	Incidence of colonic ulceration
	Initial (g)	Final (g)		
Sodium (7)	1986	2030	2.32	4/7
Calcium (7)	1850	1957	2.16	4/7
Magnesium (7)	1921	2157	2.00	0/7
Control: water only (7)	1936	2229	—	0/7

this dosage difference accounts for the absence of ulceration. This conclusion is supported by the comparable study in guinea pigs in which no colonic ulceration occurred with magnesium lignosulphonate although the average daily intake was greater than in the groups receiving the sodium or calcium salts (Watt and Marcus 1976).

It is unlikely that lignosulphonate as a foodbinder would ever be consumed in such quantities as those in our experiments in which the lignosulphonate was supplied in the drinking fluid. Even so, as a foodbinder in cubes and pellets supplied to guinea pigs or rabbits, it would seem preferable to use magnesium lignosulphonate rather than the sodium or calcium salts.

REFERENCES

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