

## POSSIBLE CONTRIBUTION OF RUMEN FUNGI TO FIBRE DIGESTION IN SHEEP

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Efficient digestion of fibre is an important aspect of ruminant production, as it is the most common dietary component consumed by ruminant species. Anaerobic fungi have been recognized as permanent residents of the rumen and the association of their sporangia with fibrous plant fragments has suggested a role in fibre digestion (Bauchop 1979). Akin et al. (1983) found a positive relationship between the sulphur content of a tropical grass and the size of the population of anaerobic rumen fungi (ARF) during digestion. Gordon et al. (1983) have found that low-sulphur (LS) wheat straw cannot support a normal ARF population, but can with methionine supplementation. To further assess the possible contribution of ARF to fibre digestion, digestibility studies were conducted with sheep.

Six Merino wethers with rumen and abomasal fistulae were fed every 3 h a LS straw diet (1% N; 44% ADF), with (+S) or without (-S) added methionine (4.5 g/day). Measurements were made of digestion in the stomach and intestines using marker techniques and of various parameters relating to microbial activity.

The values of variables relating to digestion during feeding straw with (+S) or without (-S) methionine

Treatment	-S	+S	Treatment	-S	+S
Feed S (%)	0.05	0.21*	Rumen sulphide mg/kg	0.6	1.8*
OM† intake (g/day)	428	455	Bacteria/ml $\times 10^{11}$	1.0	1.1
OM digestibility**	490	570*	Protozoa/ml $\times 10^4$	3.7	4.5*
CP leaving abomasum	103	120*	Anaerobic fungi		
CP digested in intestine**	56	78*	Zoospores/ml $\times 10^3$	1.3	2.2*
ADF† digestibility (%)	58	69*	Sporangia/mm <sup>2</sup> /leaf	12.5	21.5*
ADF digestibility in rumen**	265	308*	Breaking strength	6.4	4.1*
			Newton/leaf		

\* P < 0.05; \*\* g/kg OMI; † OM = organic matter; CP = crude protein and ADF = acid detergent fibre

Per unit of feed consumed, the +S group digested 16% more organic matter, had 17% more crude protein flowing into the intestines and 39% more crude protein digested in the intestines, this data is consistent with those of Lindsay et al. (1983).

The rumen population of the +S group contained 10% more bacteria, 22% more protozoa, 69% more fungal zoospores and had 72% more sporangia on kikuyu leaves incubated in the rumen, with these leaves having a lower breaking strength (-36%) as estimated by procedures outlined by Gordon et al. (1983). The proportionately large increase of ARF population in the +S group was coupled with a 16% increase in fibre digestion, which when combined with their known fibre degrading ability in vitro (Akin et al. 1983) suggest that ARF could be an important contributor to fibre digestion in the rumen.

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