

Effect of dietary free lipid on anaerobic fungi in the rumen of sheep

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Anaerobic fungi (AF) are a minor constituent of the rumen microbiota (1) but they are critical for fibre digestion (2). We have shown that fibre digestion was reduced and AF zoospores were undetectable in the rumen of sheep when their diet contained more than 4% free lipid (3). Here we report measurements of the rumen AF biomass in those sheep.

Six 2-year old Border Leicester x Merino wethers fitted with rumen and abomasal cannulae were given 900 g/d of diets of 75% chopped hay (2 parts wheaten, 1 part lucerne), 10% dry-rolled barley and 15% processed cottonseed kernel, some or all of which was protected with formaldehyde (Rumentek Pty Ltd, Parkside, SA). The diets contained 6.9% lipid of which unprotected (free) lipid contributed, respectively, 5.9, 4.0 and 2.1% in diets UL, ML and PL and were given in equal portions at three hour intervals. Fungal dry matter in rumen digesta and fluid was measured by amplifying fungal DNA from a purified DNA extract using the polymerase chain reaction and comparing it to similarly amplified fungal standards (A.G. Brownlee, unpublished). AF dry matter from pure cultures contained 77.83 mg N/g. True digesta reconstituted mathematically by the double-marker technique (4).

Diet:	UL ¹	ML ¹	PL ¹
Rumen true digesta (kg)	5.66 ± 0.545	4.89 ± 0.394	5.14 ± 0.524
Rumen AF biomass (mg N/kg true digesta)	n.d.	104 ± 21.7	110 ± 25.4
(mg N/g non-ammonia N)	n.d.	39.4 ± 7.51	40.0 ± 9.18

¹mean ± SEM; n.d., not detected

AF DNA could not be detected on diet UL, confirming that there is a threshold level, greater than 4% but less than 6% for free lipid above which rumen AF cannot be maintained (3). The measured AF biomass values are consistent with previous results (1) and confirm the minor contribution of AF to the rumen microbial biomass.

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