

Effects of protozoa on the outflow of long chain fatty acids from the rumen

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The decrease in amino acid outflow from the **rumen** caused by the presence of protozoa has been well documented (Ivan et al. 1991). In contrast, no comparison has been made of the ruminal outflow of long chain fatty acids (LCFA) from animals with or without **rumen** protozoa. Katz and Keeney (1967) reported up to 75% of LCFA in the **rumen** is present in protozoa and, unlike amino acids, it is known that LCFA are not degraded in the **rumen**. Because microbial LCFA may provide an important energy source for the ruminant, a study of the outflow of CFA from the **rumen** of sheep with or without **rumen** protozoa was made.

Seven sheep cannulated in the **rumen** and abomasum were defaunated using alkanate 3 SL3. Three sheep were refaunated with mixed **rumen** fluid and had a mean protozoal population of 7.5×10^5 cells/mL at the time of study. The diet (400 g lucerne chaff, 400 g oat chaff) was provided in equal portions at hourly intervals. The flow of digesta was measured using endogenous plant hentriacontane (C₃₁; 100% recovery through **rumen** assumed) and CrEDTA as markers (Table 1). LCFA content of the diet and digesta was measured by the method of Viviani et al. (1966). Ruminal LCFA production (g/d) was estimated as the difference between LCFA intake and LCFA flow through the abomasum.

The presence of protozoa in the **rumen** did not cause a significant change in the apparent digestibility of dry matter in the **rumen**, the total outflow of lipid from the **rumen** or the synthesis of lipid within the **rumen**. The consistency of ruminal lipid synthesis across treatments indicates that the quantity of lipid synthesised by the microbes, which replace protozoa after defaunation, equals that produced by protozoa in untreated sheep. It is concluded that elimination of **rumen** protozoa is unlikely to affect the total LCFA available to the ruminant.

References

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Table 1 The apparent dry matter digestibility (ADMD) and synthesis and outflow of long chain fatty acids (LCFA) from the **rumen** of sheep with or without **rumen** protozoa (s.d. in parenthesis).

| Parameter (g/d) | Defaunated (n = 4) | Refaunated (n = 3) | Difference (P) |
|-------------------------------|--------------------|--------------------|----------------|
| ADMD (%) | 26.8 (0.44) | 32.1 (0.58) | ns |
| LCFA intake (g/d)* | 4.63 | 4.89 | - |
| LCFA outflow (g/d) | 15.3 (1.59) | 15.6 (1.53) | ns |
| Ruminal LCFA production (g/d) | 10.6 (1.53) | 10.7 (1.53) | ns |

*Fixed intake for all animals.