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EFFECTS OF RUMINAL ADMINISTRATION OF CYCLOPHOSPHAMIDE ON RUMEN ORGANISMS

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Cyclophosphamide (CPA) is potentially useful as an oral administered chemical defleecing agent for sheep (Dolnick et al., 1969). CPA is ineffective until activated by the liver and presents no problem to a monogastric digestive tract. Sheep, however, have a free-living microbiota in the reticulo-rumen. The experiment described was designed to determine the effects of CPA on the population of rumen symbionts.

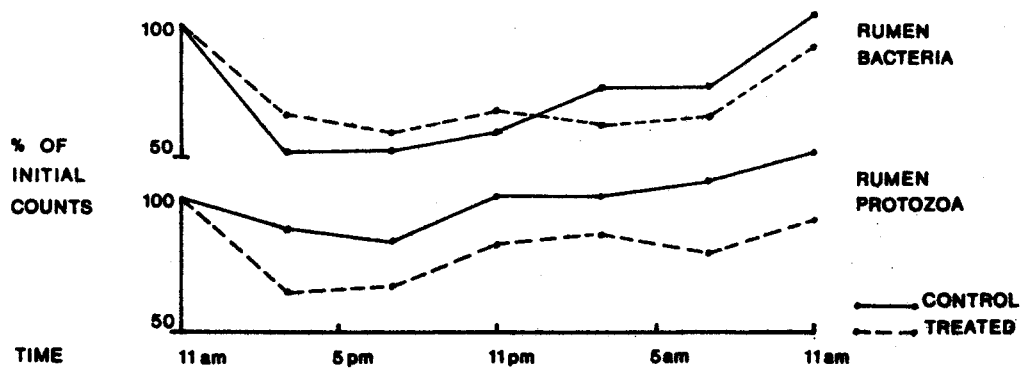
Four rumen-fistulated ewes were fed daily at 1100 h on 800 g of lucerne chaff. Rumen samples were obtained for determination of pH, CPA metabolite levels, protozoal and bacterial numbers. Rumen population counts were expressed as a percentage of the prefeeding numbers. Normal diurnal fluctuations of rumen populations were determined and then the influence of CPA on those rhythms was studied in the first 24 h after drug administration. CPA was given at the rate of 25 mg of CPA/kg body weight through the rumen fistula, a dose sufficient to remove the fleece in 14 days.

Oral administration of CPA did not appear to affect rumen bacterial numbers, but did lower the numbers of protozoa for approximately 3 days before return to normal levels. (Fig. 1).

Peak concentrations of CPA metabolites occurred in the rumen 5 h after dosing; more than an hour later than the peak of urinary excretion of CPA metabolites. This suggests that the CPA metabolites were moving back to the rumen with the saliva. Since the protozoal numbers declined before the peak concentration of CPA metabolites in the rumen, the protozoa may activate CPA in the rumen. Rumen pH was unaffected by the ruminal administered CPA.

In conclusion, ruminal administration of CPA at 25 mg/kg caused only minor changes to rumen flora. Hence CPA could be given by mouth as a defleecing agent without any adverse effects on the microbiota of the sheep's digestive system.

FIG. 1. Diurnal rhythm of rumen bacteria and protozoa numbers in 4 Merino ewes (——— control; ---- treated with 25 mg of CPA/kg by rumen fistula).



Dolnick, E.H., Lindahl, I.L., Terrill, C.E. and Reynolds, P.J. (1969) Nature (Lond.), 221:467.

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