

CHAPTER 5

GENERAL DISCUSSION

5.1 Research findings

The key finding in the present study was that while molasses blocks containing anti-protozoal detergent were effective in administering to sheep the daily dose of Alkanate that has been previously shown to defaunate animals by the drenching method, it was not effective in eliminating protozoa from the rumen of full-fed sheep. The simplest of practical approaches, that of simply supplying animals with detergent in a molasses block, does thus not appear to be effective, at least with the two detergents tested here.

It was found that the period of highest block intake coincided with the period of highest feed intake. Therefore the efficacy of the detergent would be reduced because of dilution effects of saliva and possibly through adsorption of detergent onto the high levels of fresh fibre in the rumen.

Further work on the efficacy of the anti-protozoal-molasses block demonstrated that this method of administration successfully defaunated sheep when the basal diet was withdrawn. Under these circumstances, protozoal numbers fell to zero in treated animals within 4 days. This result suggests that the efficacy of the anti-protozoal activity of detergent is influenced by the level of feed intake, presence of

fibre and nutrients in the rumen. In addition to variations in rumen dietary fibre, restricted roughage intake results in less salivation and possibly a reduction in rumen volume, therefore increasing the effective concentration of detergent in the rumen fluid. Feed restriction may also reduce rumen motility which in turn will reduce the outflow of rumen contents, consequently the detergent will remain in the rumen for a longer time. Feed restriction will limit the availability of nutrients for protozoa and thus reduce their rate of reproduction and possibly increase their susceptibility to detergent, resulting in a reduction in protozoal numbers (Figure 3.13). In order to clarify this situation, *in vitro* studies were carried out to determine the factors influencing the efficacy of Alkanate 3 SL₃ as an anti-protozoal agent.

Results from the *in vitro* studies demonstrated that the age of the Alkanate detergent (6 years versus fresh) did not affect anti-protozoal performance. However, the efficacy of the Alkanate detergent was reduced significantly when fibre was added to the rumen fluid incubations. This reduction in effectiveness was probably due to the adsorption of the active molecules onto fibre (Wright and Curtis, 1976) which would effectively reduce the concentration of active molecules in the liquid phase. A large proportion of protozoal population live in the fluid phase (Van Soest, 1994).

5.2. Future research

Although the results from these studies indicate that molasses blocks containing antiprotozoal detergents did not control protozoal populations in the rumen, other known antiprotozoal agents should be tested before this method of administration is

abandoned. It is possible that the efficacy of other antiprotozoal agents may be less affected by the level of fibre in the rumen. Clearly the control of rumen protozoa with anti-protozoal molasses blocks has the potential for increasing ruminant production, particularly under conditions where the N-content of pasture or diet frequently limits animal production (Bird, 1982). Hence, the improvement of effectiveness of this anti-protozoal molasses block and the availability of a cheap, safe and effective anti-protozoal agent is now a major research priority.

In addition to *Enterolobium Cyclocarpum* leaves (Leng *et al.*, 1992; Bahaudin *et al.*, 1992; SetyaNingrat, 1994) a natural source of anti-protozoal agent has also been found in *Sapindus rarac* seeds (Thalib *et al.*, 1994). These sources are readily available, particularly in the tropics (Allen and Allen, 1981), and further study of their efficacy when offered to ruminants in molasses blocks is now required.

Two future research areas which require experimentation are :

- a. Studies on the efficacy of molasses blocks containing natural anti-protozoal agents such as products of *Enterolobium Sp.* or *Sapindus Sp.*
- b. Studies on the efficacy of natural anti-protozoal agents when administered to ruminants as a feed supplement (by feeding in a supplement).

If successful, the first method would have widespread application for increasing production in grazing animals, particularly under tropical condition. For this method to be workable, it is essential that studies of their efficacy be conducted, and in particular the extent to which those natural anti-protozoal agents bind onto feed

particles needs to be determined. Moreover, the relevant questions which need to be examined are as follow.

- a) Will a molasses block containing natural anti-protozoal agent set sufficiently hard to ensure that sheep can achieve a suitable intake of natural antiprotozoal agent over a prolonged period ?
- b) Will sheep consume a molasses block containing natural anti-protozoal agent?
- c) Will the consumption of natural anti-protozoal agent contained in molasses block defaunate the rumen ?
- d) Will the consumption of a molasses block containing natural anti-protozoal agent have any adverse effects on the animal?

The second type of study suggested could lead to means of administering anti-protozoal agents in cut-and-carry and other "intensive" systems.

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