

## Bacterial fermentation of lichen and ruminal responses to starvation in Norwegian reindeer.

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*Abstract:* Lichens, one of the most important types of plant eaten by reindeer in winter, contain different polysaccharides compared to those of vascular plants. We investigated the ruminal bacterial population which is responsible for lichen fermentation and also microbial response to starvation. Ruminal VFA concentrations, pH, dry matter content, rumen volume and fluid passage time were further examined in four

ad lib. fed and starved rumen fistulated reindeer. The bacterial population per ml rumen fluid was  $33.98 \pm 9.98 \times 10^8$  when the animals were fed lichen. Rods and cocci occurred in the same proportion. The bacterial flora decreased by 99.7 % to  $0.1 \pm 0.08 \times 10^8$  per ml rumen fluid, after 96 hours starvation. Rods dominated in the bacterial population of starved animals.

## Adherent bacteria in the small intestine of reindeer

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*Summary:* The mammalian small intestine normally contains a diverse microflora. The lactic acid bacteria which adhere to the intestinal epithelium are thought to protect it against pathogenic bacteria. However, the role of bacteria in the small intestine of reindeer is not known. We investigated the microflora in the intestines of 5 reindeer fed lichens and in one reindeer in which diarrhoea had been induced artificially by feeding concentrates. Samples of epithelium were collected at three different sites and the pH and abundance and species composition of viable bacteria at these sites was measured. Bacterial populations, expressed as the mean num-

ber of bacteria per gram wet weight of epithelium, varied considerably between animals fed lichens as follows (range of means  $\pm$  SD): duodenum,  $0.09 \pm 0.02 \times 10^4$  to  $33.30 \pm 5.30 \times 10^4$ ; jejunum,  $0.13 \pm 0.01 \times 10^4$  to  $1.00 \pm 0.81 \times 10^4$ ; ileum,  $0.23 \pm 0.05 \times 10^4$  to  $2.53 \pm 1.00 \times 10^4$ . Cocci occurred more frequently than rods at all three sites in all five animals. Bacteria were more abundant in the reindeer with diarrhoea: duodenum,  $64.90 \pm 10.40 \times 10^4$ ; jejunum,  $13.50 \pm 1.60 \times 10^4$ ; ileum,  $42.90 \pm 5.70 \times 10^4$ . Most bacteria in this animal were rod shaped.