

THE EFFECT OF LEVEL OF INTAKE AND METHOD OF PREPARATION
ON VOLUME AND FLOW THROUGH THE RUMINANT STOMACH

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The effects of level of intake and method of preparation of roughages were used to study the role of rumen volumes and rates of flow of digesta through the stomach in the process of digestion in ruminants.

A 50:50 mixture of lucerne hay and oaten straw was chaffed (C) or milled and pelleted (P). The two rations were fed to eight Merino wethers at 900 (H) or 540 (L) g/d in equal portions at intervals of 2 h. The sheep were fitted with ruminal, omasal and duodenal cannulae. They were infused intraruminally with PEG to estimate rumen volumes and fluid flow rates through the reticulorumen, omasum and abomasum. Flow rates of dry matter were derived from the dry matter concentrations of digesta samples from the three sites.

The apparent digestibility of dry matter was not affected by either level of intake or method of preparation. Rumen volumes were similarly unaffected. The flow rate of fluid through the rumen was depressed by milling (H 15%, L 23%; $P < .01$) but increased by increased level of feed (C 43%, P 58%; $P < .01$). The dry matter content was affected only by the form of preparation, being increased by milling (H 28%, L 18%; $P < .01$) so that similar levels of dry matter flowed from the rumen for the chaffed and pelleted diets at either level of feeding. Increased level of intake markedly increased the flow of dry matter (C 44%, P 76%; $P < .01$).

In the omasum fluid flow was greater at the higher level of intake (C 58%, P 47%; $P < .01$) but depressed by milling (H 26%, L 21%; $P < .01$). These effects were co-dependent ($P < .05$). Dry matter content was again increased by milling (H 28%, L 30%; $P < .01$) so that flows of dry matter were also similar at either level of feeding. Differences due to level of intake were again large (C 65%, P 55%; $P < .01$).

The fluid flow from the abomasum was increased by increased intake (C 63%, P 45%; $P < .01$) and depressed by milling (H 23%, L 14%; $P < .01$) and dependent upon both factors ($P < .01$). Dry matter content was increased by milling (H 27%, L 12%; $P < .01$) but flows of dry matter were again similar at either level of feeding. Differences due to the level of intake were of the same magnitude as those in the rumen and omasum (C 95%, P 68%; $P < .01$).

The results suggest that the animals were able to adapt to an increase in dry matter intake by increasing the flow rate of dry matter through the stomach without alteration in rumen volume. This apparently occurred without a change in the extent of digestion since apparent digestibility was not depressed significantly. The flow of dry matter was unaffected by milling at either level of intake despite a depression in fluid flow, possibly as a result of a decreased flow of saliva or reduced activity of the reticulum, since fluid intakes were not affected. The results support the conclusion of Cloete (1966) that the quantity of dry matter rather than any other factor governs the rate of flow through the different compartments of the digestive tracts of ruminants.

REFERENCE

CLOETE, J.G. (1966). S. African Journal of agricultural Science, 9: 379.

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