

DORSO-VENTRAL STRATIFICATION IN THE BOVINE RUMEN

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There is limited and conflicting information on the extent of dorso-ventral differences in some common rumen measurements e.g. pH, volatile fatty acids (VFA) (see Gall, Stark and Loosli 1947; Balch et al. 1955; Smith et al. 1956; Fulghum et al. 1959).

Four rumen-fistulated cattle were used in a 4x4 Latin square design experiment with 33 day periods. Oaten hay (0.8% N), with or without a continuous intra-ruminal infusion of 160g urea daily, was offered ad libitum in either the long form or milled through a 7.6mm screen on a commercial hammermill. Dry matter percentage, VFA, ammonia-N and bacterial concentrations and pH, were determined in samples of dorsal, mid and ventral rumen contents (15, 35 and 60 cm from the cannula) on 2 consecutive days at the end of each period, prior to feeding (To) and at 3, 6, 9 and 12 hours after feeding.

TABLE 1 Intra-ruminal values for pH, VFA, DM and bacterial concentrations

Rumen site	pH	VFA (mmole%)	Bact.conc (nos.x10 ⁹ /ml)	Dry matter(%)		
				To	T6	T12
Dorsal	6.69a	8.64a	28.3a	11.6b	12.4bc	12.9c
Mid	6.67a	8.41a	24.2b	9.6a	9.5a	9.8a
Ventral	6.68a	8.09b	22.9b	9.2a	9.0a	9.2a
Values with different scripts are significantly different P<0.05						

There were no site differences in pH. Total VFA and bacterial concentrations were higher in dorsal, compared with ventral rumen contents. There were no significant interactions for any of these measurements between sampling time, rumen site or dietary treatment. Dry matter percentage was higher in dorsal, compared with ventral contents, and increased after feeding (Table 1). Ammonia-N levels without urea averaged 1.64mg/100ml and were similar at all sites. When urea was given with milled hay, rumen ammonia-N levels were significantly higher (20.7mg/100ml) than for milled hay alone (P<0.05) and there were no site differences. When urea was given with long hay, the rumen ammonia-N level was significantly higher (P<0.05) at the dorsal site (24.8mg/100ml) compared with the ventral site (14.4mg/100ml).

The results demonstrate that composite samples of bovine rumen contents should be used if average values are required for most common rumen measurements.

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