

VARIATION IN BONE PHOSPHORUS CONTENT OF THE TWELFTH RIB OF SHEEP

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Bone biopsy is a technique used to determine the phosphorus (P) status of grazing animals (Little and McMeniman 1973). Information is required on the variation in bone P content between opposite ribs and within a rib before this technique can be applied for serial sampling in animals.

The medial section of the left twelfth rib was removed by biopsy from each of 22 adult wethers (mean live weight 47 kg, range 37-55 kg). Six of the wethers (zero group) were concurrently sampled on the right side. The remaining sixteen wethers were divided into 4 groups and fed for 6 months isonitrogenous, isocaloric diets containing low quantities of P (diet P-L) with or without added supplements of NaH_2PO_4 (P-MSOP), meat and bone meal (P-MBM) or bran (P-ORG). The P-L diet, by NRC (1972) standards, satisfied the maintenance requirements of a 60 kg wether for N and energy but not P. The diets supplied 1.59, 3.40, 3.58 and 3.88 gP/d respectively. After this period the right twelfth rib was biopsied from the ventral, medial and dorsal sections (respectively 1-5, 5-10 and > 10 cm dorsal to the costro-chondral junction).

TABLE 1: Phosphorus content (g/kg fresh bone weight) of the twelfth left and right ribs (medial section).

	Zero group	P-L	P-MSOP	P-MBM	P-ORG
Left Rib	104.1*	102.9	105.3	107.7	104.9
Right Rib	103.9	102.6	107.4	102.3	102.4

TABLE 2: Variation in bone P content of the twelfth right rib.

	P g/kg fresh bone weight			P g/kg dry fat-free bone weight		
	Dorsal	Medial	Ventral	Dorsal	Medial	Ventral
P-L	102.6 ^{ab}	102.6 ^{ab}	98.1 ^b	133.2	128.4	129.4
P-MSOP	107.8 ^a	107.4 ^a	99.5 ^b	131.4	132.4	130.6
P-MBM	106.9 ^a	103.4 ^{ab}	97.6 ^b	129.9	127.4	127.6
P-ORG	105.6 ^a	102.4 ^a	100.0 ^a	126.7	125.0	126.7
Mean	107.2	103.9 ^a	98.8 ^b	130.3	128.3	128.6

*different superscripts within rows denote significance (P < 0.05)

The results show that either the left or right rib may be used for serial sampling, that NRC recommendations for the P requirement for adult wethers are conservative, and that the sheep had adequate bone P at the start of the trial because supplementation did not affect bone composition. Variation in P content of the fresh bone showed that in serial bone sampling care must be taken to sample the same section of rib (Little and Minson 1977) and that P content of fresh bone was a more sensitive index of the animals P status than was P content of dry fat-free rib (Little 1972; Little and McMeniman 1973).

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