

PROTECTION OF PROTEIN FROM RUMEN FERMENTATION BY BENTONITE

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Bentonite, a clay of the montmorillonite group,** is used in many commercial compounded feeds for ruminants. The "beneficial" effects of bentonite are variously attributed to its buffering capacity in the rumen of animals fed high grain based diets, to its binding of ammonia and protein and their subsequent slow release in the rumen, and other unknown causes.

Having established the wool growth assay for protein digested and absorbed from the small intestine (see Leng *et al.* this symposium), the opportunity arose to test indirectly the ability of bentonite to protect protein from rumen fermentation.

The responses in wool growth of sheep to supplements of casein or casein plus bentonite or HCHO-casein are shown in the Table.

TABLE Wool growth in sheep (groups of 6) given a basal diet of 700 g oaten chaff plus 3% minerals and 1% urea supplemented with protein and bentonite. The protein meal and bentonite were mixed before feeding to the sheep

Supplement	Wool growth (g/patch/3 weeks)	
	Expt. 1	Expt. 2
0	1.47 ± 0.13	1.30 ± 0.14
60 g casein	1.39 ± 0.12	1.55 ± 0.19
60 g casein + 28 g bentonite	1.63 ± 0.17	1.88 ± 0.18
60 g HCHO-casein	2.20 ± 0.28	2.08 ± 0.13

The results indicate a significant ($p < 0.05$) increase in wool growth when bentonite was fed together with casein. In the two experiments the bentonite apparently increased wool growth by 26 and 52% of the group fed formaldehyde treated casein. If the formaldehyde treatment affected 100% protection of the protein in the sheep in the two experiments, then bentonite apparently allowed 15.6 and 31.2 g of protein respectively, to be digested and absorbed. However, another explanation for the results, such as the possibility that bentonite effects microbial growth in the rumen requires further research.

The important practical application of the results is that bentonite is beneficial in compounded feeds and the protection it affords may allow a reduction in concentration of proteins in such diets and an increased use of urea to replace the soluble protein.

In grazing situations where green pasture protein is highly soluble, bentonite in the diet may have marked beneficial effects particularly on wool growth but further research is needed in this area.

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**Sodium bentonite (Cudgen R.Z. Pty. Ltd., Brisbane).