

PORTAL UPTAKE OF AMINO ACIDS BY SHEEP GIVEN OATEN CHAFF
SUPPLEMENTED WITH RUMEN ESCAPE PROTEIN.

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Portal uptake of amino acids (AA) indicates the net input of free AA from intestinal protein digestion. In steers given diets with proteins of differing rumen degradability, Huntington (1987) reported no significant difference in portal AA uptake. This result appears contrary to present understanding of the mechanisms by which supplementary protein affect animal performance. To further test this observation, we supplemented a roughage diet with a high quality dietary escape protein.

Catheters were inserted into the portal vein (PV) and femoral artery (A) (Katz and Bergman 1969) and a blood flow probe (Transonic Systems Inc., New York) placed around the portal vein in 5 Merino wethers. Each sheep was given, continuously, a basal diet of 900g oaten chaff plus 12g urea/d (Control) or the basal diet plus 60 g/d formaldehyde(HCHO)-treated casein. Measurements of portal AA uptake (PV-A x blood flow) were made on at least 2 days per sheep per diet. Hourly blood samples were taken for 7 h, bulked for AA analysis and blood flow measured continuously. Intake and excretion of N was measured over 5d concomitant with blood sampling periods. Treatment means are presented (\pm s.e.). All data except the ratio of essential AA (EAA) to total AA are g/d.

	Control	HCHO-casein
N intake	10.3	17.9
Faecal N	4.2 (0.26)	4.1 (0.21)
Urinary N	5.0 (0.33)	10.1 (0.50)
Total portal AA-N	5.5 (2.56)	6.2 (2.08)
Portal EAA-N	2.0 (0.90)	4.1 (1.13)
EAA/Total	0.344 (0.020)	0.518 (0.071)

Supplementation with HCHO-casein did not produce a significant increase in total portal AA uptake. The supplement was resistant to ruminal degradation (<10% degraded in 20h, Neutze et al. 1990a), and was digestible in the intestines as seen by unaltered faecal N and increased urinary N excretion ($P < 0.001$). The increased ($P < 0.05$) ratio of EAA/total AA entering the portal system is consistent with the relative ratios for HCHO-casein (0.564, S.A. Neutze, unpublished) and rumen bacteria (0.432, Neutze et al. 1990b) from wethers eating the control diet. However, recoveries, in the portal system, of absorbed total AA and EAA were estimated as 10 and 54% respectively. This indicates a disproportionately high uptake of EAA relative to non-EAA into portal blood. We cannot presently explain the disparity between intestinal digestion and portal appearance of AA.

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