

INCORPORATION OF ^{35}S INTO RUMEN MICROBIAL PROTEIN

K.J. GUNN and N.P. McMENIMAN

Radioactive markers are commonly used in rumen nutrition studies to estimate the proportion of microbial protein in abomasal digesta. The ratio of the specific activity of the marker in the microbial protein isolated from abomasal liquid to that in the whole digesta is accepted as reflecting the proportion of microbial protein in the total protein in abomasal digesta. An assumption implicit in this technique is that microbes isolated from abomasal liquid are labelled to the same extent as all of the microbes in the abomasal digesta. As a proportion of the microbes are contained within undigested plant particles it is possible that this portion of the microbial population is not labelled to the same extent as that isolated from abomasal liquid. If this were the case then microbial marker techniques would underestimate microbial protein flow through the abomasum. This experiment measured the extent of incorporation of ^{35}S into the cyst(e)ine of microbial protein isolated from abomasal liquid and from the lumen of undigested plant particles in abomasal digesta.

Three wethers with rumen and abomasal T piece cannulae were fed sorghum stubble, oaten chaff and lucerne chaff in a 3x3 latin square designed experiment. The sorghum stubble and the oaten chaff contained supplementary urea and sodium sulphate sufficient to provide rumen nitrogen and sulphur requirements. After 10 days on each diet 3.7 MBq ^{35}S was infused into the rumen of each sheep on six occasions each eight hours apart. Abomasal digesta samples were then obtained from each sheep and bulked for each animal. Free microbes were isolated by accepted methods (Hume 1974). Bound microbes were obtained by firstly washing free microbes off the abomasal particulate matter with normal saline and separating the particulate matter by centrifugation at 1150g. This procedure was repeated four times. The washed particles of undigested food were then suspended in normal saline and placed in an ultrasonic bath for 10 minutes. The microbes dislodged from the food particles by ultrasound were separated by ultracentrifugation. The cyst(e)ine and ^{35}S content of the samples were determined by the method of Elliott and Armstrong (1982).

Neither period during which diets were fed nor sheep influenced the results. There was no difference between the specific activities of the cyst(e)ine in the free and bound microbes (means \pm SE: 66638 and 70222 \pm 7284 cpm/ μg cyst(e)ine respectively). Diet had no effect except that when lucerne was fed the specific activities of the bound microbes were significantly lower than when sheep were fed oaten chaff and sorghum stubble.

These results show that both free and bound microbes incorporate similar proportions of ^{35}S from the rumen H_2S pool thus verifying one of the assumptions inherent in this method of estimating the proportion of microbial protein in the proteins in abomasal digesta.

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Dept. Farm Animal Medicine and Production, University of Queensland, St. Lucia, Qld, 4067