Ann Zootech (1995) 44, Suppl, 219

Study of nitrogen digestion from different hays by the mobile nylon bag technique in horses

D Macheboeuf [1], M Marangi [2], C Poncet [1], W Martin-Rosset [1,3]

[1]*INRA, Station de recherches sur la nutrition des herbivores, Theix, 63122 St-Genès-Champanelle, France ;* [2]*Universita di Milano, Faculta di medecina veterinaria, Instituto di alimentazione animale, I 20133 Milano, Italy ;* [3]*Corresponding author*

The *in sacco* nitrogen digestibility of 7 hays of different qualities was measured by the mobile nylon bag technique (MNBT) in fistulated horses in the precæcal part and the total digestive tract. The comparison between *in sacco* result and *in vivo* digestibility measured by the conventional technique (total fæces collection), of the same hays was used to validate MNBT.

Four adult horses fitted with a cæcum cannula were used. They were fed at maintenance and received in 2 equal meals (8:00, 16:30) a ration composed of 30 % barley given first and 70 % hay. Thirty cylindrical nylon bags (∅ 1 cm, length 6 cm, porosity 48 µm) containing 200 mg of ground hay (3 mm mesh) were introduced into stomach of each animal through a naso-œsophagal probe during the morning feed after the concentrate, at each measuring period. These were organised into 2 successive 4 x 4 latin squares (2 x 4 hays including 1 control).

About 15 bags were recovered on arrival in the cæcum 2 h to 6 h after introduction (mean retention time, MRT = 4.2 h ± 0.6). The other bags were recovered in fæces between 18 and 60 h after introduction (MRT = 38.8 h ± 2.7). After washing, the bags were dried (48 h at 60°C), weighed, and their contents pooled by animal, collection site and hay. Nitrogen content (micro-Kjeldahl), NDF and nitrogen in NDF (N-NDF) were assayed in these bag residues and for the same hays in fæces collected during *in vivo* digestibility studies. The *in sacco* digestibility was calculated for precæcal part and total digestive tract. In precæcal part, it affords an estimate of the true digestibility of feed in the stomach and small intestine. In total digestive tract, the N true digestibility of feed was calculated for the 2 methods *in vivo* and *in sacco* after assuming that only dietary N reaching the fæces was N-NDF (Glade, 1984, JAS, 58(3), 638-645).

In the total tract, digestibilities of dry matter (not reported) and nitrogen, and estimated true digestibility measured by MNBT correlated significantly with the corresponding *in vivo* parameters (R^2 = 0.99, 0.77, 0.75 respectively). As expected, the *in sacco* digestibility of N was higher by 15 to 20 points than its *in vivo* digestibility. In contrast, the true digestibilities were similar.

In the precæcal part, the *in sacco* N digestibility was high (63.5 ± 2.6 %), and varied little among hays. It decreased from 67 to 61 % when the N-NDF/N ratio increased. The proportion of feed N digested before the cæcum varied respectively from 103 to 76 % and from 90 to 69 % when expressed in total % digestible N or in % of truly digestible N.

In conclusion, the MNBT results are consistent with the results obtained with the conventional method on the total tract of the horse. Then it would afford an evaluation of the precæcal digestibility of nitrogen in feed.

Hay		1	2	3	4	5	6	7
Composition								
N (% DM)		0.76	1.03	1.50	1.55	1.56	2.46	2.63
N-ndf / N (%)		40.7	50.1	50.3	59.1	50.3	53.1	62.3
total tract								
N digestibility (%)	MNBT	65.2	61.7	68.5	68.2	75.4	83.9	79.8
	in vivo	46.6	42.0	54.5	60.1	56.7	64.7	64.6
N True digestibility (%)	MNBT	74.9	79.6	79.6	82.1	83.6	91.3	88.4
	in vivo	79.4	76.5	81.2	86.2	83.7	89.6	88.4
Precæcal N digestion (NMBT)								
% N intake		67.3	62.4	62.3	60.7	65.6	65.4	60.9
% digestible N intake		103.2	101.2	90.9	89.0	87.0	78.0	76.3
% truly digestible N intake		89.9	78.5	78.2	73.9	78.5	71.7	68.9