

Effect of feeding level, physiological state and breed on the rate of passage of particulate matter through the gastrointestinal tract of the horse

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Three heavy-breed dry mares and 3 light horses, both fed at maintenance and *ad libitum*, and 3 heavy-breed mares fed *ad libitum* in late pregnancy (9th – 10th month) and in early lactation (1st and 2nd month) were fed twice a day a diet of 85 % hay (33 % CF, 8 % CP in DM) and 15 % concentrate.

Following a single dose of Cr-mordanted hay mixed to one third of the morning meal, faeces were collected at increasing intervals from 6 h to 96 h. Mean retention time (MRT) in the entire gastro-intestinal tract was calculated as $\sum Mi ti$, where ti is the time elapsed between dosing and the i th defaecation and Mi is the marker excreted in the i th defaecation as a fraction of the total amount of marker excreted. None of the treatments significantly affected the transit time (TT) which is the time elapsed between the dose and the first appearance of the marker in the faeces. If this delay is ascribed to the retention time of the marker in the stomach and the tubular part of the intestine, variations in MRT are related to rate of passage through the cecum and the ventral and dorsal colons.

Feeding level had no significant effect on MRT, although lower values were observed at the *ad libitum* compared to the maintenance level in dry mares. Pregnant and lactating mares had the lowest MRT, but the only significant difference ($P < 0.05$) was between dry mares at maintenance and pregnant ones. MRT was significantly lower ($P < 0.05$) in the light horses than in the dry heavy mares, whatever the feeding level. These variations in the passage rate of particles explain variations in diet digestibility measured in the same experiment (Martin-Rosset *et al*, 1990). Marker excretion pattern in the faeces was the same for all treatments and could be described by a model consisting of 2 exponential components and a time delay.

Martin-Rosset W, Doreau M, Boulot S, Miraglia N (1990) *Livest Prod Sci* 25 (1), 257-264

Table 1. The passage of Cr-mordanted hay through the gastrointestinal tract of the horse as affected by breed, level of feeding and physiological state.

| Breeds | Types | N | Feeding level | Retention time (h) | |
|--------------|-------------|---|-------------------------|--------------------|--------------------|
| | | | (FL) | TT | MRT |
| Light horses | Geldings | 3 | Maintenance (1.1) | 12.0 | 25.2 ^a |
| | Geldings | 3 | <i>Ad libitum</i> (1.5) | 12.8 | 25.9 ^a |
| Heavy horses | Dry mares | 3 | Maintenance (1.2) | 12.3 | 36.5 ^b |
| | Dry mares | 2 | <i>Ad libitum</i> (1.7) | 11.0 | 31.5 ^b |
| | Pregnant M | 3 | <i>Ad libitum</i> (1.7) | 13.0 | 20.9 ^a |
| | Lactating M | 3 | <i>Ad libitum</i> (2.5) | 12.2 | 22.2 ^{ab} |

FL : Feeding level is stated at 32 g DOM/kgLW^{0.75} for maintenance.