Retention time of small feed particles and of water in the gut of dairy goats fed at different levels of intake

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The effect of feed intake on the mean retention time (MRT), in the entire gastrointestinal tract, and the rumen retention time (RRT) of water (Li-CoEDTA) and of small feed particles (Cr-labelled milled oat hulls) was studied in dairy goats. A total of six goats of the Swedish Landrace breed were used with a mean live weight of 48 kg. The goats were fed a diet composed of 400 g dry matter (DM) · kg⁻¹ DM of chopped grass hay and 600 g DM · kg⁻¹ DM of a concentrate mixture. They were fed three times a day. Feed intake was ad lib. in collection periods I and II, while in collection periods III and IV feed intake was reduced to a lower level. The experiment started at the beginning of lactation (week 6) and the subsequent collections were made in lactation weeks 11, 20 and 22, respectively.

A pulse dose of Cr-labelled oat hulls (30 g) and Li-CoEDTA (3.0 g) suspended in 250 ml of water was given orally to each animal. Faeces were collected every 4th or 8th h from 12 h up to 104 h after labelling MRT and RRT were calculated from the decline in marker concentration in the faeces.

Feed intake ranged from 19.6 g DM · kg⁻¹ live weight (LW) to 45.2 g DM · kg⁻¹ LW (48 g OM per kg LW⁰.⁷⁵ to 109 g OM per LW⁰.⁷⁵). On average only minor differences were found between the MRT of water (Co) and small feed particles (Cr) and also between the RRT of water and small feed particles. The mean and standard deviation (SD) was 30.6 (5.2), 28.8 (5.9), 13.2 (2.3) and 14.3 (2.8) h for MRT₆⁰, MRT₉⁰, RRT₆⁰ and RRT₉⁰ respectively.

MRT and RRT of water and of small feed particles were all linearly (P < 0.001) related to feed intake (g DM · kg⁻¹ LW).

Rumen outflow rate of small feed particles (Cr) was linearly (P < 0.001) related to rumen outflow rate of water (Co).

Key words: Retention time, level of intake, goat.