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43. Comparison of grazing systems in their effects on ruminal pH fluctuation, chewing activity and milk yield in cows (Vergleich von Weidesystemen hinsichtlich ihrer Wirkung auf ruminale pH Schwankungen, die Kauaktivität und die Milchleistung bei Kühen). Frigga Dohme*, C.M. Graf and M. Kreuzer - Posieux/Zürich

Full-time and even part-time grazing of dairy cows during the summer feeding periods reduces feeding costs and promotes animal welfare in regions dominated by grassland. However, forage-based diets may not supply sufficient physical structure when provided highly digestible in a very young stage of vegetation. We hypothesised that rapid fermentation of carbohydrates in young grass, together with reduced chewing times, could result in decreased saliva secretion and rumen fluid pH with the risk of occasionally or permanently low values. The objectives of the experiment was to compare the influence of full-time grazing (A) versus part-time grazing of dairy cows supplemented either with hay (B) or maize silage (C) on ruminal pH fluctuation, chewing activity and milk yield.

Methods: Six multiparous rumen-fistulated Brown Swiss cows (average milk yield: 29.2 ± 2.4 kg/d; average live weight: 561 ± 23 kg) were subjected to a replicated 3×3 Latin square arrangement. The amount of hay (treatment B) and maize silage (C) supplemented was 5.5 kg DM/d being offered during the night in the cowshed. The three experimental periods lasted 28 d each, consisting of 21 d of adaptation and 7 d of collection of feed and faeces samples. Herbage intake was quantified by the double alkane technique using controlled-release capsules (1). Throughout the collection periods live weight and milk yield were recorded at each milking and aliquot milk samples were drawn. In order to determine periods of eating and ruminating, the chewing activity was recorded continuously for 22 h on average three days using the device of Rutter et al. (2). Rumen pH was measured continuously over 24 h except during milking using a pH electrode placed in the rumen through the fistula and a corresponding data recording unit integrated in the cover of the fistula. The resulting data were summarised separately for daytime and night for each cow as mean, maximum, minimum pH and time period when pH was below 5.8.

Results: The different grazing systems had no significant influence on live weight (\bar{x} 561 kg) as well as milk yield (\bar{x} 18.3 kg), fat (\bar{x} 3.7%), protein (\bar{x} 3.1%) and lactose (\bar{x} 4.7%) content. Daily total DM intake did not significantly differ between treatments with the numerically highest value in group C (15.2 kg) followed by groups B (13.1 kg) and A (12.8 kg). No differences were observed for time spent ruminating (362 min/d) and for rumination time per kg DM intake (28 min). Cows in treatment A spent more time for eating (\bar{x} +121 min (29%)) per day and per kg DM intake (\bar{x} +11 min (34%)) compared to the other groups ($P < 0.05$). No differences occurred among treatments for maximum pH (day: 6.85; night: 6.66) and minimum pH (day: 5.86; night: 5.41). Regardless of treatment group, the mean pH was 6.14 during the night and the time period when pH was below 5.8 was 130 min. By contrast, throughout the day cows in treatment B had a significant lower pH (-0.24) compared to treatment A and the time period when pH was below 5.8 was longer (77 instead of 11 min) compared to treatment C ($P < 0.05$ for each variable).

Conclusions: Full-time grazing had no negative effect on milk yield, ruminal pH evolution and rumination time compared to part-time grazing with supplementation of hay or maize silage. The hay supplied at night and supposed to be rich in physical structure had no noticeable efficiency in stabilising rumen fluid pH at night and even led to suppressed average pH values during the day.

- 1) BERRY, N.R., SCHEEDER, M.R.L., SUTTER, F., KRÖBER, T.F. and KREUZER, M., (2000): Ann. Zootech. 49: 3-13.
- 2) RUTTER, S.M., CHAMPION, R.A. and PENNING, P.D., (1997): Appl. Anim. Behav. Sci. 54: 185-195.

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