

Estimation of individual intake of grazing dairy cows with RumiWatch®

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Knowledge of individual intake of dairy cows on pasture is required, for estimating nutrient consumption and adapting forage and concentrate supplementation to meet nutrient requirements of cows. Measuring individual intake on pasture precisely is time-consuming and expensive. A less time-consuming opportunity may be, estimating herbage intake of dairy cows by behavioural characteristics. RumiWatch®, a system based on a pressure sensor and a triaxial accelerometer, allows automatic detection and evaluation of individual feeding behaviour characteristics of cattle. The aim of this study was to determine the mean eating chew size of grazing dairy cows by marker-based intake estimations with n-alkanes. In addition, behaviour-based intake estimations were validated against marker-based intake estimations from an independent dataset. Therefore, 18 lactating Holstein cows were kept on pasture during 18 hours per day; 12 of them were supplemented in the barn with maize silage or maize silage and a protein supplement. All cows were equipped with the RumiWatch® halter over three 7-d periods; simultaneously intake of each cow was estimated by mean of a dosed n-alkane. In order to calculate the eating chew size, marker based intake estimations of nine cows were divided by the number of eating chews, individually recorded by the RumiWatch® system. To validate the estimations by previously calculated eating chew size and recorded eating chews, behaviour- and marker-based intake estimations of the remaining nine cows were compared. In total 27 7-d files were collected for the validation but, due to technical problems, only 18 out of these could be used. The mean absolute error for intake estimation of grazing dairy cows, with no supplementation in the barn was 8.0% (SD 0.7); 9.0% (SD 0.6) when cows were supplemented with maize silage and 6.7% (SD 0.3) when maize silage and a protein supplement were additionally fed. Results indicate the possibility to estimate the intake of dairy cows on pasture using intake behaviour characteristics, but the accuracy depends especially on the animal individual rate of mastication bites while grazing. To increase accuracy of intake estimations for grazing dairy cows, further research should focus on differentiation of mastication and prehension bites during grazing.

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