

DCAB of feed and NSBA in urine of suckler cows during the grazing period

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Introduction

Dietary Anion-Cation Balance (DCAB) in grazing systems under German condition show a tendency to decrease from May until September and often are measured DCAB lower than 100 meq per kg dry matter. Lower DCAB in grass feeding system can change the metabolic status of suckler cows and often are results in acidotic metabolism. Measurement of acid-base excretion in dairy cows has been proved to a method to evaluate the acid-base status (LACHMANN and SEFFNER, 1979; FÜRLL, 2016). The hypothesis was that metabolic imbalances could be identified by urine measurement in suckler cows.

Material and Methods

The farm study was conducted during the grazing seasons 2017 and 2018 and involved 7 suckler cow farms in Germany. Suckler cows grazing during the whole time of the investigation and had no access to other feeding components. Cows had free access to water, salt block and free access to minerals (loose). The dry matter of the grass was determine at 60 °C and was than analysed for energy and nutrient content as well as the Dietary Cation-Anion Balance (DCAB). Urine was collected in 50 ml-glasses and analysed for net acid-base excretion (NSBA) and the concentration of creatinine as well as urea in the laboratory (LKS, 2006). Statistical analysis took place with ANOVA with fixed effects of farms (1-7), month (May until September) and number of lactations (1, 2 and ≥ 3 lactations) using SPSS Version 25.0. An alpha of 0.05 was used for all statistical tests.

Results

During the grazing periods of the years 2017 and 2018 were observed an average DCAB in the grass of 167 meq per kg DM. A very high variability could be determined from - 42 meq to + 439 meq per kg DM. In both years the highest and significant values of DCAB in the grass was observed in May (figure 1) and decrease to the end of the grazing period. Reference values in relation to DCAB were described between 150 meq and 400 meq per kg DM (APPER-BOSSARD et al., 2006; CHAN et al., 2005; STAUFENBIEL et al., 2007). It was found the high chlorine content with reduce potassium level led to this reduce in DCAB at the end of the grazing period.

Between the DCAB of the grass and the NSBA in urine of suckler cows was a correlation according to PEARSON of $r = 0.478$ ($p \leq 0.001$) or after SPEARMAN of $r = 0.601$ ($p \leq 0.001$) observed (figure 2). GELFERT et al. (2004) found comparable results in dairy cows ($r = 0.620$; $p < 0.001$). For the control of urine values of grazing suckler cows, the wide spread of the values poses a challenge of the interpretation, especially the DCAB is unknown.

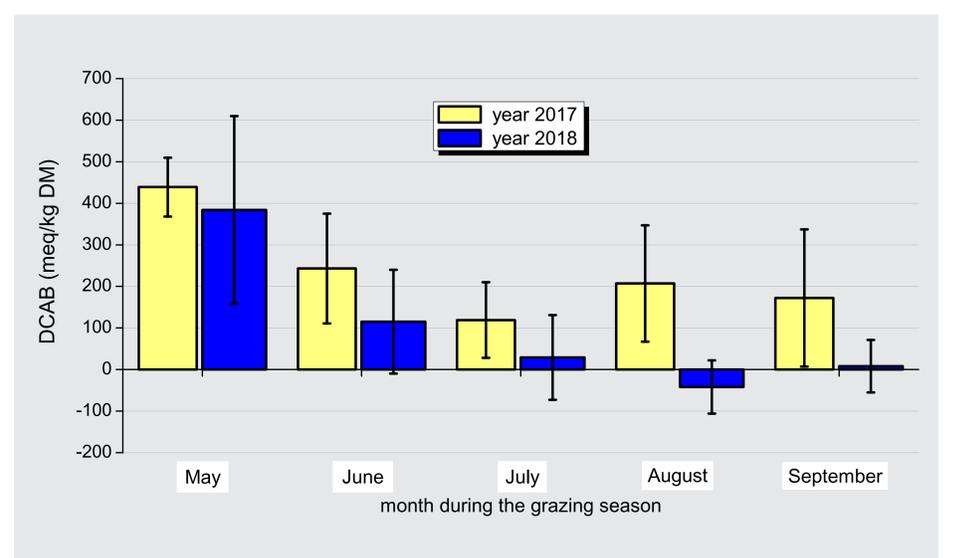


Figure 1: DCAB of grass during the grazing season in the year 2017 and 2018

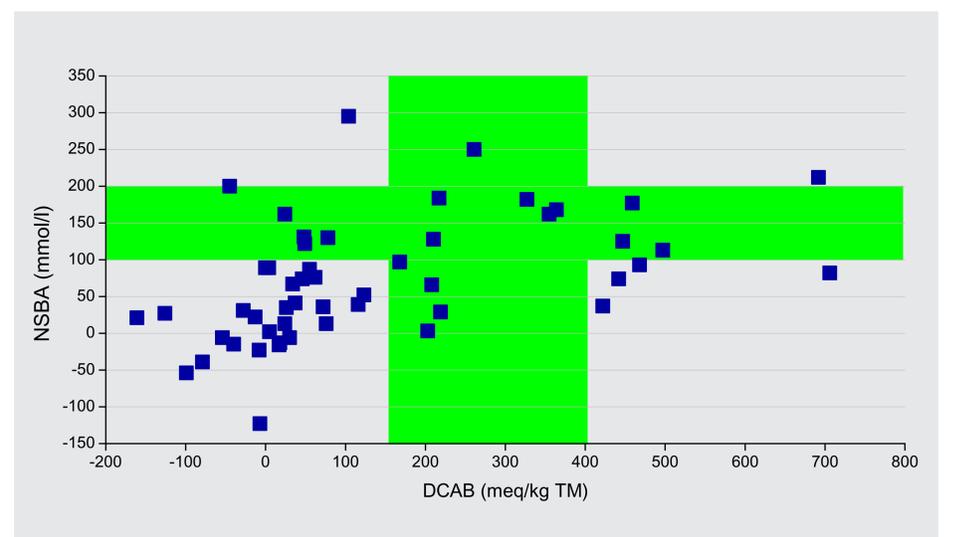


Figure 2: DCAB in feed (grass) and net acid-base excretion (NSBA) in urine in suckler cows during the grazing seasons 2017 and 2018

The influence of several feeding components such as chlorine, sulfur, potassium and sodium (ions for the DCAB) and dry matter feed intake during the grazing period of suckler cows should be taken into account in further research.

Conclusions

The results obtained show that up a decrease in the DCAB is related to a decrease in NSBA in urine of suckler cows. Monitoring of metabolic disturbances should include analysis of urine, blood, milk and ruminal fluid.