

Ruminal function influenced by diet parameters in dairy herds with milk fat drop syndrome in Belgium

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Milk fat drop syndrome (MFDS) is usually attributed to herds with acidosis risks or maize based diet associated to ruminal flora shift. The MFDS is also present in grass-based diets with fibers content reaching largely international standards. The objective of this study is to compare ruminal function with diet quality.

233 Holstein cows, between 50 and 200 DIM, from 38 dairy herds with MFDS diagnosed on bulk tank milk fat, were analyzed. On each cow, health scores and rumen juice were collected. On each rumen sample, pH (pH-meter), redox evaluation (methylen-blue) and protozoa observation were assessed. Individual diet components were recorded as well as milk parameters from milk recording or robot. Means \pm SD, Odds Ratio (OR) and correlations were statistically determined using Minitab 2017.

Mean ruminal pH was 6.5 ± 0.5 with 4.7 % of cows had ruminal acidosis and 21.0 % alkalosis. 14 % of the cows had a slowed down ruminal flora and 11 % had a hyperactive flora. The average milk yield was 31 ± 7.4 kg/cow at 118 ± 75 DIM. Neutral digested fibers (NDF) content was 395 ± 35.6 g/kg DM and starch 178 ± 44.5 g/kg DM). There was no correlation between pH and milk fat content. There was significant linear correlation between ruminal pH and cellulose ($r=0.36$, $P<0.001$). The other significant correlations were quadratic ($P<0.001$). This model explains the variation of the ruminal pH including NDF, sugars, proteins, and bypass starch. The risk of a slowed down ruminal function was significantly increased when CB was above 19% (OR 2.9; $P=0.02$) and more when the diet contained less than 5% of sugar (OR 3.5; $P=0.02$). The risk of rumen alkalosis was increased when the ruminal function was slowed down (OR 1.8; $P=0.03$) and when the by-pass starch was above 1.2 kg per day (OR 6.2).

Links between nutrition and MFDS are complex. Single measurement of the ruminal pH could not provide enough information to diagnose and to treat ruminal dysfunctions. Providing information regarding the management of the herd, diet, health scores and ruminal activity are needed to manage MFDS.