

# STUDY OF INFLAMMATORY MARKERS IN DAIRY COWS EXPOSED TO GRAIN-RICH DIET

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Grain-rich diets are commonly fed to cows in modern dairy herds, exposing cows to the risk of development of Subclinical Acidosis (SARA). This research aims to explore the effects of SARA on inflammatory status of animals. For this purpose, 3 groups of 8 multiparous cows each, enrolled around 60 DIM, were housed in the experimental tie stall barn of the University and fed an acidogenic diet for 4 weeks. This diet had a forage:concentrate ratio of 25:75, while the pre-challenge diet had a F:C ratio of 45:55. During this period, individual dry matter and water intake and rumen pH were recorded continuously and blood was sampled 8 times: the first time before the beginning of the trial (day 0), 4 times in the 1<sup>st</sup> week to evaluate the acute response (day 1,2,3 and 7) and then at day 14, 21 and 28. On each sample complete hematologic and biochemical profile was determined, together with IFN-  $\gamma$ , IL-1 $\beta$  and IL-6.

Data were statistically analysed with a mixed model with time point, group and interactions as fixed effects and animal as random effect. Significant effects were then compared between time points with a T-student test.

As expected, rumen pH was reduced with the high concentrate diet: time with pH below 5.8 and 5.5 was significantly higher compared to the pre-challenge period (305 vs 290 min/d <5.8 and 53 vs 34 min/d <5.5).

Blood analysis revealed an acute phase response of the organism following the acidogenic diet. In particular, IL-6 increased significantly after 7 days of challenge (+473 pg/ml, P<.05) as well as serum amiloid A and ceruloplasmin that, compared to T0 reached their maximum after 2 and 3 weeks respectively (+125.15  $\mu$ g/ml and +0.62  $\mu$ mol/L, P<.05). Accordingly, albumin decreased constantly after the intake of the experimental diet getting the minimum after 4 weeks of trial indicating a status of chronic inflammation (-1.69 g/l, P<.01).

Reactive Oxygen Metabolites (ROMs) increased after 7 days of acidotic diet and remained high until the end of the trial, with a peak after 3 weeks (+3.53mg H<sub>2</sub>O<sub>2</sub>/100 ml, P<.01). Ferric Reducing Ability of Plasma (FRAP) begins to decrease after 2 weeks of trial and reached the minimum after 21 days (-18.44  $\mu$ mol/L., P <.01), confirming together with ROMs levels, the presence of oxidative stress in these animals.

These results show that an excessive content of concentrates in the diet can trigger an inflammatory response that could have important consequences on the health of high producing or fresh animals.