

## EVALUATION OF ACUTE PHASE PROTEINS AS POTENTIAL INDICATORS OF SOCIAL STRESS IN DAIRY CATTLE

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### Introduction

It is generally thought that multiparous cows are dominant over primiparous cows and this may result in social stress due to competition for limited resources such as water, feed, or resting areas. Acute phase proteins (APP) have been proposed as potential indicators of stress, and thus, they might potentially be used to assess social stress in dairy cattle. The aim of this study was to assess the value of APP to quantify social stress in primiparous cows.

### Materials and Methods

A total of 60 primiparous cows were randomly distributed into two groups: a group of 45 primiparous cows with no multiparous cows (PM) and a group composed by 15 primiparous cows and 30 multiparous cows (MIX). The ratio animal/feeding place was 1.6 in both groups, thus not all animals could eat at the same time. The two groups were kept on the same dairy farm, received the same ration, and were subjected to the same management conditions. Cows were blood-sampled 30 min after the morning feeding to determine serum amyloid A (SAA) and haptoglobin concentrations. On the same day, a milk sample was collected from each primiparous cow during milking to determine milk amyloid A concentrations. Amyloid A in serum and milk was analyzed using ELISA, and serum haptoglobin was determined by the hemoglobin-binding method using a random analyzer. Data were analyzed using an analysis of variance with days in milk (DIM), treatment (MIX or PM), and the interaction between these two fixed effects.

### Results

Primiparous cows in the MIX treatment gave priority to multiparous cows to access the feed bunk, as the median time of day at which they accessed the feed bunk was delayed ( $P < 0.001$ ) about 30 min with respect multiparous cows. This suggests that primiparous cows in the MIX group experienced a social pressure from their multiparous mates. Preliminary results show that serum haptoglobin decreased ( $P < 0.01$ ) with DIM and tended ( $P = 0.09$ ) to be lower in PM than in MIX cows during the first quartile of lactation (1.23 vs 0.24  $\mu\text{g/ml}$ ). Serum amyloid A concentrations were not affected by treatment nor by DIM. Milk amyloid A concentrations followed the same trend as SAA. In fact, these two measurements were positively correlated although the correlation was not strong ( $r^2 = 0.34$ ,  $P < 0.001$ ).

### Conclusions

These preliminary results indicate that haptoglobin might be a useful indicator of social stress. However, if serum haptoglobin concentration is to be used to assess stress in dairy cattle, it would be necessary to establish different thresholds according to DIM, as serum haptoglobin concentrations are also affected by the physiological state of the animal.