

Assessing the effects of forage: Concentrate ratio on the rumen indicators and lactational performances of dairy goats

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Firstly, I wish to express my sincere gratitude for the assistance Short-Term Scientific Mission (STSM), who have promoted the collaboration and learning between young scientists in different institutions.

To our knowledge, the continuous data acquisition by telemetry allows the dynamic measuring of responses and helps to define the correlation between management and environmental variables (Eigenberg et al., 2008; Rutten et al., 2013). Baumgard and Rhoads (2013) state that, different physiological, lactational, and nutritional responses to heat stress have been reported in the ruminants dairy cows. Moreover, Hamzaoui et al. (2013) and Salama et al. (2014) observed this in dairy goats and non-lactating dairy goats (Castro-Costa, 2015). However, there is a lack of evidence about the changes in the rumen pH and temperature due to individual variation in the sensitivity of animals towards acidosis. Therefore, the objective of this study was to evaluate the use of wireless sensors to assess the ruminal variations produced by diets with high concentrate ratios in comparison to, direct measures done by using cannulated animals. The term "acidosis" commonly refers to ruminal acidosis that is determined by various rules, such as the duration in which the pH of the rumen content is below a certain threshold (i.e., 6.0).

During the scientific mission, we studied the simultaneous ingestion of food and water, and the kinetics of ruminal pH, as well as, the evolution of fermentation parameters concerning the rumen and the physiological consequences at the level of plasma parameters, and the composition fatty acids of milk fat.

Since the latest agreement of the MoSAR groups' new schedule, the experimental design was adapted accordingly. The trial was conducted by using eight cannulated dairy Sannen and Alpina goats at early lactation. The animals were equipped with eight wireless rumen sensors to monitor the rumen temperature and their pH (Kahne Limited, Auckland, New Zealand). All goats were assigned to the same dietary treatments consisting of:

- Low concentrate diet: 20% concentrate and 80% forage
- High concentrate diet: 40% concentrate and 60% forage

After the seven-day adaptation period in individual cages with a control of the amount ingested to get about 10 to 15% of refusals, the eight goats were placed into boxes and equipped with a set of scales to continuously measure their food intake and water for more than a period of two weeks to measure the basic plan (i.e. low concentrate), and the abrupt transition to a diet rich in concentration, followed four-week acidogenic diet. Each goat had weekly blood and rumen samples taken before the distribution of the morning food ration (i.e. every, one; two; four and six hours) through the rumen cannulas and measurements using the rumen sensors (at 20 min interval), throughout the six-week experiment. Weekly abrupt transition samples that were taken daily. A sampling of the ration and refusal goat (sample 24 hours after the distribution of the evening ration) was done weekly to measure the sort. Water intake, this will be available ad-libitum.

Preliminary results and benefits

The proposed plan aimed was covered both the scientific and appropriate objectives practically. It must be pointed out that, the direct measurement of rumen pH and temperatures is not possible at the UAB laboratory as they do not host fistulated animals. Therefore, this stage intended to find the key to determining how to manipulate cannulated goats to interface of the conventional methodology with of the new biosensor technology. Together with, acquiring new concepts, software, and ways to implement new and efficient task management. Not to mention, providing a multidisciplinary integration and 'multilingüe' between people different field worldwide and researchers with more expertise.

The stage ended in the middle of May 2015, so the preliminary results shown until now, that the response of goats to diet varies between animals. That might explain why only some animals in a herd were sensitive to an acidogenic diet. Furthermore, a discussion between the two groups of researchers is needed to explain the differences in the goats' aptitude with respect to, modifying their feeding behavior in agreement with the diet. As a result of supplementing the existing data of the milking and milk composition, blood, ambient temperature, and so on. However, I request more time is required to carry out further investigation at the *AgroParisTech Institute* in order to work closely with all the data collected and have access to the software available.

The discussion based on the group of scientists of excellence at the *INRA-MoSAR* unit in Paris and at the *G2R* in Barcelona will be used to compose a academic paper that will be presented to the scientific community.

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