



Variability of rumen acidosis and intake behavior of dairy goats submitted to a dietary acidogenic challenge

Andreia Castro-Costa, Gerardo Caja, Alexandra Eymard, Ophelie Dhumez,
Joseph-Alexandre Tessier, Sylvie Giger-Reverdin

► To cite this version:

Andreia Castro-Costa, Gerardo Caja, Alexandra Eymard, Ophelie Dhumez, Joseph-Alexandre Tessier, et al.. Variability of rumen acidosis and intake behavior of dairy goats submitted to a dietary acidogenic challenge. ADSA-ASAS Joint Annual Meeting, Jun 2017, Pittsburgh, United States. 2017. hal-01840974

HAL Id: hal-01840974

<https://hal.science/hal-01840974>

Submitted on 2 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

ranged from 0.2 to 1.0. Including the degree of maturity as predictor of NP_G and NE_G canceled out the differences across sexes in Saanen goats.

Key Words: mature weight, nutritional requirements, sex

342 Effects of dietary nitrogen sources and nisin on nutrient digestibility, rumen fermentation, nitrogen utilization, plasma metabolites, and growth performance in growing lambs. J. Shen^{*1,2}, Y. Chen¹, W. Zhu¹, and Z. Yu², ¹Nanjing Agricultural University, Nanjing, Jiangsu, China, ²The Ohio State University, Columbus, OH.

This study was conducted to investigate the effects of dietary N sources and nisin on nutrient digestibility, rumen fermentation, N utilization, growth performance, and plasma metabolites in growing lambs. Thirty-two male Hu lambs (23.1 ± 1.66 kg initial BW) were assigned to 4 dietary treatments in a randomized block design with a 2 × 2 factorial arrangement. Two N sources, soybean meal (SBM) and distillers dried grains with solubles (DDGS), and 2 levels of nisin, 0 and 30.5 mg of nisin/kg of diet, were used to formulate 4 diets. Growth performance of lambs fed with different N sources diet responded differently with time. From wk 1 to 4, DDGS resulted in lower DMI and ADG than SBM ($P < 0.05$), but G:F was not affected ($P > 0.05$). In contrast, from wk 5 to 8, DDGS did not affect DMI or ADG ($P > 0.05$) but resulted in a higher G:F than SBM ($P < 0.05$). In wk 4, the SBM-fed lambs had a trend to increase BW relative to those fed DDGS ($P = 0.07$), while the final BW did not differ between SBM and DDGS ($P > 0.05$). Ruminal acetate, butyrate, and BCVFA concentrations were greater ($P < 0.05$) and total VFAs concentrations tended to be greater ($P = 0.08$) for the SBM-fed lambs than for the DDGS-fed lambs. The SBM-fed lambs had higher ruminal ammonia-N, BUN, and urinary N excretion than those consuming DDGS ($P < 0.05$), while N retention was similar between SBM and DDGS ($P > 0.05$). Compared with the DDGS-fed lambs, SBM-consuming lambs had higher DM, OM, and CP but lower ADF digestibility ($P < 0.05$). Nisin supplementation did not affect growth performance, rumen fermentation, nutrient digestibility, plasma metabolites, or N utilization ($P > 0.05$). It was concluded that DDGS can substitute SBM to grow Hu without adverse effects on animal performance and to reduce production cost, but nisin supplementation probably has little no benefits.

Key Words: nitrogen source, nisin, growing lamb

343 Effects of algae supplementation on milk performance and rumen fermentation in lactating Xinong Saanen dairy goats. P. Wang^{*1}, Y. Xue², X. Zhang¹, A. Koontz², and J. Luo¹, ¹Alltech-NWAFU Animal Science Research Alliance, College of Animal Science and Technology, Northwest A&F University, Yangling, Shaanxi, China, ²Alltech China, Beijing, China.

The objective was to evaluate the effects of algae supplementation on milk performance and rumen fermentation in lactating dairy goats. Eight multiparous Xinong Saanen dairy goats in late lactation (3.9 ± 0.4 Parities; 208.5 ± 2.7 DIM; 61.5 ± 6.2 kg BW) were individually penned and randomly assigned to a replicated 4 × 4 Latin square design with 4 periods of 18 d. Four levels of algae power (Alltech International, Inc.) were supplemented in the basic ration: 0, 10, 20 and 40 g/d per goat. Algae powder was mixed with a small portion of concentrate and provided for goats before each feeding. Then left concentrate was given to goats followed by corn silage and alfalfa hay which was ad libitum. Goats were fed and manually milked twice daily in the pens before each feeding. DM intake (DMI) and milk performance were measured for 4 d following a washout period of 14 d in 18 d-period. Rumen fluid

was collected for measuring pH value, NH₃-N concentration and VFAs profile at the last day of each period. Data were run by MIXED linear procedure and treatment means were compared by LSD test ($P < 0.05$). No significant dietary × time interaction effects was shown on DMI and milk performance. Goats fed 40 g/d algae produced 29.5% more milk than goats fed with 0 g/d algae, although milk yield was not affected by algae supplementation. Neither DMI nor milk components were changed by diets. In addition, no apparent milk fat depression was observed in goats with algae supplementation. Although pH value, NH₃-N concentration and total VFAs (TVFAs) in rumen were not influenced, changes of VFAs profile were provoked by algae supplementation. Lower molar proportion of acetate and higher of propionate were induced by algae ($P < 0.05$), decreasing the ratio of acetate to propionate ($P < 0.05$). In conclusion, goats with 40 g/d algae showed the potential to produce more milk than those with 0/d g algae, while not provoking milk fat depression. Considering VFAs profile was changed by algae supplementation, further analysis for the rumen microbial process and milk fatty acids profile should be measured.

Key Words: Saanen goats, algae supplementation, rumen VFA

344 Variability of rumen acidosis and intake behavior of dairy goats submitted to a dietary acidogenic challenge. A. Castro-Costa¹, G. Caja^{*1}, A. Eymard², O. Dhumez², J. Tessier², and S. Giger-Reverdin², ¹University Autònoma of Barcelona, Bellaterra, Barcelona, Spain, ²INRA, AgroParisTech, University of Paris-Saclay, Paris, France.

Eight rumen cannulated dairy goats in early lactation (3.7 ± 0.2 kg/d) from the INRA-AgroParisTech experimental farm (Thiverval-Grignon, FR), were provided with wireless bolus sensors (KB1001 Kahne, Auckland, NZ) of pH and temperature to study the relationship between intake and subclinical acidosis for 35 d. After adapting to a TMR control diet (CO, 20% concentrate) for 12 d, goats were brusquely changed to an acidogenic diet (AC, 50% concentrate) for 23 d. Diets were fed ad libitum twice daily (a.m. 1/3, p.m. 2/3) according to milking intervals. Rumen pH and temperature data were captured every 15 min and intake measured every 2 min by weighing scales. Rumen samples were collected (h 0, 1, 2, 4 and 6 post feeding) to measure pH by pH-meter before (d 8 and 11) and after (d 13, 14, 15, 16, 20, 26 and 34) the change. One sensor failed and was discarded, the rest of data being modeled by logistic regression with Solver of Microsoft Excel. Data were analyzed by MIXED for repeated measurements and GLM procedures of SAS. Values of pH-meter vs. sensors correlated ($r^2 = 0.86$; $P < 0.01$) and were used for sensor recalibration. Mean rumen pH varied markedly by hour and diet; on average, it was higher in CO vs. AC (6.34 ± 0.06 vs. 6.10 ± 0.03; $P < 0.001$). Despite the high concentrate percentage of AC diet, rumen pH was shortly under pH 6.0. Feed intake reached plateaus during the day when pH was closer to the a.m. or p.m. nadirs, and correlated negatively ($r^2 = 0.77$ to 0.87; $P < 0.01$) during the periods in which pH dropped. Correlations between rumen temperature and pH were very poor ($r^2 < 0.1$), except for the nightly resting period ($r^2 = 0.93$; $P < 0.001$), the rumen being slightly colder in AC goats (CO vs. AC, 39.73 ± 0.09 vs. 39.61 ± 0.09°C; $P < 0.001$). Temperature and pH data from sensors fit logistic models ($r^2 = 0.97$ to 0.99; $P < 0.001$). Pattern of pH logistic models and time spent under pH 6.0, allowed us to classify the goats as sensitive (3/7, 43%) or tolerant (4/7, 57%) to acidosis, which was related to individual feeding behavior. In conclusion, daily intake measurement and wireless sensors proved to be useful for monitoring rumen function, which allow for an individual separation of sensitive and tolerant goats to rumen acidosis.

Key Words: rumen sensor, SARA, goat