

**278 Differences in digestive kinetics and methane production among rhizoma peanut (*Arachis glabrata* Benth.) cultivars.** A. B. Norris<sup>1</sup>, W. L. Crossland<sup>1</sup>, J. L. Foster<sup>2</sup>, J. P. Muir<sup>3</sup>, and L. O. Tedeschi<sup>1</sup>, <sup>1</sup>Texas A&M University, College Station, <sup>2</sup>Texas A&M AgriLife Research, Beeville, <sup>3</sup>Texas A&M AgriLife Research, Stephenville.

Our objective was to determine if fermentation dynamics of 8 rhizoma peanut (RP; *Arachis glabrata* Benth.) cultivars differed among themselves and alfalfa (*Medicago sativa* L.). Rhizoma peanut is a hardy subtropical legume of nutritive value comparable to alfalfa but produces polyphenol oxidase (PPO), which may potentially result in a protein sparing due to antimicrobial properties. Although alfalfa and RP demonstrate similar nutritive profiles, prior research indicates that decreased ruminal protein degradation rates of RP may improve N use efficiency relative to non-PPO producing forages. Polyphenol oxidase enzymes from RP and red clover (*Trifolium pretense* L.) decrease proteolysis during ensiling and within the rumen, decrease plant-facilitated lipolysis, reduce PUFA biohydrogenation, and lower CH<sub>4</sub> emissions. There is a large variation in nutritive value and PPO production among RP cultivars, signifying the need to screen. In our preliminary analysis, RP cultivars Arblick, Florigrade, UF Peace, Latitude 34, Arbrook, Ecoturf, UF Tito, and variety not specified (VNS) were hand collected late in the 2016 growing season from the Texas A&M AgriLife Research Center at Beeville, TX. Using an in vitro gas production technique, we determined 48-h fermentation dynamics of each RP cultivar and alfalfa. Measurements of CH<sub>4</sub> via gas chromatography, pH and redox potential, and digested residue were analyzed. Kinetic analysis of cumulative 48-h gas production was performed using GasFit. All cultivar kinetics fit the exponential model with discrete lag times. There were no differences ( $P > 0.05$ ) among RP cultivars for total gas production, fermentation rate, lag time, total CH<sub>4</sub> grams per liter, or CH<sub>4</sub> grams per liter per gram of NDF digested. There were no differences between RP cultivars and alfalfa for total gas production, lag time, or total CH<sub>4</sub> (g/L). However, fractional rate of fermentation was slower for alfalfa vs. UF Peace (9.44 vs. 19.76%/h;  $P = 0.03$ ) but not different from other cultivars (12.94, 17.62, 17.79, 14.62, 11.69, 17.89, and 16.53%/h for Arblick, Florigrade, Latitude 34, Arbrook, Ecoturf, VNS, and UF Tito, respectively) and marginal mean differences could not be determined using Tukey's honest significant difference. Further analyses of neutral detergent insoluble N and PPO are required to determine the impact of PPO on N metabolism. Based on these in vitro findings, RP may serve as a viable forage substitute, nutritionally and environmentally.

**Key Words:** fermentation dynamics, methane, perennial peanut

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**279 Can potassium chloride mitigate nitrous oxide emissions from grassland soil?** A. S. Cardoso<sup>1</sup>, B. G. Quintana<sup>1</sup>, E. R. Januszkiewicz<sup>1</sup>, L. F. Brito<sup>1</sup>, E. S. Morgado<sup>2</sup>, R. A. Reis<sup>1</sup>, and A. C. Ruggieri<sup>1</sup>, <sup>1</sup>São Paulo State University, Jaboticabal, Brazil, <sup>2</sup>Universidade Federal de Uberlândia, Uberlândia, Brazil.

Nitrous oxide (N<sub>2</sub>O) is the third most important greenhouse gas, with a global warming potential 300 times more than carbon dioxide. The main sources of N<sub>2</sub>O in grassland soils are nitrogen fertilizers application and animal excretion. The objective of this research was to test the hypothesis that KCl can inhibit N<sub>2</sub>O emissions from soil. The experimental design was completely randomized with 5 treatments and 4 replicates. The treatments were 4 concentrations of KCl diluted in cattle urine (0.0, 5.0, 10.0, and 20.0 g/L). The N<sub>2</sub>O emissions from a tropical Ferralsol were evaluated in an incubation under controlled conditions. The N<sub>2</sub>O emissions were evaluated using a static closed chamber and the gas concentration was determined by gas chromatography. Nitrous oxide emissions were integrated over time to calculate the cumulative emissions and the amount of N lost as N<sub>2</sub>O and then the ANOVA was performed. To analyze the effect of KCl concentrations on N<sub>2</sub>O emission, a polynomial orthogonal contrast was tested. The percent of applied N emitted as N<sub>2</sub>O was 3.22 (±1.21), 4.44 (±0.65), 3.03 (±0.42), and 1.17 (±0.23) for the KCl concentrations of 0.0, 5.0, 10.0, and 20.0 g/L of urine, respectively. The KCl addition to the soil affected N<sub>2</sub>O emissions ( $P < 0.01$ ). The effect of KCl concentration was curvilinear ( $P < 0.01$ ,  $R^2 = 0.87$ ). A possible mechanism that explains the reduction of N<sub>2</sub>O production when KCl concentration increases is that higher KCl concentration may inhibit the nitrification. The increase in the K<sup>+</sup> ions probably negatively affects the nitrification. The KCl addition to a grassland soil diminishes N<sub>2</sub>O emissions and possibly can be used to mitigate N<sub>2</sub>O production.

**Key Words:** climate change, nitrous oxide, tropical soil  
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**280 Isolation and identification of lactic acid bacteria that colonize tropical whole-plant corn silage during the fermentation process.** L. Silva<sup>1</sup>, O. G. Pereira<sup>1</sup>, T. C. Silva<sup>1</sup>, J. P. Roseira<sup>1</sup>, M. C. N. Agarussi<sup>1</sup>, V. P. Silva<sup>1</sup>, R. A. Paula<sup>1</sup>, R. M. Martins<sup>1</sup>, and T. F. Bernardes<sup>2</sup>, <sup>1</sup>Federal University of Vicosa, Vicosa, Brazil, <sup>2</sup>Federal University of Lavras, Lavras, Brazil.

The goals of the present study were to isolate and identify the lactic acid bacteria (LAB) that colonize tropical whole-plant corn silage during the fermentation process. The experiments were conducted and crops were grown at the Department of Animal Science of the Federal University of Vicosa, Minas Gerais, Brazil. Corn (*Zea mays*) plants were harvested when

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