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Mathematics and Science.Animal Science.01

ArthurGoetsch, TerryGipson, RyszardPuchala

Langston University

Effects of Lespedeza Condensed Tannins Alone or With Monensin, Soybean oil, and Coconut oil on Feed Intake, Growth, Digestion, Ruminal Methane Emission, and Heat Energy by Yearling Alpine Doelings

The primary objective was to determine if greater effects of forage condensed tannins on ruminal emission of the greenhouse gas methane could be achieved by simultaneous use of other rumen modifiers. Yearling Alpine doelings (55) consumed 75% forage diets in a 12-week trial. Alfalfa was the forage in the control (C) diet, and others consisted of Sericea lespedeza resulting in an average dietary condensed tannin level of 8.4%. Lespedeza treatments were no additive (L) and inclusion of monensin (I) at 22 mg/kg (dry matter; L-I), soybean oil (SBO) at 3% (L-S), coconut oil (CCO) at 3% (L-N), I and 3% SBO (L-I-S), I and 3% CCO (L-I-N), 1.5% SBO and 1.5% CCO (L-S-N), and I, 1.5% SBO, and 1.5% CCO (L-I-S-N). Dry matter intake (1.47, 1.27, 1.29, 1.19, 1.33, 1.14, 1.08, 1.14, and 0.98 kg/day), average daily gain (122, 79, 89, 83, 100, 76, 70, 78, and 65 g), and total tract digestibility of organic matter (57.4, 50.9, 51.8, 52.7, 50.3, 52.1, 52.1, 51.9, and 49.8% for C, L, L-I, L-S, L-N, L-I-N, L-S-N, and L-I-S-N, respectively) were greater for C than for lespedeza treatments. Ruminal methane emission was lower for diets with lespedeza relative to intake of gross energy (5.9, 3.3, 3.5, 3.2, 2.8, 2.9, 3.2, 3.2, and 3.3%) and digestible energy (11.2, 7.0, 7.4, 6.4, 5.9, 5.7, 6.4, 6.4, and 6.7% for C, L, L-I, L-S, L-N, L-I-N, L-S-N, and L-I-S-N, respectively). In conclusion, the effect of lespedeza condensed tannins on methane was not influenced by monensin, soybean oil, or coconut oil.

Mathematics and Science.Animal Science.02

ArthurGoetsch, TerryGipson, RyszardPuchala

Langston University

Effects of Different Levels of Lespedeza and Supplementation With Monensin, Coconut oil, or Soybean oil on Ruminal Methane Emission by Mature Boer Goat Wethers After Different Lengths of Feeding

The effect of forage condensed tannins on ruminal emission of the greenhouse gas methane was compared with those of other rumen modifiers. Mature Boer goat wethers (36) consumed pelleted alfalfa hay (CON), Sericea lespedeza hay (HSL; 6.4% condensed tannins), a 1:1 mixture of alfalfa and lespedeza (MSL), or alfalfa with monensin (ION; 22 mg/kg), coconut oil (CCO; 4%), or soybean oil (SBO; 4%). Total dry matter intake in the 20-week study (3.86, 3.75, 3.52, 3.69, and 3.64% body weight) and total tract organic matter digestibility determined every 5 weeks (72.8, 69.5, 70.3, 72.0, and 71.1% for CON, MSL, HSL, ION, CCO, and SBO, respectively) were not affected by treatment. Ruminal methane emission was not influenced by period but was greatest among treatments for CON expressed as percentages of gross (10.3, 6.8, 6.3, 7.2, 6.5, and 6.5%) and digestible energy (14.8, 10.2, 9.3, 10.6, 9.8, and 10.1% for CON, MSL, HSL, ION, CCO, and SBO, respectively). In conclusion, a 1:1 mixture of alfalfa and lespedeza, with a low to moderate level of condensed tannins, had similar effect on ruminal methane emission as lespedeza as the sole forage (31 and 37% decreases relative to digestible energy intake, respectively). Inclusion in basal alfalfa diets of monensin and coconut and soybean oils elicited similar decreases in methane emission (28, 34, and 32%, respectively). There was no evidence of adaptation to any of the modifiers, with methane emission determined in weeks 5, 10, 15, and 20.

Mathematics and Science.Animal Science.03

ArthurGoetsch, TerryGipson, RyszardPuchala, LuanaRibeiro

Langston University

Effects of Gestation Nutritional Plane and Diet Nutritive Value During Lactation on Feed Intake and Digestion in Lactating Alpine Goats

Alpine goats (55) were used to evaluate effects of nutritional plane during gestation for 28 weeks (High- and Moderate-GES) and diet nutritive value (High- and Moderate-LAC) during the first 16 weeks of lactation on feed intake and digestion. Initial body weight and body condition score (BCS; 1-5) in gestation was 57 kg and 2.32, respectively. At 11 days before kidding, body weight was 78.2 and 73.5 kg and BCS was 3.17 and 3.02 for High-GES and Moderate-GES, respectively. Both lactation diets included 20% alfalfa hay and 10% cottonseed hulls, whereas High-LAC and Moderate-LAC contained 10 and 20% grass hay, 12.9 and 10% wheat middlings, 12.9 and 10% rolled oats, 3 and 2.5% soybean oil, and 5 and 2.5% molasses, respectively. The High-LAC and Moderate-LAC diets were 72.7 and 64.4% TDN, respectively. Intake of DM (3.74, 3.56, 4.15, and 3.74% body weight), digestibility of organic matter (78.0, 75.8, 78.3, and 78.8%; SEM = 1.62), and digested organic matter intake (1,911, 1,883, 2,204, and 1,881 g/day for High-GES/High-LAC, High-GES/Low-LAC, Low-GES/High-LAC, and Low-GES/Low-LAC, respectively) were not affected by gestation nutritional plane, diet nutritive value during lactation, or their interaction. In conclusion, differences in digested organic matter intake suggest potential benefit from use of a high quality diet during lactation subsequent to a moderate nutritional plane during gestation.

Mathematics and Science.Animal Science.04

ArthurGoetsch, TerryGipson, RyszardPuchala

Langston University

The Varying Relationship Between Packed Cell Volume and Fecal Egg Count in Different Breeds of Hair Sheep and Meat Goats Artificially Infected with Haemonchus Contortus

The objective was to evaluate the relationship between packed cell volume (PCV) and fecal egg count (FEC) with growing hair sheep and meat goats in 3 central sire performance tests. There were 52 Dorper (DOR), 96 Katahdin (KAT), 49 St. Croix (STC), 48 Boer, 55 Kiko, and 57 Spanish (SPA) males used. Animals were dewormed then dosed with 10,000 infective Haemonchus contortus larvae, with PCV and FEC determined 21, 28, 35, 42, and 49 d later. The PCV and FEC were correlated for DOR, KAT, STC, Boer, and Kiko (r=-0.22, -0.49, -0.28, -0.43, and -0.23, respectively) but not SPA. A mixed effects model for each species included fixed effects of breed, year, breed×year, day as a repeated measure, and log transformed FEC (lnFEC) and lnFEC×breed as covariates. Breed affected PCV in goats (24.9, 27.1, and 25.9% for Boer, Kiko, and Spanish, respectively; SEM=0.42) but not in sheep. There were effects of lnFEC×breed and the coefficient differed from 0 for DOR, KAT, STC, Boer, and Kiko (-0.0011, -0.0005, -0.0006, -0.0005, and -0.0009% per egg) but not Spanish. In conclusion, PCV does not appear highly reflective of FEC in Spanish goats infected with H. contortus, and the nature of the relationship varied among other breeds of sheep and goats. Based on the magnitude of the lnFEC×breed coefficient, Dorper sheep and Kiko goats incurred relatively greater reduction in PCV as FEC increased, and correlations indicate strongest relationships for Katahdin sheep and Boer goats.

Mathematics and Science.Animal Science.05

ArthurGoetsch, TerryGipson, RaquelLourencon

Langston University

Goats for Controlling Redcedar in Oklahoma and Missouri

The objective of this study was to evaluate the degree of redcedar control by goats at sites in Oklahoma and Missouri. There were three research plots in Oklahoma with eight goats each: Langston, Oklahoma City and Mannford, and one in Neosho, Missouri, with 12 goats. All plots were 0.81 hectares. The redcedar population was inventoried, quantified as to height, width, and GPS coordinates during the summer of 2016. One year later, trees were scored for browsing: 0 being unbrowsed, between 1 and 5 medium browsed and from 5 to 9 was considered severely browsed. Percent of trees dead (0% green) or live according to size (short; ≤ 1.83m or tall; > 1.83m) were analyzed using Chi-Square statistics. A subsequent multiple regression analysis was conducted for tree height, tree width, and browsing score. The goats in Neosho killed 18% of the trees, as compared to 1% at other locations (P<0.001). A greater percentage of trees in Neosho were more severely browsed than the average at the three sites in Oklahoma, 60% and 8% respectively (P<0.001). In Mannford, the shorter trees were most scored as medium browsing than the taller trees (1.97% vs. 1.68%, P<0.05). In Oklahoma City, the taller trees were more severely browsed than the shorter trees (6.88% vs. 4.93%, P<0.05), although more short trees were killed by browsing (P<0.05). This may indicate that shorter trees are more sensitive to browsing. Redcedar trees were more effectively controlled by goats in Neosho, Missouri.

Mathematics and Science.Animal Science.06

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FUNCTIONAL INSECT PROTEIN EXTRACTS FOR FOOD APPLICATIONS

The world population has been increasing rapidly which results in high demand for a nutrient dense food supply. Conventional animal protein sources may be insufficient to meet this need, subsequently opening a door to alternative sources. Edible Insects are, in general, rich in protein, Vitamins, Minerals and can provide all the essential amino acids, unsaturated fatty acids and micronutrients. This study suggests Cricket (Gryllidae), is a potential source of protein for human consumption.

In this study protocol, Ethanol (99.5%) and Hexane (100%) was used for defatting cricket powder at a solvent to material ratio of 5 mL/g. The solution was centrifuged at 4800 rpm for 10 minutes. The filtrate was then passed through nitrogen gas. The fat and the solvent were separated using a rotary evaporator and the fat percentage was calculated. The ethanol and hexane de-fatted powder was used for protein extraction by NaOH and freeze dried to a powder. The extracts were then analyzed for amino acid composition and various functional properties.

The consumption of insects therefore contributes positively to the environment, food and nutritional security for present and future generations. The afore-stated method shows that insects can be used as an alternate source of protein. The future investigation of this research will be to incorporate the protein powder in low nutrient dense foods, study its properties, and analyze the use of insect-based protein powder.

Mathematics and Science.Animal Science.07

JacobBurch-Konda, AdelPezeshki, JuliaSutton

Oklahoma State University

Supplementation of Herbanimal® Extract in Drinking Water of Broiler Chickens Improved the Oxidative Stress Status

The objective of this study was to assess the oxidative stress status in broiler chickens which received either Herbanimal® extract supplements in water or an antibiotic (ANT) in diet.

We hypothesized that Herbanimal® extract can improve the oxidative stress status in chickens and be used as an alternative to antibiotics.

A total of 120-day-old male broiler chicks were randomly divided into 24 pens with 5 chicks per pen. All birds were weighed and randomly subjected to one of two treatments (60 birds/treatment, 12 pen/treatment) for 6 weeks: 1) ANT: standard commercial diet supplied with an ANT, and 2) HBS: control/standard diet without ANT with supplemented Herbanimal® in drinking water (4 ml/L). On week 5, after sacrificing a subgroup of birds (10 birds/treatment), blood and liver samples were collected and stored at -80C until further analysis. The mean of measured variables between the two groups was separated by paired Students t-test.

The total antioxidant capacity of the liver was higher for the HBS group compared to ANT group. In addition, the HBS birds had improved plasma superoxide dismutase and catalase activity when compared to their ANT counterparts. Overall, Herbanimal® supplementation in water improved the oxidative stress status of broiler chickens. This together with our previous data on growth performance indicates that herbal extracts can be considered a safe alternative to ANTs in poultry production.

Mathematics and Science.Animal Science.08

PatriciaWilliams

Tulsa Community College

Methods for Shell-Less Incubation of Poultry

Broken or cracked shells can mean the loss of valuable hatching eggs for individuals who work with poultry or other birds. If a method can be devised for shell-less incubation, these eggs could potentially be saved. Based upon my knowledge of incubation and research on the subject I predicted that the eggs placed in the artificial environment could reach maturity after a 21-day incubation period but at a lower rate than normally incubated eggs. I also predicted that the addition of calcium would improve the hatch rate. For this research, an artificial vessel was created using PVC pipe or glass jars, and eggs were incubated in three groups with three subgroups, each incubated using different protocols. Each artificial vessel was covered with cling wrap to act as a barrier for gas exchange. All eggs were incubated in Little Giant Styrofoam incubators set at 99.5°F with the humidity between 50-55%. During incubation, data was collected on the number of embryos alive at three-day intervals and charted to determine the best conditions for optimal survival rates. Data compiled during the incubation process showed that eggs supplemented with calcium did have better survival rates than non-supplemented eggs. The eggs incubated in the PVC environments showed better embryo growth than those in the glass jars which showed no embryo growth at day three. I was able to grow one embryo to day nine of incubation with the addition of calcium and antiseptic in the PVC environment.