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LC-Triple TOF MS and SWATH® data acquisition to explore avian resistance to the fungal alkaloid ergovaline in endophyte-infected tall fescue diets. H. Roberts, J. Durringer, M. Craig, J. Hermes, G. Cherian, Oregon State University, Corvallis, OR 97331

Fungal-derived ergot alkaloids are a major source of livestock disease in both pastured and concentrated feeding operations throughout the world. Ergovaline (EV), the most common ergot alkaloid produced by the grass endophyte *Neotyphodium coenophialum*, is the causative agent of tall fescue toxicosis, a disease characterized by vasoconstriction, thermoregulatory distress, weight loss and reproductive failure in a number of mammalian species. Domestic birds such as chickens and quail have shown reduced sensitivity to the deleterious effects of ergot alkaloids, yet the mechanisms behind this resistance are largely undiscovered. In the present work, we utilize Coturnix quail (*Coturnix coturnix*) to characterize the avian response to and digestive biotransformation of dietary ergovaline. Two cohorts of quails were divided into treatments, and were fed one of three nutritionally balanced diets (n=15 birds/diet and n=66 birds/diet in the first and second cohorts, respectively). Diets used were a corn-soy based diet (C), a diet including 20% endophyte-free fescue seed (E-), and a diet including 20% endophyte-infected fescue seed (E+) . These resulted in complete rations with <50ppb ergovaline in C and E- groups, and >1700ppb ergovaline in the E+ group. Bird feed consumption, weight gain, and reproductive effort were tracked throughout the study, with core and peripheral body temperature measurements at 2 weeks of age. Digestive excretion of ergovaline was explored using a targeted LC-Triple TOF mass spectrometry approach, with SWATH® data acquisition for highly sensitive identification of metabolites. We quantified parent ergot alkaloids in feed and combined excreta, and explored previously reported major mammalian metabolites. Only bird body temperature showed classical signs of fescue toxicosis ($p \leq 0.05$; increasing an average of 0.51 in E+ birds over E- birds), and adult birds in the second cohort indeed weighed significantly more than E- animals (+22% baseline body weight estimate; $p \leq 0.05$). Ergovaline in combined fecal and urate excreta averaged only 9, 10 and 13% of fed levels in chicks, adult males and adult females, respectively, indicating major biotransformation events in this species. Production of four monohydroxylated metabolites yielded up to 7.53-fold increases in excreta when compared to fed levels, along with the appearance of two novel monohydroxylated metabolites not found in feed. Di-hydroxylated ergovaline, a common mammalian metabolite, was not identified in excreta of quails. This work identifies monohydroxylated ergovaline for the first time in an avian system, and indicates that this may serve as a major detoxification pathway for this species. The reduction of the parent ergot alkaloid in the present study indicates that biotransformation may be the primary mechanism of resistance to high levels of ergot alkaloids in domestic poultry.

Blackberry Pomace - A Novel Feed Supplement for Transition Dairy Cows: Effect on Reproductive Performance. K. Swanson, S. Akers, K. Estenson, R. Wilson, M. Keller, and G. Bohe, Oregon State University, Corvallis, OR. Department of Animal Science

Blackberry pomace (BBP) is a by-product generated from juice processing that contains skins, pulp, and seeds of the original fruit. Currently, BBP is disposed in landfills. As alternative, we propose BBP as a novel feed supplement for dairy cows during the transition period, because BBP is rich in antioxidants and the dairy cow's antioxidant reserves are depleted during the transition period. Thus, the objective of this study was to evaluate BBP as antioxidant-rich feed supplement in transition dairy cows. Using a randomized block design, 24 multiparous dairy cows (blocked by breed) were given 0 (Control), 57 (Low BBP), or 114 g/d (High BBP) of dried BBP as a top dressing to their fed total mixed ration (TMR). Supplementation started 28 d before predicted calving date and ended 28 d post calving. Blood and milk samples were collected on d 0, 1, 3, 7, 14, 21, and 28 postpartum. Besides markers of metabolism, inflammation, and antioxidant status, we measured at d 7, 14, 21, and 28 postpartum serum concentrations of estradiol and progesterone as indicators of follicular and luteal activity, respectively. In addition, we recorded reproductive events after calving. Reproductive data were analyzed using PROC MIXED, PROC GLIMMIX, and PROC LIFEREG in SAS version 9.4. Fixed effects were breed (Holstein, Jersey) and supplementation (Control, Low BBP, High BBP). For repeated-measures, the variance-covariance matrix was modeled using heterogeneous compound symmetry. High BB cows showed first heat 12 d earlier ($P = 0.02$), were first bred 15 d earlier ($P = 0.04$), and were open for 73 d less ($P = 0.002$) than Control cows, as more cows tended to be confirmed pregnant from their first breeding ($P = 0.06$). Moreover, High BB cows resumed earlier follicular activity than Control cows, as Control cows did not reach serum estradiol concentrations similar to those of High BBP cows at d 7 until d 28 (treatment x time effect: $P = 0.08$). Furthermore, High BBP cows tended to have higher serum progesterone concentrations than Control cows ($P = 0.08$), as High BBP cows reached serum progesterone concentrations indicative of luteal activity at d 21, one week ahead of Control cows. The reproductive performance of Low BBP cows was similar to that of Control cows, except that they showed first heat 15 d earlier ($P = 0.02$). Milk production and serum markers of metabolic status and inflammation did not differ among cows. Our results suggest that supplementation with 112 g/d of BBP may accelerate resumption of ovarian activity and improve reproductive performance of dairy cows.

Flaxseed Supplementation with and without Rumen-Bypass Processing: Effect on Milk Production and Milk Fatty Acid Composition. S. Akers¹, R. Wilson¹, K. Swanson¹, M. Keller¹, L. Goddick¹, G. Cherian¹, R. Day², and G. Bobe¹. ¹Oregon State University, Corvallis, ²N3Feed, LLC, Tualatin, OR.

Current flaxseed processing methods have shown limited or varying success in improving the fatty acid profile of milk beyond what is achieved with feeding unprocessed flaxseed. In this study, the efficacy of a novel proprietary method of 'rumen-bypass' processing (12BT40, N3Feed[®] LLC; Tualatin, OR) was tested in two parts. To determine the optimal supplementation rates, 6 pregnant Holstein cows (blocked by parity) were fed in study 1 increasing amounts of 12BT40 for 6 weeks (0 and 2 lbs of supplement for 1 week each and 4 and 6 lbs of supplement for 2 weeks each). To determine the effectiveness of bypass-processing, 6 Holstein cows (blocked by parity) were fed in study 2 in a random order for 2 weeks each no flaxseed, 3 kg/d of rumen-bypass flaxseed, and 3 kg/d of the ground ingredients of bypass flaxseed as top dressing (3 x 3 Latin Square design). Milk and serum samples were collected at the end of each period and analyzed for fatty acid profile and metabolic indicators. Data were analyzed using PROC MIXED in SAS version 9.4. Fixed effects were supplementation rate (linear, quadratic and cubic for study 1, supplement type (control, ground flaxseed, and bypass flaxseed), feed period (1, 2, and 3; the latter two for study 2) and parity (primiparous, multiparous); cow was the random effect. In study 1, bypass flaxseed supplementation increased linearly milk production with the largest increases observed with 6 lbs of supplement ($+3.84 \pm 0.69$ kg/d; $P = 0.003$). Similar increases in milk production were observed in study 2 with 3 kg of supplement ($+3.11 \pm 0.80$ kg/d; $P = 0.002$) with no additional benefits by bypass processing. There was a quadratic effect on milk fat content in study 1 with the highest concentrations achieved at 4 lbs/d of bypass flaxseed supplementation, whereas no significant association were observed in study 2. In regards to milk fatty acid profile, in study 1 bypass flaxseed supplementation increased linearly milk omega-3 proportions with the largest increases observed with 6 lbs of supplement ($+2.91 \pm 0.32$ wt% FA; $P = 0.0003$). In study 2, 3 kg of supplement also increased milk omega-3 proportions ($+1.21 \pm 0.33$ wt% FA; $P = 0.004$) with additional increases observed with bypass processing ($+0.84 \pm 0.29$ wt% FA; $P = 0.02$). In conclusion, both studies consistently show that feeding rumen-bypass flaxseed is a potential management tool to improve the nutritional value of milk and dairy products, while at the same time increasing milk yield.

Effects of precision feeding protein to dairy cattle on emissions from fresh slurry

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The aim of the present study was to reduce nitrogenous emissions from cow excreta, while maintaining milk production levels, by feeding diets designed to balance postruminally available methionine (M) and lysine (L). 20 lactating Holstein cows, blocked by parity and days in milk, were randomly assigned to one of four dietary treatments arranged as a randomized complete block design, with five cows per treatment (n=5). Diets were corn silage based and supplemented with varying amounts of rumen-protected M (Smartamine; RPM) and L (AjiPro-L 2; RPL). Diets included: A: 15% crude protein (CP) with low rumen protected amino acids (RPAA), B: 15% CP with high RPAA, C: 18% CP with low RPAA, and D: 8% CP with high RPAA. Diets were formulated to have similar metabolizable protein content with a 3:1 ratio of L: M for absorption by the duodenum. Milk samples were analyzed for fat, protein, and urea nitrogen (MUN). Blood (BUN) and urine (UUN) samples were analyzed for urea nitrogen. Urine and feces were collected from each cow on days 0, 14, and 28 and homogenized to form a slurry. Slurry sample emissions were measured over 72 hr using a flux chamber system connected to a mobile air emissions laboratory. Gas emission measurements included methane (CH₄), nitrous oxide (N₂O), ammonia (NH₃), hydrogen sulfide (H₂S), and methanol (MeOH). Data, including ANOVA and Least Squares means, was analyzed using the lmer statistical package in R. Dry matter intake (P < 0.029) and milk yield (P < 0.002) were lower for the low CP groups. High CP diets increased MUN, PUN, and UUN (P < 0.001), while the addition of both RPM and RPL had no effect on these variables. Crude protein, but not RPAA, effected both total nitrogen (P < 0.027) and ammonia nitrogen (P < 0.001) in the slurry. Gaseous emissions of NH₃ were significant for the treatment over day (P < 0.005) and time (P < 0.001) and N₂O was significant over day (P < 0.001). There were no differences across treatments for CH₄ and MeOH. Hydrogen sulfide decreased with increased dietary CP (P < 0.036). Precision feeding of RPAA had an effect on nitrogenous emissions over time (RPAA). Decreasing dietary CP concentration from 18 to 15% decreased concentrations of total slurry nitrogen and ammonia nitrogen, as well as MUN, PUN, and UUN.

The effect of 2,4- thiazolidinedione on milk lipid soluble vitamins and fatty acid profiles in lactating goat induced with sub-clinical mastitis. C. Y. Tsai*¹, F. Rosa², M. Bionaz², and P. Rezamand¹. ¹Department of Animal and Veterinary Science, University of Idaho, Moscow, ID 83844. ²Department of Animal and Rangeland Sciences, Oregon State University, Corvallis, OR 97331

2,4-thiazolidinedione (TZD), a peroxisome proliferator-activated receptors agonist, modulates metabolism and inflammation. The objective of this study was to determine the effect of TZD on milk lipid soluble vitamins and fatty acid profiles in goats with sub-clinical mastitis. The experiment included twenty-four Saanen lactating dairy goats receiving low-energy diet without vitamins supplement. Six goats in each group received a daily I.V. injection of either 8 mg/kg BW of TZD or saline. A week later, goats were challenged with intramammary infusion (IMI) of saline (CTZD or CTRL) or *Streptococcus uberis* (MTZD or MCTR). Milk samples were obtained on d -8, 1, 4, 7 and 12 relative to IMI challenge. The milk samples were analyzed for retinol, α -tocopherol and fatty acid profile. Data were analyzed using the Proc Mixed of SAS with significance declared at $P \leq 0.05$. Results showed that CTZD had greater retinol concentration compared with CTRL on d 1, and MTZD had significant decrease in retinol concentration over time. At d 4 after IMI challenge, MCTR had greater α -tocopherol concentration than CTRL and tended to be greater than MTZD. The MTZD had significant decreased α -tocopherol over time. On d 12, CTZD had a greater C18:0 (stearic acid), C18:1 cis (oleic acid), C18:3 n3 (α -linolenic acid) and C20:5 (eicosapentaenoic acid) than CTRL. In addition, during sub-clinical mastitis the MTZD had greater α -linolenic acid at d 12 and docosahexaenoic acid on d 4 compared with CTRL group. In conclusion, during sub-clinic mastitis with low energy diets and inadequate vitamins, TZD may increase fatty acids with anti-inflammatory, properties as well as increase in retinol during the galactopoiesis. This may indicate that TZD may have an effect on anti-inflammatory responses.

Key words: thiazolidinedione, mastitis, vitamin, fatty acid, goat

The effect of limit feeding forage on rumen development in pre-weaned Jersey calves
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During the transition from milk to solid feed, calves are subject to sub-acute ruminal acidosis due to increased concentrate consumption. Long-stem forage increases ruminal pH and increases chewing time which can reduce the severity and duration of sub-acute ruminal acidosis. The objective of this study was to determine the effect of limiting forage on the development, and pH of the rumen in pre-weaned Jersey calves. Jersey bull calves (n=13) at four weeks of age were individually housed and randomly assigned to one of two treatments in a randomized complete block design. One group was limit-fed (LF) long stem alfalfa forage at 90g/d (n=5) while the second group was fed long stem alfalfa forage ad libitum (AL) (n=8). All calves were fed 1300 g/d of milk replacer (26% CP, 18% fat) and a texturized calf-starter ad libitum. Weekly, calves were weighed, and a blood sample was taken for metabolite analysis. After a calf consumed 680g/d of starter for three consecutive days, calves were ruminally dosed with a rumen pH logger and ruminal pH was recorded every 2 minutes for 7 days. Data were analyzed using the Mixed procedure of SAS 9.4. Average daily gain was not significantly different between AL and LF (0.87 ± 0.03 vs. 0.85 ± 0.04 kg/d, respectively; $P = 0.55$). Mean rumen pH did not differ between AL and LF treatments (6.23 ± 0.17 vs. 6.13 ± 0.22 , respectively; $P = 0.68$) and there was no difference between duration of time rumen pH < 5.8 between AL and LF (259 ± 178 vs. 318 ± 228 min/d, respectively; $P = 0.83$). Standard deviation of rumen pH was greater in LF than AL (0.33 ± 0.02 vs. 0.25 ± 0.02 , respectively; $P = 0.05$). Additionally, forage intake was negatively correlated to standard deviation of rumen pH ($r = -0.93$; $P = 0.02$). This study demonstrates that limit-feeding forage can help maintain mean rumen pH in pre-weaned dairy calves. Although mean rumen pH is not different between AL and LF treatments, the higher standard deviation indicates rumen pH is more variable when forage is limit-fed.

Effects of feeding grape pomace in finishing cattle diets on production performance, carcass characteristics and product quality. F. A. Arend, M. E. Doumit, G. K. Murdoch, and G. E. Chibisa. Department of Animal and Veterinary Sciences, University of Idaho, Moscow, ID 83843

The continued expansion of the wine industry in Idaho is resulting in an increase in the availability of grape pomace, a cost-effective by-product that could be used as cattle feed. Although shown to be highly palatable, there is still scarcity of information on the effects of feeding grape pomace to finishing (FIN) cattle on performance, and carcass and meat quality. Therefore, our objective was to determine the effects of inclusion of grape pomace in FIN cattle diets on production performance, carcass characteristics and product quality. A group of 24 cows (Jersey × Holstein crosses), were allotted to two dietary treatments: 1. a typical FIN diet (CON), and 2. a FIN diet containing 58% grape pomace on a DM basis (GP). The grape pomace partially replaced some of the energy sources in the CON diet. At the end of the FIN phase, animals were harvested and carcasses were chilled for 24 hours before collection of carcass data by trained University of Idaho personnel. Wholesale cuts (longissimus lumborum [strip loin] and semimembranosus muscles [top round]) were collected from the left side of each carcass, vacuum-packed and aged for 14 d. Thereafter, 2.54 cm-thick steaks were cut from trimmed muscle for determination of fluid and cooking loss, tenderness (WBSF), and color (Hunter Mini-Scan) and lipid oxidation (T-BARS) over 8 d of retail display. As expected, the energy content of the GP diet was lower than for the CON diet. Therefore, feeding the GP diet increased the number of days cattle were on feed by 26 d and reduced the hot carcass weight and yield grade compared to feeding the CON diet. Feeding the GP than CON diet also reduced back fat thickness and resulted in a greater proportion of high select compared to low choice carcasses. Fluid and cooking loss were higher in semimembranosus steaks, whereas fluid loss was lower in longissimus steaks harvested from cattle fed the GP compared to the CON diet. There was no diet effect on tenderness (WBSF). However, feeding GP resulted in a decrease in lipid oxidation during retail display of longissimus (day 4 to 8) and semimembranosus steaks (d 2 to 8). In addition, the brightness and color (red) stability of longissimus steaks was also greater for cattle fed the GP compared to the CON diet. However, feeding GP did not result in changes in the brightness and color stability in semimembranosus steaks. In conclusion, although a high inclusion level of grape pomace in FIN diets reduced production performance and carcass quality, it improved retail acceptability of longissimus and semimembranosus steaks.

Effect of betaine supplementation on total tract digestibility, rumen fermentation, and rumen microbiome in dairy cows. H. C. Hung, C. Y. Tsai, and P. Rezamand. Department of Animal and Veterinary Science, University of Idaho, Moscow, ID 83844-2330

Betaine, also called trimethylglycine, can be either produced endogenously by choline oxidation or found naturally in wheat or sugar beets. Betaine acts as an organic osmolyte, a methyl donor, and can be fermented to acetate in the rumen. The objective of this study is to determine the effect of supplemental betaine on total tract apparent digestibility, ruminal fermentation, and ruminal microbiome in mid-lactation dairy cows. There were two experiments: experiment I) 20 mid-lactation dairy cows were assigned in a 3 x 3 Latin square design with 3 periods and 3 treatments of betaine (control, 100 g/d and 200 g/d) and each period was 28 days. Samples of total mixed ration were collected each week and stored at -20 °C for later analysis. During days 21 through 28, all cows were fed with chromic oxide. Fecal and urine samples were obtained on days 26 through 28. The fecal samples were analyzed for dry matter and other nutrients. Blood samples were obtained on days 26-28 and milk samples were collected on day 21 and day 28. All samples were analyzed for fatty acids composition. In addition, milk samples were analyzed by near infrared analysis (Washington DHIA, WA). Experiment II included three rumen cannulated Holstein dairy cows assigned in a 3 x 3 Latin square design with 3 periods and 3 treatments of betaine at 0, 100, and 200 g/day which were placed into Dacron bags (50µM pores, 10 x 20 cm) and double sealed. These were loaded into large mesh bags and introduced into the rumen at 0 m, 60 m, 90 m, 120 m, 180 m, 6 h, 12 h, and 24 h, rinsed and dried. Dry and organic matter degradation was determined on dried, post in situ sample bags. Milk samples were obtained for fatty acid analysis. Total mixed lactation ration were obtained daily and stored at -20°C to analyze nutrient composition. Data were analyzed using the Proc Mixed of SAS with significance declared at $P \leq 0.05$. In experiment I, no significant effects were observed regarding total tract apparent digestibility, DMI, milk yield, and milk component. However, there was a significant increase in milk fat percentage with the 200 g/d of Betaine. In experiment II, the result showed that the organic matter degraded dramatically when betaine retention time was longer than 12 hours. Overall, the betaine feeding may be involved in increasing of milk fat percentage but showed no significant effects on digestibility, DMI, milk yield, and milk component. Further research is needed to investigate its effect on rumen microbial population.

Key words: betaine, digestibility, milk fatty acid, volatile fatty acid

Effects of maturity at harvest on the nutritive value of *Eragrostis tef* (Moxie) when fed to beef cattle. J. R. Vinyard¹, J. B. Hall², J. E. Sprinkle², G. E. Chibisa¹. ¹Department of Animal and Veterinary Sciences, University of Idaho, Moscow, ID 83843; ²Nancy M. Cummings Research, Extension and Education Center, University of Idaho, Carmen, ID 83462

The provision of nutritionally adequate forage for rangeland cattle is increasingly difficult in the US due to persistent drought conditions, the domination of invasive species, and an increase in the frequency and severity of wildfires. Therefore, feeding strategies that enable producers to have a reliable forage source all-year-round are urgently needed. A potential strategy is the identification and increased use of alternative forages as cattle feed. *Eragrostis tef* ('Moxie' teff), a warm-season annual grass, could be an excellent forage for beef cattle. However, there is limited information on its nutritive value as cattle feed when harvested at different stages of maturity. Thus, our objective was to determine the effect of feeding teff hay harvested at the boot (BT), early-heading (EH), or late-heading (LH) stages of maturity on nutrient intake, ruminal fermentation characteristics, omasal nutrient flow, and N utilization in beef cattle. Six ruminally cannulated beef heifers (mean initial BW \pm SD, 476 \pm 32.6) were used in a replicated 3 \times 3 Latin square design with 28-d periods (18 d for adaptation and 10 d for measurements). Dietary treatments were BT, EH, or LH teff hay. Dry matter intake was measured daily. Indwelling pH loggers were used to measure ruminal pH from d 21 to 28. Ruminal fluid and omasal digesta for the determination of fermentation characteristics and nutrient flow to the omasum, respectively, were collected from d 26 to 28. Fecal and urine samples for the measurement of N excretion were also collected (d 26 to 28). Blood samples for plasma urea-N (PUN) determination were collected 3 h after feeding on d 28. There were marginal changes in the fiber fractions of teff with advancing maturity. Diet had no effect ($P > 0.05$) on DMI, and ruminal total short chain fatty acid concentration, pH, digestibility and outflow of DM, OM, NDF, ADF, and CP. However, the CP content of BT hay was greater than for EH and LH hay (18.1, 14.1, and 11.5%, respectively, DM basis), and this resulted in the higher CP intake for heifers fed the BT than the EH and LH hay. Consequently, ruminal ammonia-N (NH₃-N) concentration was greater ($P < 0.05$) for heifers fed BT than EH and LH hay, thereby explaining the tendency for a decrease ($P = 0.08$) in PUN concentration, and a decrease ($P < 0.01$) in the excretion of total N, urine N and urea-N (UUN) with advancing maturity. However, fecal N excretion did not differ ($P > 0.05$). In conclusion, despite a decrease in CP intake and ruminal NH₃-N concentration, feeding beef heifers EH and LH compared to BT teff hay did not compromise ruminal digestion and outflow of DM, OM, NDF, ADF, and CP, and microbial protein synthesis. Advancing maturity in teff hay also resulted in a decrease in the excretion of total N and urine N and UUN when fed to cattle. Thus, beef producers could wait until the LH stage to harvest/graze teff grass to maximize forage yield without severely compromising nutrient supply.

Effect of processing *Ventenata dubia* on palatability in ruminants. Corrina J. Watts¹, Dana E. McCurdy¹, Gwinyai E. Chibisa¹, Fara A. Brummer², Timothy S. Prather³, Anne H. Laarman¹

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Ventenata dubia (*Ventenata*) is an invasive grass species abundant in the Pacific Northwest that decreases both the quantity and palatability of hay yields. Its current spread requires solutions to improve palatability to increase its usefulness in animal production settings. The objective of these studies was to investigate the role of feed processing on palatability of *Ventenata* in beef calves, goats, and sheep. All studies were a choice preference study where animals were provided with two feed bunks: one contained a reference diet consist of grass hay, and the other containing a test diet consisting of one treatment. After a seven-day adaptation period, daily intakes were measured daily for an additional seven days. Using the daily feed intakes, preference for the treatment diet was calculated, with a higher value indicating greater preference for the treatment diet. In the beef study, 35 six-month-old beef steers were divided into five treatments: control (grass hay), autoclaved grass hay, autoclaved *ventenata* hay, pelleted *ventenata* hay, and unprocessed *ventenata* hay. In the goat and sheep studies, 20 mature, non-lactating animals were divided into four treatments: control (grass hay), pelleted grass hay, pelleted *ventenata* hay, and unprocessed *ventenata* hay. Results in beef calves showed decreased preference for *ventenata* hay compared to control hay (40.1 ± 3.6 vs. 15.7 ± 3.6 %, $P < 0.05$). There was no difference between autoclaved grass hay and autoclaved *ventenata* hay (24.2 ± 3.6 vs. 15.1 ± 3.6 %, $P = 0.48$). Pelleting *ventenata* increased preference compared to *Ventanata* hay in beef calves (60.1 ± 3.6 vs. 15.7 ± 3.6 %, $P < 0.01$), but not in goats (13.2 ± 10.4 vs. 26.5 ± 10.4 %; $P = 0.12$) or in sheep (21.3 ± 9.6 vs. 21.8 ± 15.3 %, $P = 0.26$). Beef calves, goats, and sheep all display a preference against *Ventenata*. Pelleting *ventenata*-infested hay improves palatability in beef calves, but not in goats or sheep. Poor palatability of *Ventenata* is related to texture and varies from species to species. Improving our understanding of the factors affecting *Ventenata* palatability will help development of effective strategies for controlling *Ventenata dubia* in the Pacific Northwest.

Effects of feeding supplemental butyrate on transfer of passive immunity

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This study examined the effect of supplemental butyrate on serum IgG levels in late pregnancy dams and their calves. Twenty multiparous cows were fed a close-up TMR and separated into a control group and a treatment group. Treatment dams were fed butyrate daily at a rate of 1% of DMI, mixed into the TMR, starting at three weeks pre-partum until calving. Blood serum was sampled weekly until calving. Within 2 hours of calving, calves were assigned to either control or treatment groups. All calves were given one gallon of colostrum replacer within two hours of birth; treatment calves had colostrum replacer supplemented with 2.5% butyrate. Butyrate supplementation did not change serum IgG levels in dams in control and butyrate treatments (1785 ± 117 vs. 1736 ± 137 mg/dL, respectively; $P = 0.79$). There was no difference in DMI between control and treatment dams (25.0 ± 3.2 vs. 24.1 ± 2.1 kg, respectively; $P = 0.77$). In calves, serum IgG levels were higher in control calves than in butyrate treatment calves (1489 ± 71 vs. 997 ± 63 mg/dL, respectively; $P < 0.01$). Calf average daily gain did not differ between control and butyrate groups (0.54 ± 0.05 vs. 0.49 ± 0.05 kg, respectively; $P = 0.43$). Feeding supplemental butyrate did not impact IgG production in cows, but had detrimental effects on serum IgG concentrations in calves. Supplementing colostrum with butyrate does not appear to benefit passive transfer of immunity, nor does it benefit calf performance early in life.

Effects of inclusion of grape pomace in backgrounding cattle diets on nutrient intake and digestibility, and nitrogen excretion. J. R. Vinyard, C. A. Myers, and G. E. Chibisa. Department of Animal and Veterinary Sciences, University of Idaho, Moscow, ID 83843.

The continued expansion of the wine industry in Idaho in recent years has resulted in grape pomace (GP) being increasingly available for potential use as cattle feed. However, there is still limited information on its feeding value. Therefore, our objective was to determine the effects of inclusion of 0, 15, or 30% GP (DM basis) in backgrounding diets on the intake and apparent total tract digestibility of nutrients, and N excretion. Six ruminally cannulated beef heifers (mean initial BW \pm SD, 614 \pm 49.5 kg) were used in a replicated 3 \times 3 Latin square design with 21-d periods (14 d for adaptation and 7 d for measurements). Heifers were fed backgrounding diets formulated to contain either 0, 15, or 30% GP (dry matter basis), with GP solely replacing grass hay. Dry matter intake was measured daily. Ruminal fluid was collected from d 19 to 21 for the determination of ruminal short-chain fatty acid (SCFA) concentration. Fecal and urine samples were collected from d 19 to 21 to measure apparent total tract nutrient digestibilities and N excretion. Intake of DM tended ($P = 0.07$) to be lower for heifers fed 0% GP (kg/d; 14.7) than heifers fed 15 (17.1) or 30% (16.6) GP. The intake of OM also tended ($P = 0.06$) to be lower for heifers fed 0% GP (kg/d; 13.4) than heifers fed 15 (15.5) or 30% (15.2) GP. The intake of ADF was lower ($P < 0.01$) for heifers fed 0% (kg/d; 3.92) than heifers fed 15% (4.90) or 30% (5.37) GP. Similarly, the intake of CP was also lower ($P = 0.02$) for heifers fed 0% (kg/d; 2.09) than heifers fed 15% (2.52) or 30% (2.36) GP. However, NDF intake did not differ ($P = 0.41$) across treatments. Similarly, there was no diet effect ($P \geq 0.17$) on the molar proportions of propionate, isobutyrate, valerate, and isovalerate, total SCFA, and the acetate:propionate ratio. However, the molar proportion of acetate was greater ($P < 0.01$) whereas the molar proportion of butyrate was lower ($P < 0.03$) in heifers fed 0 compared to 15 and 30% GP. Nitrogen intake was greater ($P = 0.02$) for heifers fed 15% (g/d; 404) than heifers fed 0% (335) or 30% (378) GP. Apparent N balance (g/d) was also greater ($P = 0.02$) for heifers fed 15% (g/d; 180) than heifers fed 0% (158) or 30% (119) GP. However, urine output, urine N, and urine N as a percentage of N intake were not different ($P > 0.29$) across treatments. Fecal output ($P < 0.01$) for heifers fed 30% (kg/d; 9.41) than heifers fed 0% (6.16) or 15% (7.92) GP. Fecal N was greater ($P < 0.01$) for heifers fed 30% (g/d; 227) than heifers fed 0% (145) or 15% (191) GP. Apparent total tract DM, OM, NDF, ADF, and CP digestibility were greater ($P \leq 0.01$) in heifers fed 0% than in heifers fed 15 or 30% GP. In summary, although it increased DM, OM, ADF, and CP intake, dietary inclusion of GP in backgrounding diets reduced apparent total tract DM, OM, NDF, ADF, and CP digestibility. Feeding an increasing amount of GP also increased fecal N output. However N retention was greatest in heifers fed 15% GP. Therefore, besides increasing the loss of nutrients in feces, inclusion of over 15% GP in backgrounding diets could possibly limit nutrient supply, and compromise growth performance in backgrounding cattle.