

Forages and Pastures: Grasses and silages

263 Maturity is a larger driver of fatty acid content in summer annuals than nitrogen fertility. Caleb P. Goossen*, Sidney C. Bosworth, Heather M. Darby, and Jana Kraft, *University of Vermont, Burlington, VT.*

Summer annual forages are a potentially important supplement for summer grazing. The C₄ photosynthetic pathway allows increased mid-season growth relative to C₃ perennial pasture. Maximizing grazing availability is important to I) producers seeking to optimize the fatty acid content of their dairy products, and II) organic dairy producers that must satisfy the National Organic Program 30% minimum pasture rule. Although total fatty acid (FA) and polyunsaturated fatty acid (PUFA) content responses to nitrogen (N) fertility and harvest timing have been considered in C₃ forage species, to our knowledge no studies have enumerated the FA profiles of summer annual forage species. This experiment was conducted over two years (2013 and 2014) at two Vermont locations (loamy sand and silt loam, respectively) to assess the effects of N fertility and harvest timing on total FA and PUFA content of sudangrass (*Sorghum × drumondii* ‘Hayking’) and pearl millet (*Pennisetum glaucum* ‘Wonderleaf’). The experiment was a split-plot design, with harvest height whole plot treatments (60 cm vs. 90+ cm) and N fertility sub-plot treatments (39, 79, 118, and 157 kg N/ha). A measure of leafiness—the proportion of leaf blades relative to the entire plant as dry matter (DM)—was recorded, as most FA from vegetative forages are found in chloroplast thylakoid membranes. At both locations in 2013, harvests at 60 cm instead of 90+ cm resulted in higher total FA concentration (17.2 vs. 12.6 g/kg DM, $P < 0.001$) and a greater proportion of PUFA (62.3 vs. 57.7 g/100g total FA identified, $P < 0.001$). At the loamy sand location however, both total FA and PUFA effects of harvest height were present only in sudangrass (interaction effect, $P < 0.0001$). The loamy sand location was the only to show a sub-plot effect of increasing N fertility, with a total FA gain of only 1.9 g/kg DM from the lowest N level to the highest ($P = 0.0478$). Leafiness was positively correlated with PUFA content in sudangrass and pearl millet ($r = 0.645$ and 0.503 , respectively). PUFA and total FA content of summer annual forages are primarily driven by maturity. Nitrogen fertility effects were confined to the low fertility soil location.

Key Words: summer annual forage, PUFA, n-3 fatty acid

264 Effect of grazing seedhead-suppressed tall fescue pasture on the vasoactivity of serotonin receptors. James L. Klotz*¹, Glen E. Aiken¹, Amanda M. Egert², and David L. Harmon², ¹USDA-ARS, Forage-Animal Production Research Unit, Lexington, KY, ²Department of Animal and Food Sciences, University of Kentucky, Lexington, KY.

Previous research has demonstrated that exposure to ergot alkaloids reduces vasoactivity of serotonin (5HT) receptors. Chemical suppression of tall fescue seedhead production is a tool to reduce the level of exposure to ergot alkaloids by a grazing animal. Therefore, the objective was to evaluate contractility of lateral saphenous veins biopsied from mixed breed steers following a 87–101 d grazing period on 3-ha pastures of bermudagrass (BG; $n = 5$; 340 ± 9 kg), or standard endophyte-infected tall fescue that was not sprayed (UNSUP; $n = 5$; 300 ± 6 ; 0.56 ppm ergovaline) or sprayed (SUP; $n = 5$; 294 ± 9 kg; 0.24 ppm ergovaline) with herbicide containing aminopyralid and metsulfuron-methyl (Chaparral; Dow AgroSciences). To evaluate contractility, biopsied veins were mounted in a multimyograph and exposed to increasing concentrations

of a tall fescue seed extract (EXT; ergovaline source); and 5HT_{1B} (CP9), 5HT_{1D} (L), and 5HT_{2A} (TCB) agonists. All contractility data were normalized to a maximal response of 1×10^{-4} M norepinephrine and were analyzed as a split plot treatment design using SAS for effects of pasture treatment, agonist concentration, and the interaction. There was no contractile response to any concentration of CP9 in any of the pasture treatments. There were pasture \times concentration interactions for contractile responses to TCB ($P < 0.01$) and EXT ($P < 0.01$). For both EXT and TCB, BG veins were more vasoactive to the higher concentrations ($P < 0.05$) and there were no differences between UNSUP and SUP veins. There was also a pasture \times concentration interaction for the contractile responses to L ($P < 0.01$). However, these responses were not sigmoidal and reached a zenith at 5×10^{-7} and 1×10^{-6} M. At these concentrations, the response was greatest for UNSUP ($P < 0.05$) and did not differ between SUP and BG veins. Although lower levels of ergovaline in SUP pastures did not alter vasoactivity of 5HT_{2A} or 5HT_{1B} receptors in the lateral saphenous vein, elevated vasoactivity of 5HT_{1D} in UNSUP veins suggests that lower ergovaline levels in SUP pastures reduces the vascular effects of ergot alkaloids at this receptor.

Key Words: ergot alkaloid, cattle, serotonin receptor

265 Microbial count, fermentation, and aerobic stability of regular- and brown midrib-corn hybrids ensiled with and without a combo inoculant. Juan J. Romero*¹, Yuchen Zhao², Youngho Joo³, Jinwoo Park³, Marco A. Balseca-Paredes¹, Adam J. Heitman¹, and Miguel S. Castillo¹, ¹Department of Crop Science, North Carolina State University, Raleigh, NC, ²Department of Animal Nutrition and Feed Science, China Agricultural University, Beijing, China, ³Department of Animal Science, Gyeongsang National University, Jinju, Korea.

The objective was to evaluate the effects of a combo inoculant on microbial count, fermentation, and aerobic stability of 4 hybrids of corn. Treatment design was the factorial combination of 4 corn-types ensiled with (INO) and without (CON) inoculant. Corn-types were TMF2R737, F2F817 (A and B, respectively; from Mycogen), P2089YHR, and P1449XR (C and D, respectively; from Pioneer). The NDF digestibility of A and C conventional hybrids was ~56.5% compared with 65.5% for B and D brown midrib hybrids. The inoculant added contained *Lactobacillus buchneri* and *Pediococcus pentosaceus* (4×10^5 and 1×10^5 cfu/g of fresh corn). Experimental design was a complete randomized block design (3 field blocks) with treatments replicated 2 times (2 plots) within blocks, for a total of 16 experimental units within block. Corn from each plot was chopped, treated or not with inoculant, packed into 7.6L bucket silos, and stored for 100 d. At d 0 there were differences due to hybrids solely. The %DM was 44.0, 38.3, 42.1, and 41.3 for A, B, C, and D, respectively; lactic acid bacteria (LAB) count (log cfu/g of fresh corn) was greatest and similar for B and D (7.7) compared with A (6.7) and C (7.1 ± 0.07); yeast count was greatest in D (6.8 vs. 6.6 ± 0.02) and mold count was lowest in C compared with the others (5.7 vs. 5.9 ± 0.05); and pH was higher for A (5.81) vs. C (5.60) and D (5.70), but B (5.79 ± 0.04) was only higher than C ($P \leq 0.05$). At opening, INO increased LAB (from 6.2 to 6.6 ± 0.08) and pH (from 3.80 to 4.02 ± 0.01), and decreased yeast (from 5.10 to 3.74 ± 0.18 , $P \leq 0.05$) compared with CON. Aerobic stability (h) was extended by INO compared with CON (181 vs. 35 ± 1.1) but to a lesser extent for B (73 vs. 36 ± 1.2 ; $P \leq 0.05$). The DM recovery (%) was higher for A (95.8) vs. B (93.4) and D (93.1), but C (95.0 ± 0.6) was only higher than D (P

≤ 0.05). The results indicate that corn-hybrid had an effect on %DM and DM recovery, and that the combo inoculant used improved silage conservation to different extents depending on hybrid type.

Key Words: corn, microbe, inoculant

266 In vitro digestion kinetics of NDF from stockpiled Tifton 85 bermudagrass as influenced by N fertilization. Samantha R. Sechler*, Courtney M. Holland, Carla J. Weissend, Mary K. Mullenix, and Russell B. Muntiferling, *Auburn University, Auburn, AL.*

Productivity and nutritive value of stockpiled bermudagrass are influenced by N fertilization and environmental conditions. Intake of forage DM and DE are highly correlated with kinetics of NDF digestion; yet, NDF digestion kinetics of stockpiled bermudagrass have not been extensively investigated. Therefore, a study was conducted to evaluate effects of N fertilization and seasonal changes in nutritive value on NDF digestion kinetics from stockpiled bermudagrass. Replicate (n = 2) pastures of Tifton 85 bermudagrass were cut on Aug 1 and fertilized with 56 (56N), 112 (112N) or 168 (168N) kg N/ha. Stockpiled forage was sampled monthly beginning on Oct 24, 2012 and analyzed for kinetic parameters of NDF digestion using in vitro fermentation. Undigested NDF residues were recovered at 3, 6, 9, 12, 18, 24, 48 and 72 h of incubation. Potential extent of NDF digestion was assumed complete at 72 h. Rates of NDF digestion were determined by least-squares regression of ln % potentially digestible NDF remaining vs. time; solution of the first-order kinetic equation to equal 100% potentially digestible NDF remaining yielded estimates of lag time. Data were analyzed as a completely randomized design using the PROC MIXED procedure of SAS 9.2. No N fertilization × sampling date interactions ($P > 0.05$) were observed for any kinetic parameters measured. Potential extent of NDF digestion was greatest ($P < 0.05$) in Oct (75.6%), least ($P < 0.05$) in Jan (47.8%), and intermediate but not different ($P > 0.05$) between Nov (61.1%) and Dec (59.0%). Potential extent of NDF digestion was greatest ($P < 0.05$) for 168N (63.2%) and least ($P > 0.05$) for 56N (58.8%). Rates of NDF digestion were not affected ($P > 0.05$) by N fertilization, but were greater ($P < 0.05$) in Oct (0.069 h^{-1}) and Nov (0.068 h^{-1}) than in Jan (0.063 h^{-1}). Lag time was less ($P < 0.05$) for the 168N (7.3 h) than 56N (9.1 h) and 112N (8.8 h) treatments. Lag time was least ($P < 0.05$) in Oct (6.0 h), intermediate ($P < 0.05$) in Jan (7.8 h), and greatest but not different ($P > 0.05$) between Nov (10.5 h) and Dec (9.4 h). Potential extent of NDF digestion was the kinetic parameter most affected by N fertilization and seasonal changes in stockpiled Tifton 85 bermudagrass.

Key Words: bermudagrass, digestion kinetics, neutral detergent fiber

267 Variation in aerobic stability of maize silage with and without microbial inoculant. Ida K. Hindrichsen* and Nina Milora, *Chr. Hansen A/S, Hørsholm, Denmark.*

Forages to be ensiled for subsequent feeding to dairy cows are often contaminated with spoilage microorganisms that negatively affect feed quality and feed safety. Aerobic instability due to these spoilage organisms can cause heating and significant DM loss. *L. buchneri* improves aerobic stability, but because it grows slowly it is often combined with homofermentative strains to achieve a fast reduction in pH early in fermentation. Efficacy of silage inoculants can vary depending on forage type, harvest time, management etc. In the current study it was aimed at keeping the experimental conditions equal between experiments and to test the efficacy of a dual-purpose silage inoculant. Three samples of chopped whole maize were collected from farms in 2012 and 2013 on the day of harvest. Aerobic stability, microbial population and dry matter

loss of the maize was measured using the same methodology. Briefly, maize was inoculated with a combination of *L. buchneri* and *L. lactis* (150,000 cfu/g) or pure tap water and allocated into 1 kg bags, vacuum packed and stored for 15 weeks at 25°C. Then silage was placed in a polystyrene container (1.2 L; 274 kg/m³) with 1 cm diameter hole in top and bottom. The change in temperature was recorded continuously for 6.5 d using a data logger placed in the middle of each sample. Results showed that the pooled freshly harvested maize was very similar in microbial composition between the farms and years. All samples were highly contaminated with yeast and mold, while epiphytic total lactic acid bacteria were lower than the inoculated. The effect of the silage inoculant varied considerably among the 3 maize samples. Acetate concentration after 15 weeks of anaerobic fermentation was significant ($P < 0.05$) for all inoculated samples compared with control. The aerobic stability varied considerably between the different control samples (46 h, 75 h, >156 h). Inoculation significantly increased ($P < 0.05$) aerobic stability of the unstable samples (72 h, >156 h, >156 h). This study showed that maize with similar quantities of spoilage organisms in the fresh maize can vary widely in their aerobic stability.

Key Words: aerobic stability, maize silage, silage inoculant

268 A comparative study of lignin assays and relationship with grass digestibility. Alejandro Vargas Velásquez* and Romualdo Shiguelo Fukushima, *Department of Animal Nutrition and Production (VNP), Faculty of Veterinary and Animal Science (FMVZ), University of São Paulo, Pirassununga, São Paulo, Brazil.*

Accurate determination of lignin is essential to understand the mechanism by which it inhibits carbohydrate digestion. Available analytical procedures have repeatedly produced conflicting results. The gravimetric methods ADL, potassium permanganate lignin (PL) and KL were compared against the spectroscopic acetyl bromide lignin method (ABL). Grass species *Brachiaria brizantha* 'Marandu' and 'Xaraés', *Panicum maximum* 'Mombaça' and *Pennisetum purpureum* 'Cameroon' and 'Napier' were harvested at 7 maturity stages. A completely randomized experimental design with duplicate analysis for the lignin assays was used. A randomized block design was used for the in vitro experiment. Highly significant effects for maturity, lignin method and their interaction on lignin content were observed. The ADL yielded the lowest values (28.05 to 103.05 g/kg DM) in all species. Values for PL were in accordance to previous observations from our laboratory and other authors (65.45 to 160.65 g/kg DM). The KL values observed (61.35 to 136.20 g/kg DM) were approximately double the values observed for ADL. Values for ABL were higher than all corresponding values from the other methods. Strong negative correlations between lignin contents and IVDMD or IVNDFD were observed for all methods. Higher correlations were observed for IVDMD than for IVNDFD, contrary to what could be expected, because lignin affects the CW digestibility but not the cellular contents. Regression analysis of ADL, KL and ABL produced negative slopes when plotted against IVDMD and IVNDFD. The PL method failed to reliably estimate the digestibility of tropical grasses, possibly because of other substances (pectin, tannins or flavonoids) solubilized by the KMnO₄ solution. Although ADL and KL had similar correlations with digestibility and therefore, estimate digestibility of forages with similar accuracy, these methods use strong acids and require determination of ash in the lignin residues, increasing time and cost of analysis. The ABL method has no need for corrections and is a fast and a convenient method for determination of total lignin content in plants, thus, a good option for routine laboratory analysis.

Key Words: lignin, acetyl bromide, digestibility

269 Using Bayesian inference to delineate diet composition of mixed forages. Napoleón Vargas Jurado^{*1}, Amy E. Tanner², and Ronald M. Lewis¹, ¹University of Nebraska, Lincoln, NE, ²Virginia Tech, Blacksburg, VA.

Diet preferences in grazing animals are important for range management and ecology. However, estimating the composition of diet mixtures is challenging. The plant-wax marker technique, combined with nonnegative least squares (NNLS), has traditionally been used to estimate diet composition across herbivore species. More flexible methods, such as the normal compositional model (NCM) under Bayesian inference, offers an alternative approach for predicting diet composition. The efficiency of NCM was assessed by simulation. Mean *n*-alkane (C₂₇, C₂₉, C₃₁, C₃₃) and long-chain alcohol (LCOH; C₂₆OH, C₂₈OH, C₃₀OH) concentrations (mg/kg) were obtained for 11 subsamples for each of 2 forages – tall fescue and red clover – by gas chromatography. The CV of those measures was 10.7%, which was used to derive a common SD (20 mg/kg). Forage mixtures ranging from 0.10 to 0.90 fescue, in 0.10 increments, were simulated from a Gaussian distribution. Values for each *n*-alkane and LCOH, using their respective mean and the common SD, were drawn independently. For each mixture, 100 sets of observations were generated. Data were analyzed using NNLS and NCM. For the *n*-alkanes and LCOH alone and in combination, efficiency was assessed by normalized mean squared error (NMSE), mean average difference (MAD), and coverage of 95% CI. For both types of markers, both methods accurately predicted the forage mixtures, although more so with NCM. The NMSE for the NNLS were 0.032%, 0.019% and 0.012% for *n*-alkanes, LCOH and their combination, respectively; for NCM, those respective values were 0.028%, 0.011% and 0.008%. Similarly, MAD for NNLS were 1.29%, 0.92% and 0.75% for *n*-alkanes, LCOH and their combination, respectively; for NCM, the respective values were 1.22%, 0.74% and 0.63%. Coverage was high for the combined markers: 97.1% for NCM and 91.2% for NNLS. Given the scenario used, the NCM more accurately predicted forage mixtures. In the current study, a common SD was assumed. Such is doubtfully the case in practice, and the NCM methodology can accommodate non-trivial covariance structures among markers and better model differences in variation for individual markers. Such extensions are underway. The NCM approach provides a robust tool for estimating forage mixtures.

Key Words: plant-wax markers, Bayesian inference, diet composition

270 Interaction of isoflavones and endophyte-infected tall fescue seed extract on vasoactivity of bovine mesenteric vasculature. Yang Jia^{*1}, David L. Harmon¹, and James L. Klotz², ¹Department of Animal and Food Sciences, University of Kentucky, Lexington, KY, ²USDA-ARS, Forage-Animal Production Research Unit, Lexington, KY.

It is hypothesized that isoflavones may attenuate ergot alkaloid-induced vasoconstriction and possibly alleviate diminished contractility of vasculature after exposure to ergot alkaloids. The objective of this study was to determine if incubation of bovine mesenteric vasculature with formononetin (F), biochanin A (B), or an ergovaline-containing tall fescue seed extract (EXT) and their combinations affect ergotamine (ERT) induced contractility. Multiple segments of mesenteric artery and vein supporting the ileal flange of the small intestine were collected from Angus heifers at slaughter (n = 5, BW = 639 ± 39 kg). After cleaning and sectioning, duplicates of each vessel type were incubated in tissue culture flasks at 37°C with a 50-mL volume of Krebs-Henseleit buffer containing: only buffer (Control); or 1 × 10⁻⁶ M EXT; F; or B; and combinations of 1 × 10⁻⁶ M EXT+F; 1 × 10⁻⁶ M EXT+B; 1 × 10⁻⁶ M

F+B; or 1 × 10⁻⁶ M EXT+F+B. After incubation for 2 h, sections were mounted in a multimyograph chamber. The ERT dose responses were normalized to 0.12 M KCl. Pretreatment with F, B, and F+B without EXT resulted in similar contractile responses to ERT in mesenteric artery and the incubations containing EXT resulted in a complete loss of vasoactivity to ERT. In mesenteric artery pretreated with EXT, treatments that contained B had higher contractile responses (P < 0.05) at ERT concentrations of 1 × 10⁻⁷ M and 5 × 10⁻⁷ M. Also, treatments containing B tended (P < 0.1) to have greater responses than treatments without B at ERT concentrations of 1 × 10⁻⁶ M, 5 × 10⁻⁶ M, and 5 × 10⁻⁵ M. In mesenteric vein pretreated with EXT, treatments containing F had greater contractile responses to ERT at 1 × 10⁻⁵ M, 5 × 10⁻⁵ M, and 1 × 10⁻⁴ M (P < 0.05). These data indicated that F and B at 1 × 10⁻⁶ M and their combination did not affect the overall contractile response to ERT in mesenteric vasculature. However, F and B may alleviate the reduction of vasoconstriction caused by prior exposure to alkaloids in endophyte-infected tall fescue seed extract.

Key Words: ergot alkaloid, isoflavone, mesenteric vasoconstriction

271 Proximate and fiber composition of leaves and stems of *Pennisetum purpureum* varieties fertilized with animal manure. Victoria O. Ojo^{*}, Sarafadeen T. Adewuyi, Alaba O. Jolaosho, Adebayo O. Oni, and Oludotun O. Adelusi, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria.

An experiment was conducted at the Organic Research Farm, Federal University of Agriculture, Abeokuta between September 2013 and March 2014 to evaluate the influence of manure type and season on the chemical composition of plant fractions of *Pennisetum purpureum* varieties. The experiment was a split-split plot design with 4 manure types: swine (10.16 kg), cattle (22 kg), poultry (7.92 kg)/plot and control) were applied in one application as the main plot, 4 varieties of *P. purpureum* (green, purple, S13 and S15) as the sub-plot and 2 seasons (early and late dry season) as the sub-sub plot with 3 replicates. An area of land of 53m × 11m was divided into individual plot size of 2m² after land clearing and was sown with *P. purpureum* stems. The level of manure application was determined according to the nitrogen need of the soil which contained: total N (0.15%), organic C (1.31%), and available P (32.87 mg kg⁻¹). Forage subsamples were harvested after 12 weeks of growth, weighed and oven-dried. Analysis of proximate and fiber contents of leaves and stem fractions was carried out and data obtained were analyzed using GLM procedure of SPSS Statistics 20. Results from this experiment showed (P < 0.05) CP content of *P. purpureum* leaves was highest in early dry and late dry seasons for swine manure (25.94%, 21.94%) compared with control (24.86%, 21.83%), cattle (25.53%, 18.49%) and poultry (24.19%, 18.04%) respectively. *P. purpureum* variety Local green had the highest (P < 0.05) CP content (23.32%) in leaf fractions while *P. purpureum* variety purple had the highest (P < 0.05) CP (4.73%) in stem fractions. Cellulose contents of leaf (42%) of the grasses harvested in the early dry season was higher (P < 0.05) than those harvested in the late dry season. The ADL content were lower (P < 0.05) in the leaves than in the stem fractions in all the parameters measured. Feeding values of all the varieties (DDM, DMI, RFV and FI) were higher (P < 0.05) in the leaf fractions than stem fractions. It could therefore be concluded that swine manure is a good source of nutrient for sown pasture production and the use of animal manures maintained the quality of the grasses throughout the dry season.

Key Words: manure, leaf, stem

272 Effects of inoculated lactic acid bacteria on aflatoxin B₁ in corn silage. Zhengxin Ma*, Felipe X. Amaro, Juan J. Romero, and Adegbola T. Adesogan, *Department of Animal Sciences, University of Florida, Gainesville, FL.*

The objective was to determine the effect of adding viable and unviable silage inoculant bacteria on binding of aflatoxin B₁ (AFB₁) and silage quality. A corn hybrid was harvested at 35% DM, chopped to achieve a theoretical length of 1.9 cm and treated in quadruplicate with deionized water (Con) or 30 µg/kg of AFB₁, or with a mixture of AFB₁ and viable, heated or acid-treated forms (1×10^9 cfu/g) of *Lactobacillus plantarum* R2014 (Lp), *L. buchneri* R1102 (Lb), or *Pediococcus acidilactici* EQ01 (Pa). Each of the inoculants was incubated for 1 h in 30 mL of phosphate-buffered saline (pH 7.3) at 37°C (viable) or 85°C (heated) or in 30 mL of 0.003 M HCl (pH 2.5) at 37°C (acid-treated) before application. Silages (3 kg) were stored for 21 d in polythene bags. Concentrations of AFB₁ were measured after 0, 24, 48, and 72 h of ensiling and silage samples from d 21 were analyzed for chemical composition, pH, volatile fatty acids and lactate. The experiment had a completely randomized design. Data were analyzed using the GLIMMIX procedure of SAS (SAS Institute Inc., Cary, NC). The AFB₁ concentration decreased linearly ($P < 0.05$) to 0.35 µg/kg or less within 3 d of ensiling across treatments. Bacterial inoculation did not ($P > 0.05$) increase the AFB₁ reduction. Treatment with AFB₁ reduced ($P = 0.03$) the CP concentration (8.83 vs. 8.25%) and increased ($P < 0.001$) butyric acid concentration (0.37 vs. 0.62%) but inoculation prevented ($P < 0.05$) these effects. Treatment with viable Lp increased ($P < 0.05$) the acidification of the forage in the first 3 d and the lactic acid concentration on d 21 (1.52 vs. 3.97%). However, inoculation with viable Lb or Pa did not ($P > 0.05$) affect the chemical composition, suggesting that typical beneficial effects of these bacteria were attenuated by AFB₁. The spiked aflatoxin was reduced to a safe level within 3 d of addition. Inoculation with bacteria did not increase AFB₁ removal but viable Lp prevented the increase in butyric acid and decrease in CP caused by the toxin.

Key Words: aflatoxin B₁, lactic acid bacteria, silage

273 In vitro digestibility of dried cassava peel, mushroom degraded cassava peel and silage from guinea grass. Bolanle T. Akinyemi*, Moronfolu Ige, Alaba O. Jolaosho, Moses O. Arigbede, And Shamsideen O. Iposu, *Federal University of Agriculture, Abeokuta, Abeokuta, Ogun State, Nigeria.*

This study was carried out to determine the quality and in vitro digestibility of dried cassava peel, mushroom degraded cassava peel when mixed with 40% of silage from guinea grass and the grass at different levels. Samples from dried cassava peel, mushroom degraded cassava peel (SMS), silage and grass was collected and the nutritional potential was investigated by determining the chemical composition and the level of digestibility. The result shows that there was a significant difference ($P < 0.05$) on the in vitro gas production of dried cassava peel, mushroom-degraded cassava peel and when mixed with 40% of silage from guinea grass and the grass at different levels. The highest gas production of whole samples was from 100%CP having the ($P < 0.05$) value of 56.25 mL/200 mg of DM and the lowest was from which had the ($P < 0.05$) value of 26.50 mL/200 mg of DM. The highest gas production of diets was from Diet 6 (40% grass + 50% cassava peel + 10% PKC) having the ($P < 0.05$) value of 59.00mL/200mgDM and the lowest was from Diet 2 (40% silage + 50% cassava peel + 10% PKC), which had the ($P < 0.05$) value of 17.50 mL/200 mg of DM. Diet 6 had the highest values for metabolizable energy (ME), organic matter digestibility (OMD) and short-chain fatty acids (SCFAs; 7.26 MJ·kg⁻¹, 59.93% and 0.82 µmol respectively). Diet 3 has the lowest value for ME, OMD and SCFAs (3.84 MJ·kg⁻¹, 35.79% and 0.22 µmol respectively). The highest methane gas production of whole samples was from 100%CP having the ($P < 0.05$) value of 26.33 mL and the lowest was from 100%SMS which had the ($P < 0.05$) value of 12.88 mL. The highest gas production of Diets was from Diet 1 having the ($P < 0.05$) value of 25.00 mL and the lowest was from Diet 3 which had the ($P < 0.05$) value of 11.25 mL. The diet having 40% grass + 50% cassava peel + 10% PKC had the highest nutritional qualities. It is therefore concluded from this study that the use of cassava peel as substrate for producing edible mushroom improved the potential feeding value of the resultant substrate.

Key Words: silage, mushroom degraded cassava peel, in vitro digestibility