T378 Sheep performance on sorghum or sorghum-soybean silage diets. A. A. Melin[1] and H. M. Arelovich*[2], *[1]Coronel Suárez-Pasman Experimental Station, [2]Departamento de Agronomía-CIC-CERZOS.*

Silages of different species are extensively used in Argentina in a variety of dietary programs. Sorghum (Sor) crop is well adapted to environmental constraints of semiarid areas; however Sor silage is usually low quality. A mixed crop of Sor with Soybean (Soy) is expected to improve silage voluntary DM and protein intake. An assay was conducted to evaluate silage quality and sheep performance when receiving either of 4 silage diets: (1) Grain Sor (GS), (2) Sweet Sor (SS), (3) GS-Soy (85 to 15%) and (4) SS-Soy (85 to 15%). Pure or mixed crops were harvested and processed to a 20–25 mm particle size of green material, to be packed and sealed in 220-kg capacity plastic containers. Twenty Corriedale wethers (51.4 kg IBW) were randomly allocated to individual metabolism stalls. Following a 7-d adaptation period, silages were fed ad libitum on a daily basis previous collection of rejected material at 9 a.m. Feces were collected daily between 11 and 12 a.m. Offered and rejected materials were daily sampled and pooled. Samples were dried at 60°C, ground with a Wiley mill (1 mm) and saved for lab analyses. Diet quality, Daily DM intake (DMI), in vivo DM digestibility (DMD), digestible DMI (DDMI) and Total Protein Intake (TPI) data were analyzed by ANOVA as complete randomized design. Average silage pH was 3.9. Sor type has not affected silage quality, but Soy inclusion improved CP content. Average DMD increased 11% with Soy silages, with a trend for higher DDMI. Higher energy and CP consumption could be achieved by intercropping a minor proportion of Soy in Sor crops for silage.

Table 1.

Item	GS	SS	GS-Soy	SS-Soy	*P* =	CV, %
Diet, %						
DM	25.3	25.1	25.7	25.6	0.894	4.5
CP	5.1[a]	6.5[a]	8.7[b]	8.5[b]	0.0003	6.6
NDF	57.5	58.9	56.7	57.9	0.757	4.6
ADF	32.3	32.3	33.1	34.1	0.503	4.9
Performance						
DMI, g/d	470	459	612	594	0.449	30.5
DMD, %	55.4[a]	57.7[ab]	64.1[b]	63.0[b]	0.041	6.8
DDMI, g/d	262	265	391	374	0.148	28.4
TPI, g/d	30.5[a]	23.5[a]	52.2[b]	51.6[b]	0.008	27.3

DMI= offered DM – rejected DM; DMD= [(DM intake – Fecal output)/ DM intake]; DDMI= DMI*(DMD/100); TPI= DMI*(CP/100).

[ab]Values in the same row differ ($P < 0.05$).

Key words: silage, sorghum, soybean

T379 The effect of sulfuric acid on in vitro gas production parameters of sugarcane top in Arabian sheep. S. Mahmoudi, M. Chaji*, M. Eslami, T. Mohammadabadi, and M. Bojarpour, *khuzestan Ramin Agricultural and Natural Resources University, Molassani, Khuzestan, Iran.*

The objective of this study was to investigate the effect of sulfuric acid (H2SO4) on chemical composition and in vitro gas production of sugarcane top (SCT) by Arabian sheep of Iran. Sugarcane top ensiled with different levels of sulfuric acid (0.9 and 1.8% acid) in laboratory silos for 45 d. Rumen fluid was supplied from 2 fistulated sheep were fed a 40:60 concentrate: forage, and the samples were incubated with 35 mL buffered rumen fluid in 100 mL glass syringes, for 2, 4, 6, 8, 10, 12, 16, 24, 48, 72 and 96 h, at 39°C. Cumulative gas production data were fitted to the exponential equation. The residues of each syringe were dried and used to calculate the cell wall degradation. The obtained data analyzed as a completely randomized design using the general linear model procedure of SAS. The results indicated that the ensiling SCT with 1.8% sulfuric acid caused to increase cell wall degradation, potential of gas production and rate constant in compared with the other treatments (48%, 140.2 mL and 0.04 mL/h, respectively; $P < 0.05$). The highest degradation and gas production at 24 and 72 h after incubation was for ensiled with 1.8% sulfuric acid (39 and 62 mL, respectively; $P < 0.05$). Therefore, the results of the present study demonstrated that ensiling with sulfuric acid improved in vitro gas production parameters of SCT.

Key words: degradation, sugarcane top, sulfuric acid

T380 The effect of urea, molasses and sulfuric acid on in vitro digestibility of sugarcane top by Arabian sheep. S. Mahmoudi, M. Chaji*, M. Eslami, T. Mohammadabadi, and M. Bojarpour, *Khuzestan Ramin Agricultural and Natural Resources University, Molassani, Khuzestan, Iran.*

The objective of this study was to investigate the effect of urea, molasses and sulfuric acid (H2SO4) on in vitro digestibility of sugarcane top (SCT) by Arabian sheep of Iran. Experimental treatments were including: untreated SCT (SCT), SCT ensiled with 10 g/kg DM urea+30 g/kg DM molasses (SCT1), SCT ensiled with urea+molasses+9 g/kg DM sulfuric acid (SCT2) in laboratory silos for 45 d. In vitro digestibility of dry matter (DM) and natural detergent fiber (NDF) was measured by procedure of Tilley and Terry. Rumen fluid was obtained from 2 Arabian sheep were fed a 40:60 concentrate: forage, then was mixed with McDougall buffer in a ratio 1:4, and incubated at 39°C. After 48 h fermentation, 6 mL of HCL (20%) and 5 mL pepsin solution (pepsin in HCL 0.1 N) were added and the incubated for 48 h simulating post-ruminal degradation. After incubation, the residual substrates of each tube were filtered and used to determine disappearance of DM and NDF. Data of disappearance of DM were analyzed as a completely randomized design using the general linear model procedure of SAS. The results of this experiment indicated that the SCT2 increased in vitro DM digestibility in compared with the other treatments (44.2, 43.6 and 41.04%, respectively; $P < 0.05$). Sugarcane top ensiled with urea+molasses+sulfuric acid had the highest NDF digestibility (79.77%). Therefore, the results of the present study demonstrated that urea+molasses+ 9 g/kg DM sulfuric acid improved in vitro NDF digestibility value of the SCT.

Key words: sugarcane top, molasses and urea, digestibility

T381 Interactions between nutrient supply and dietary flavors on diet selection by lambs. A. Bach*[1], J. J. Villalba[2], and I. R. Ipharraguerre[3], *[1]ICREA and Ruminant Production-IRTA, Barcelona, Spain, [2]Utah State University, Logan, [3]Lucta, S.A., Barcelona, Spain.*

Thirty-two crossbred lambs (BW = 36.7 ± 4.5 kg) housed in individual pens were used in 3 7-d experiments to investigate 1) the relationship

between protein status of the animals and diet selection based on dietary CP, 2) the interaction between dietary CP and preference for bitter, and 3) the interaction between protein supply and preferences for a caloric and a non-caloric sweetener. In Exp. 1, 16 lambs previously fed a low (LP; 10.9% CP) or a high (HP; 20.4% CP) CP diet for 42 d, received a double choice of the HP and LP diets. In Exp. 2, 16 lambs were offered a double choice of unflavored LP or HP diets or the same diets flavored (0.066%) with a bitter flavor. In Exp. 3, the 16 lambs from Exp. 1 were offered a double choice between an unflavored diet (LP or HP) or the same diet flavored with sucrose (0.2%) or a non-caloric sweetener (0.066%). Data were analyzed using a mixed-effects model with animal within treatment as a random effect, and treatment, time, and their interactions as fixed effects. When offered a choice between HP or LP (Exp. 1), lambs previously fed LP progressively ($P < 0.01$) increased total daily intake, whereas consumption was constant for lambs previously fed HP. On d 1, lambs previously offered HP showed a lesser ($P < 0.05$) preference for LP (23%) than those offered LP (30%), but preference for LP increased to about 50% at d 4, negating thereby differences in consumption between treatments. At the onset of Exp. 2, lambs were unresponsive to flavor; as time elapsed, however, lambs fed LP progressively reduced ($P < 0.05$) preference for the bitter flavor from 53 to 34%. In Exp. 3, lambs previously fed LP diets consumed less ($P < 0.05$) sweetener- than sucrose-supplemented diet, whereas lambs previously offered HP diets consumed more ($P < 0.05$) sweetener- than sucrose-supplemented diet. These results indicate that lambs are able to sense dietary CP content and modulate short-term consumption of flavored feeds based on nutrient requirements.

Key words: diet selection, sheep, flavor

T382 Effect of forage type in the diet on *Ruminococcus flavefaciens*, *Ruminococcus albus* and *Fibrobacter succinogenes* populations in sheep rumen content as determined by real-time PCR. C. Saro[1,2], M. J. Ranilla*[1,2], and M. D. Carro[1], *[1]Dpto. Producción Animal, Universidad de León, León, Spain, [2]IGM (CSIC–ULE), Finca Marzanas s/n, Grulleros, León, Spain.*

The diet of the host is a major factor influencing the structure and function of ruminal bacterial populations. The objective of this study was to use real-time PCR to quantify the relative abundance of *Ruminococcus flavefaciens*, *Ruminococcus albus* and *Fibrobacter succinogenes* in the solid phase of the rumen of sheep fed 2 different diets. The diets had 70:30 forage:concentrate ratio and contained either alfalfa hay (AL) or grass hay (GR) as forage. Four rumen-fistulated sheep were fed the 2 diets in a crossover design. Rumen content samples (500 g) were collected before and 4 and 8 h after the morning feeding on 2 non-consecutive days, and strained through 2 layers of cheesecloth, and the solid content was thoroughly mixed before sampling. About 20 g of solid content were placed in sterile containers, and stored frozen at −80°C until DNA extraction. DNA was extracted from the samples using QIAamp DNA stool mini kit (Qiagen, Valencia, Spain) and hexadecyltrimethylammonium bromide (CTAB). Concentrations of *R. flavefaciens*, *R. albus* and *F. succinogenes* rDNA were measured by real-time PCR relative to total bacteria amplification. Validated primers specific for genes encoding 16S ribosomal DNA were used, and data were analyzed using repeated measures ANOVA. Relative abundance of *F. succinogenes* was greater ($P < 0.001$) for GR compared with AL, but no differences between diets were detected for *R. flavefaciens* ($P = 0.11$) and *R. albus* ($P = 0.56$). Post-feeding evolution of the 3 cellulolytic bacteria was similar for both diets. At 4 h after feeding the populations were greater ($P < 0.001$) than at 0 h, but they recovered initial values at 8 h post-feeding. The greater values observed at 4 h may be due to the attachment of new bacteria from the liquid phase or other particles and/or to bacteria proliferation on feed particles. *F. succinogenes* was the most predominant of the 3 species at all sampling times, and the only one influenced by forage type, which indicate the ecological and functional significance of this species in sheep receiving forage diets.

Key words: real-time PCR, ruminal cellulolytic bacteria, sheep

T383 The effect of replacing corn bran with water-soaked neem fruit on nutritive value and in vitro gas production characteristics of West African Dwarf sheep. M. K. Adewumi*, *Department of Animal Science, University of Ibadan, Ibadan, Nigeria.*

Six male West African Dwarf (WAD) sheep (15.6 kg) divided into 2 groups were used in a complete randomized design to evaluate the effect of replacing corn bran with water-soaked neem (*Azadirachta indica*) fruit in a supplementary diet on nutritive value and nitrogen balance. Experimental treatments were (i) control containing 80:10:10 of cassava peels, fullfat soybean and corn bran and (ii) a test diet where corn bran was replaced with the water-soaked neem fruit (w/w). The animals were offered *Panicum maximum* hay ad libitum .The duration of the experiment was 21 d consisting of a 15-d adaptation phase and 7-d data collection phase. Ruminal fluids obtained from the 2 groups of animals were used in an in vitro gas production study to determine gas production characteristics of a standard maize substrate. Gas production was recorded after 24 h of fermentation. Apparent digestibility (g/100 g DM) of DM (56.60 vs. 57.80), CP (32.50 vs. 31.40), ether extract (56.00 vs 49.00) and ADF (63.00 vs. 41.50) were greater ($P < 0.05$) for the control. However, while N intake (g/d) (6.36 vs. 6.38) was similar ($P > 0.05$), nitrogen balance (1.66 vs. 1.37) was greater ($P < 0.05$) for the control. Metabolizable energy (MJ/kg DM) (8.27 vs. 8.36), short chain fatty acids (µml) (0.89 vs. 0.91) and organic matter digested (g/100g DM) (55.79 vs. 56.34) obtained from in vitro gas production were not different ($P > 0.05$) for the 2 diets. Replacement of corn bran with the water-soaked neem fruit increased($P < 0.05$) total gas produced(ml) (83.25 vs. 48.57) but reduced ($P < 0.05$) methane production (mL) (13.00 vs. 2.00).These results showed that replacing corn bran with water-soaked neem fruit has the potential to improve nutritive value and reduce energy loss through methane emission.

Key words: gas production characteristics, nutritive value, West African Dwarf sheep