T248 Proposal for standard methods and procedure for guinea pig carcass evaluation, jointing, and tissue separation. Davinia Sánchez-Macías*[1], Noemi Castro[2], Miguel Rivero[3], Anastasio Argüello[2], and Antonio Morales-delaNuez[4], *[1]Department of Agroindustrial Engineering, Universidad Nacional de Chimborazo, Riobamba, Chimborazo, Ecuador, [2]Animal Science Department, Universidad de Las Palmas de Gran Canaria, Arucas, Las Palmas, Spain, [3]Department of Veterinary Histology and Pathology, Universidad de Las Palmas de Gran Canaria, Arucas, Las Palmas, Spain, [4]Facultad de Ciencia Pecuarias, Escuela Superior Politécnica de Chimborazo, Riobamba, Chimborazo, Ecuador.*

The South American guinea pig rodent has become a livestock animal acceptable for human consumption in different parts of the world. Its white meat has a great potential as a new protein source, and its social and economic importance for different human populations is considered key for development. Scarce data are found in the literature when the statistical livestock information is checked, and few researches have been done about morphological characteristics of guinea pigs carcasses. These works do not follow the same procedures, using different criteria, overall the jointing, making it difficult to compare different studies. The aim of the present study is to suggest a practical and normalized method to analyze the guinea pig carcass characteristics allowing their evaluation. It describes the main traits to be considered from the birth of the animal to the carcass analysis. This work concerns (1) growth, feeding, pre-slaughter and slaughter processing, (2) method for the definition, hanging and presentation of the carcass, (3) carcass morphological characteristics, (4) jointing procedure based on 4 anatomically defined regions, (5) methods for 20 evaluating meat pH and color and (6) method for tissue separation. This proposal could be useful to compare data of these animals under different conditions.

Key Words: guinea pig, carcass, jointing

T249 Cow-calf production performance under different management systems in Thailand. Jirayut Khemsawat[1], Skorn Koonawootrittriron*[1], Thanathip Suwanasopee[1], and Mauricio A. Elzo[2], *[1]Kasetsart University, Bangkok, Thailand, [2]University of Florida, Gainesville, FL.*

The numbers of beef cattle and cow-calf producers in Thailand are decreasing every year due to a sharp increase in demand and high prices offered for all types of cattle by neighboring countries. To help evaluate the extent of this problem, an assessment of the current status of cow-calf production in Thailand is needed. Thus, the objective of this study was to compare the cow-calf production performance and profitability in 3 regions of Thailand (UN = upper Northeast region; LN = lower Northeast region, CT = Central region). The factors considered were number of cows per farm, paddock size, number of laborers, birth weight, weaning weight, sale age, calving interval, costs and profits. Data for these factors were gathered from 501 cow-calf producers (130 producers in UN, 341 producers in LN, and 30 producers in CT) using questionnaires, interviews, visits, and seminars. Means and SD were used to describe factors. Least squares means (LSM) for all factors in each region were computed using a linear model that included region (UN, LN, CT) and farm size (small: less than 10 cows; medium: 11 to 20 cows; large: more than 20 cows) as fixed effects, and residual as a random effect. Cow-calf producers had from 7.7 (UN) to 12.9 (CT) cows per farm, paddock size ranged from 1.3 (UN) to 2.1 (CN) ha, and hired 1.9 (LN) to 2.2 (UN) laborers for their operations. Calf birth weights ranged from 24.3 (UN) to 29.9 (CT) kg, weaning weights ranged from 151.9 (LN) to 193.4 (CT) kg, weaning ages from 7.8 (CT) to 8.6 (UN) mo, and sale ages ranged from 11.7 (CT) to 13.5 (LN) mo. Calving intervals were from 12.6 (LN) to 13.7 (UN) mo. Factor LSM differed among regions ($P < 0.05$), except for weaning age, sale age and calving interval. Cow-calf producers in CT had higher profits and lower costs than UN and LN ($P < 0.05$). These results suggested the need for different cow-calf production strategies would need to be implemented in each Thai region improve productivity and profitability in a sustainable manner.

Key Words: cattle, cow-calf production, cost

T250 Chemical composition, physical parameters and cholesterol status of fertile and unfertile eggs from chicken and quail birds. Patience Olusola Fakolade*, *Osun State University, Ejigbo, Osun State, Nigeria.*

A study to compare the chemical composition, physical parameters and cholesterol status of fertile and unfertile eggs from chicken and quail bird was evaluated. One hundred twenty Harco black and 120 Japanese quail birds were used for the study. Birds were fed with compounded feeds and divided into 2 groups, group A had 60 birds each from chicken and quail to produce unfertile eggs while group B had 55 hen and 5 cocks each from chicken and quail, to produce fertile eggs. All the birds were subjected to appropriate vaccination and medication procedures. Both eggs (fertile and unfertile) were evaluated for their variations in chemical composition, physical status and cholesterol levels in a 3 × 3 factorial design. Results for chemical composition, showed that, unfertile chicken eggs had highest significant values ($P < 0.05$) of (Ca, P, Na, Zn, Fe and K), than for fertile chicken eggs, unfertile quail eggs, and fertile quail eggs. The fertile quail eggs had significant higher value for (Na, Zn and Fe) but lower value for (Ca, P, and K) than the unfertile eggs. In this study, the physical characteristics measured followed the same trend as that of the chemical composition except for the shell weight and yolk color. Quail eggs for both fertile and unfertile eggs had lowest significant value ($P < 0.05$) for cholesterol (10 mg/100 g and 36.49 mg/100 g) and viscosity level (16.20 mL/s and 28.90 mL/s), than for chicken eggs with (1150 mg/100 g and 1291.20 mg/100 g) and the viscosity level had (55.60 mL/s and 69.20 mL/s). Quail eggs had lower cholesterol level than chicken eggs and as such could be incorporated into human diet to increase protein intake and reduces cholesterol accumulation in the diet, through consumption of egg.

Key Words: chicken egg, quail egg, fertile egg

T251 Correlation between the guinea pig tissue composition and carcass measurements. Iván Barba[1], Lida Barba*[1,2], César Hernández[1], Julio Palmay[1], Nibaldo Rodríguez[2], and Davinia Sánchez Macías[1], *[1]Department of Agroindustrial Engineering. Universidad Nacional de Chimborazo, Riobamba, Chimborazo, Ecuador, [2]School of Informatics Engineering. Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile.*

Combining carcass measurements, such as weights, conformation and fat classes and carcass dimensions would lead to moderate predictions of muscle, fat or bone content in carcass. A correlation analysis of these parameters is necessary to build up potential prediction equations. This

study was performed to establish correlations between guinea pig carcass composition and measurements. The carcasses of 40 guinea pigs, males and females of 3 and 12 mo age (fattening and discarded animals, respectively) with similar management previous to slaughter were used. Seventeen measurements consistent in weight, yield, and the length of carcass pieces were analyzed to identify the major correlation with the 9 variables of tissue composition. The tissue composition is represented as subcutaneous fat (SF), intermuscular fat (IF), muscle (M), bone (B), skin (S), waste (W), and 3 combined variables SF-IF, B-W, and muscle plus freeze loss (M-FL). In all the cases, an important positive correlation with live weight at slaughter (LWS), empty body weight (EBW), hot carcass weight (HCW), and cold carcass weight (CCW) was found. The variables related to fat were highly correlated with the measurement perirenal and pelvic fat (PPF). The linear measurements internal carcass length (L), external carcass length (ECL), lumbar circumference (LC), and thorax circumference (ThC) showed high correlation with the tissue composition variables that are not related to fat. The major correlation was found in the relation M-LWS, M-EBW, M-HCW, M-CCW with a Pearson Coefficient of R = 95%, followed by the relation S-LWS, S-EBW, S-HCW, S-CCW with R = 94%. Some measurements that are not correlated with any variable are hid limb length (F), buttock width (BW), and thorax width (ThW).

Key Words: guinea pig, carcass composition, correlation

T252 Prediction of guinea pig carcass tissue composition from weight and linear normalized measurements. Lida Barba*[1,2], Iván Barba[1], Julio Palmay[1], César Hernández[1], Nibaldo Rodríguez[2], and Davinia Sánchez Macías[1], *[1]Department of Agroindustrial Engineering. Universidad Nacional de Chimborazo, Riobamba, Chimborazo, Ecuador, [2]School of Informatics Engineering. Pontificia Universidad Católica de Valparaíso, Valparaíso, Chile.*

The evaluation of carcass composition makes possible to assign a value for the carcass. It is possible to predict carcass composition by measurements taken on the carcass: weights, carcass yield, fatness, conformation and other non-invasive methods. The use of these measurements offers an advantage over joint dissection, as they are faster and easier to make and do not involve any loss of carcass tissue. The aim of this work is to develop equations to predict the tissue composition of guinea pig carcasses, by using weight, yield and linear measurements. The data were obtained after a practical and normalized method to measure the guinea pig carcass, based on anatomical guidelines. The carcass measurements of 40 South American Guinea pigs, males and females of 3 and 12 mo age (fattening and discarded animals, respectively) were used for multiple regression analysis; which was implemented from the correlation matrix of dependent and independent variables and the significance test. The independent variables or predictors used were live weight at slaughter (LWS), hot carcass weight (HCW), perirenal and pelvic fat (PPF), external carcass length (ECL), and thorax circumference (ThC). The accuracy of the predictions was evaluated with root mean square error (RMSE) and coefficient of determination (R^2). The prediction equations for carcass composition in grams were more accurate than those related to composition proportion. In the prediction of some variables in grams such as total muscle (TM), skin (S) and muscle + freeze-thawing loss (MpFL) were obtained values of R^2 = 95%, for total bone (TB) was obtained an R^2 = 90%, and for subcutaneous fat (SF) and total fat (TF) were obtained R^2 = 78% and 76%, respectively. Lean (or muscle) and fatness are both the most important commercial components of a carcass. In this case, PPF was a good predictor for guinea pig carcass fatness, whereas HCW and ThC were good predictors of lean content.

Key Words: guinea pig, carcass composition, prediction

T253 Comparison between a method based upon the anatomical structure and a method based upon standardized butchering practice of guinea pig carcass. Julio Palmay[1], César Hernández[1], Iván Barba[1], Roberto Remache[1], Antonio Morales de la Nuez[2], Anastasio Argüello[3], Noemí Castro[3], and Davinia Sánchez Macías*[1], *[1]Department of Agroindustrial Engineering, Universidad Nacional de Chimborazo, Riobamba, Chimborazo, Ecuador, [2]Facultad de Ciencia Pecuarias, Escuela Superior Politécnica de Chimborazo, Riobamba, Chimborazo, Ecuador, [3]Animal Science Department, Universidad de Las Palmas de Gran Canaria, Arucas, Las Palmas, Spain.*

A diversity of methods for jointing meat animal carcasses exists in the literature and in the technical regulations in different countries. Standardized methods with good repeatability are needed for researching works. The objective of this work is to determine a representative cut for tissue carcass composition of guinea pig from 2 different jointing methods. Forty guinea pig carcasses were selected: 20 from 3-mo-age fattening animals (10 males and 10 females) and 20 from 12-mo-age breeding discarded animals (10 males and 10 females). Each carcass was divided into 2 half carcasses; the right half carcass was jointed in 2 cuts following a technical standard commercial regulation from Peru (forequarter and hindquarter), and the left half carcass was jointed in 4 cuts following anatomical points (neck, shoulder, hind leg and ribs). Each cut was dissected in skin, muscle, sub-cutaneous fat, inter-muscular fat, waste and bone. Total fat was calculated as the sum of sub-cutaneous and inter-muscular fat, inedible section as the sum of bones and remainder, and muscle + freeze-thawing loss. All results are presented in proportion to the cut. A factorial ANOVA procedure was used with the statistical program SAS (v. 11), for each tissue comparing the different cuts and total tissue in the carcass, and second, the effect of the animal group. In some animal groups, the neck differed from the carcass in terms of proportion for sub-cutaneous and inter-muscular fat tissues, total fat and bones. On the other hand, the muscle proportion in the hindquarter cut in 12 mo-age female guinea pigs was higher respect to the muscle proportion in the whole carcass. The other studied cuts were similar in terms of proportions of the different tissues respect to the whole carcass composition. However, it is noted that the closest cut to the tissue composition of the guinea pig carcass, in percentage values, was the hind leg cut. We conclude that the most representative cut of guinea pig carcass is the hind leg, and thus the jointing method proposed in 4 cuts is the most appropriated for these animals.

Key Words: carcass tissue composition, guinea pig, jointing

T254 Carcass tissue composition in fattening or discarded guinea pigs. Julio Palmay[1], Iván Barba[1], César Hernández[1], Erick Ureña[1], Antonio Morales de la Nuez[2], Noemí Castro[3], Anastasio Argüello[3], and Davinia Sánchez Macías*[1], *[1]Department of Agroindustrial Engineering, Universidad Nacional de Chimborazo, Riobamba, Chimborazo, Ecuador, [2]Facultad de Ciencia Pecuarias, Escuela Superior Politécnica de Chimborazo, Riobamba, Chimborazo, Ecuador, [3]Animal Science Department, Universidad de las Palmas de Gran Canaria, Arucas, Las Palmas, Spain.*

The development of tissue composition during growth may be reflected in the carcass tissue composition due to age at slaughter and sex. For

this reason, the aim of this work is to analyze the carcass composition in 6 different carcass cuts, in males and females fattening or discarded guinea pigs. Forty guinea pig carcasses were selected: 20 from 3-mo-age fattening animals (10 males and 10 females) and 20 from 12-mo-age breeding discarded animals (10 males and 10 females). Each carcass was divided into 2 half carcasses; the right half carcass was jointed in 2 cuts following a technical standard commercial regulation from Peru (forequarter and hindquarter), and the left half carcass was jointed in 4 cuts following anatomical points (neck, shoulder, hind leg and ribs). Each cut was dissected in skin, muscle, sub-cutaneous fat, inter-muscular fat, waste and bone. Total fat was calculated as the sum of sub-cutaneous and inter-muscular fat, inedible section as the sum of bones and remainder, and muscle + freeze-thawing loss. All results are presented in tissue weights of the cut or whole carcass. A factorial ANOVA procedure was used with the statistical program SAS (v. 11), comparing among the different cuts, and analyzing the effect of age and sex. For the whole carcass composition, 3 mo-age guinea pigs showed the lowest fat content and female 12 mo-age animals the highest value. For muscle, bones, skin and waste, 12 mo-age guinea pigs had higher values in carcass than the younger animals, and no differences were found due to the sex. Into the 4 cuts jointing method, long leg and ribs cuts had the higher values of fat, muscle, bones and skin, while ribs presented the highest waste content. And into the commercial jointing method, the forequarter showed the highest contents of all the analyzed tissues. We conclude that tissue composition in the whole carcass is different in fattening or discarded guinea pigs, except for the fat content, in this case, 3 mo-age females have similar values than discarded guinea pigs.

Key Words: carcass tissue composition, guinea pig, jointing

T255 Substitution of commercial concentrate by mulberry forage (*Morus alba* 'Linn') in the ration of fattening tropical Pelibuey lambs. Andrés Alpízar-Naranjo[1], Javier Arece-García[2], Marcos Esperance[2], Yoel López[1], Michael Molina[2], and Eliel González-García*[3], *[1]Escuela de Ciencias Agrarias, Facultad de Ciencias de la Tierra y el Mar, Universidad Nacional de Costa Rica, Heredia, Costa Rica, [2]Estación Experimental de Pastos y Forrajes "Indio Hatuey," Matanzas, Cuba, [3]INRA UMR868, Systèmes d'Elevage Méditerranéens et Tropicaux (SELMET), Montpellier Cedex 2, France.*

The effects of substituting concentrate by chopped and fresh home-ground mulberry forage were evaluated in an experiment with fattening lambs lasting 126 d from weaning. The basal forage diet was composed by *Pennisetum purpureum*, *Panicum maximun* 'Likoni' and sugarcane. Forty-eight entire Pelibuey lambs (initial BW 20.6 kg) were randomly allocated in 4 experimental groups according to treatments which consisted on the level of supplementing (or not) the basal diet with mulberry forage: M-1: mulberry at 1% of BW (DM basis); M-0.75: mulberry at 0.75% plus 0.1 kg/lamb/d of concentrate; M-0.50: mulberry at 0.50% plus 0.2 kg of concentrate; and M-0: supplementing basal diet with 0.3 kg of concentrate (Control). Average daily gain (ADG, g/d) was significantly affected ($P < 0.01$) by the supplementation regimen with M-1 lambs yielding the lowest ADG (100.2 g/d). No differences in ADG among the other groups were observed (124.7; 125.4 and 128.9 g/d for the treatments M-0.75, M-0.50 and M-0, respectively). Feed conversion was 11.6, 9.9, 10.3 and 9.7 kg DM/ kg of BW gain for M-1, M-0.75, M-0.50 and M-0 lambs, respectively. Differences in final BW at slaughtering and hot or cold carcass yields were coherent with those found in growth performance. Supplementing with mulberry forage at 0.75% of BW was the feeding alternative showing the best productive response. Results are shown in Table 1.

Table 1 (Abstr. T255). Performance data

Item	Diet				SEM
	M-1	M-0.75	M-0.50	M-0	
Initial BW, kg	20.5	20.7	20.7	20.7	0.38
Final BW, kg	29.6^{b}	32.2^{a}	32.3^{a}	32.8^{a}	0.57
BW change, kg	9.1^{b}	11.5^{a}	11.6^{a}	12.1^{a}	—
ADG, g/lamb/d	100.2^{b}	124.7^{a}	125.4^{a}	128.9^{a}	3.08
Total feed intake, g DM/lamb/d	835.8^{b}	908.2^{a}	953.7^{a}	930.0^{a}	7.0
Average feed intake, g DM/kg BW	33.4	34.3	36.0	34.8	—
Average feed intake, g DM/kg BW$^{0.75}$	74.6	77.9	81.7	79.1	—
Feed conversion, kg DM/kg BW gain	11.6^{a}	9.9^{c}	10.28^{b}	9.70^{c}	—
Hot carcass weight, kg	11.5^{b}	13.3^{ab}	13.5^{a}	13.7^{a}	0.30
Cold carcass weight, kg	11.2^{b}	13.0^{ab}	13.2^{a}	12.8^{ab}	0.28
Gastrointestinal tract weight, kg	8.5	9.4	7.7	7.9	0.25
Offal's weight, kg	0.8	1.0	1.0	0.9	0.03
Perirenal and mesenteric fat, kg	0.95	1.2	0.93	1.12	0.09
Hot carcass yield, %	40.2^{b}	41.0^{ab}	43.2^{a}	43.4^{a}	0.45
Cold carcass yield, %	39.3	40.2	42.2	40.8	0.57

^{a,b}Values with different superscripts in the same row differ at $P < 0.05$ (Tukey test).

Key Words: fattening tropical lamb, concentrate substitution, mulberry forage supplementation

T256 Carcass quality of guinea pigs: Sex effect on fattening or discarded animals. César Hernández[1], Iván Barba[1], Julio Palmay[1], Lisbeth Medina[1], Antonio Morales de la Nuez[2], Noemí Castro[3], Anastasio Argüello[3], and Davinia Sánchez Macías*[1], *[1]Department of Agroindustrial Engineering, Universidad Nacional de Chimborazo, Riobamba, Chimborazo, Ecuador, [2]Facultad de Ciencia Pecuarias, Escuela Superior Politécnica de Chimborazo, Riobamba, Chimborazo, Ecuador, [3]Animal Science Department, Universidad de las Palmas de Gran Canaria, Arucas, Las Palmas, Spain.*

Guinea pigs are used for meat production in South America, Africa, and Asia. The increased interest in this product is due to the low production price, and because of their relatively rapid reproduction and the large litter size. The objective of the present study was to evaluate the effect of age and sex on weight, yield, drip loss and pH evolution in guinea pig carcasses. Forty guinea pigs (10 male and 10 female of 3 mo age, and 10 male and 10 female of 12 mo age discarded animals) were used. The animals were fasted during 14 h before slaughter. Live weight at slaughter (LWS), empty body weight (EBW), and hot and cold carcass weights (HCW and CCW) were recorded. pH evolution was measured at 15, 45 min and 24 h after slaughter in *Longissimus dorsi* (LD) and *Psoas major* (PM) muscles. Four different carcass yields and drip loss (in grams and percentage) were calculated. Twelve mo-age animals showed higher LWS, EBW, HCW and CCW than 3 mo-age guinea pigs. The lowest values of hot or cold carcass yields (HCY, CCY) were observed in 3 mo-age male guinea pigs and no differences were found among the other groups. CCY was lower than HCY in all cases, due to the drip loss during the chilling time (24h at 4°C). When yields were presented related to empty body weight, the values were higher than

the yields that used live weight at slaughter, as expected. Discarded animals had higher drip losses, but expressed in percentage, 3 mo-age females had the highest losses, while the 12 mo guinea pigs showed the lowest losses. pH declined significantly during 24h in both muscles and all the animals, with the exception of 12 mo-age female guinea pigs. At 15 and 45 min LD did not show differences due to sex or age. After 24h, 12 mo-age females had the highest pH values (6.37) and 3 mo-age females had the lowest (5.54). When pH in PM was analyzed, the results revealed different behavior than LD. At 15 min and 24 h, 12 mo females presented the lowest pH (6.29 and 6.30, 15 min and 24 h, respectively), while the in the other groups pH ranged from 6.70 to 6.44 at 15 min, and was near to 6 after 24h postmortem.

Key Words: carcass quality, sex, guinea pig

T257 Comparison of linear carcass measurements in male or female fattening and discarded guinea pigs. César Hernández[1], Julio Palmay[1], Iván Barba[1], Jairo Espinoza[1], Antonio Morales de la Nuez[2], Noemí Castro[3], Anastasio Argüello[3], and Davinia Sánchez Macías*[1], *[1]Department of Agroindustrial Engineering, Universidad Nacional de Chimborazo, Riobamba, Chimborazo, Ecuador, [2]Facultad de Ciencia Pecuarias, Escuela Superior Politécnica de Chimborazo, Riobamba, Chimborazo, Ecuador, [3]Animal Science Department, Universidad de las Palmas de Gran Canaria, Arucas, Las Palmas, Spain.*

Linear carcass measurements (LCM) are important variable of carcass quality. Several studies describe a relationship between LCMs and body live weight and other parameters of carcass and meat quality in different species. Guinea pigs are an important source of protein in numerous undeveloped countries and currently they are introducing in developed countries. The present study analyzes the effect of sex and fattening or discarded guinea pigs on LCMs carcass. Forty guinea pig carcasses after 24 h of chilling were selected: 20 from 3months-age fattening animals (10 males and 10 females) and 20 from 12 mo-age breeding discarded animals (10 males and 10 females). The following measurements in carcasses after chilling for 24 h at 4°C were recorded: carcass length (L), loin length (Lo), hind limb length (F), width of the buttocks (G), lumbar circumference (LC), thorax circumference (ThC) and thorax width (ThW). Furthermore carcass compactness (CarC) and leg compactness (LegC) were calculated. L, Lo, LC and ThC were higher in 12 mo-age than 3 mo-age guinea pigs. Sex did not affect the described measurements, and G values were similar (7 cm) in all studied animals. F was higher in 12 mo-age males (12 cm), while 3 mo-age females showed the smaller value (9 cm). There was a sex effect on F for 12 mo animals, being higher in males than in females (12 *vs* 10 cm, respectively). When CarC was analyzed an age effect was evident in 12 mo-age animals, which showed 40g cm-1 of carcass weight vs 25–30g cm-1 for the 3 mo-age guinea pigs. So, after 3 mo the animals not only increased their length, but they also increased their body mass. Sex had an important effect on LegC of fattening guinea pigs: males had higher values than females (67% and 55%, respectively). However, in discarded guinea pigs, males showed smaller compactness than females (50% and 60%, respectively).

Key Words: linear carcass measurement, carcass quality, guinea pig

T258 Fatty acid composition of fats from female and male muskoxen (*Ovibos moschatus)* living in western Greenland. Susana P. Alves[1], Angelo Cabo[1], Katrine Raundrup[2], Rui J. B. Bessa[1], and André M. de Almeida*[3], *[1]CIISA/FMV - Centro Interdisciplinar de Investigação em Sanidade Animal, Faculdade de Medicina Veterinária, Universidade de Lisboa, Lisboa, Portugal, [2]Greenland Institute of Natural Resources, Nuuk, Greenland, [3]Instituto de Biologia Experimental e Tecnológica, Oeiras, Portugal,*

Muskoxen (*Ovibos moschatus*) are large ruminants living in Arctic habitats, and their diet is usually dominated by grasses, sedges and dicots. Muskoxen have an exceptional ability to fatten during spring and summer to support their energy needs during the arctic winter. However, little is known about the fatty acid (FA) composition of muskox meat, adipose tissue and liver. The objective of this study is to characterize the FA composition in samples from muskox females and males from Western Greenland. Muskox samples (muscle, adipose tissue and liver) from adult female (n = 12) and male (n = 8) were collected around Kangerlussuaq (West Greenland) during the winter hunting season of 2014. Samples were freeze-dried and lipids were extracted using dichloromethane and methanol (2:1, v/v). Total lipids were measured gravimetrically. Fatty acid methyl esters (FAME) were prepared from the lipid extracts with sodium methoxide in methanol followed by hydrochloric acid in methanol. FAME were quantified by GC-FID using a Shimadzu GC-2010 Plus (Shimadzu, Kyoto, Japan) equipped with a TR-CN100 capillary column (100 m, 0.25 mm i.d., 0.20 µm film thickness, Teknokroma, Spain). FAME were expressed as g/100 g of total peaks and data were analyzed using the PROC MIXED of SAS (SAS Institute Inc., Cary, NC) with a model that included the sex (female vs. male) as the single effect. Muskox muscle, adipose tissue and liver contained about 396, 916 and 150 mg/g DM of total lipids, respectively. Females showed the highest fat content ($P = 0.046$) compared with males, which might be an additional energy reserve for the late-winter lactation. More than 60 FA were detected in muskoxen samples, however, the 18:1*cis*-9 was the dominant FA in muscle and adipose tissue, presenting more than 43% and 32% of total FA, respectively. The great oleic acid concentration in muskoxen fats might indicate a higher lipogenic activity in these animals. Differences between sexes on the FA composition were minor in liver and more pronounced in adipose tissues. In general, males presented more levels of branched-chain FA, while female presented more oleic acid.

Key Words: musk ox, fatty acid profile

T259 Body condition score, subcutaneous fat and reproductive performance relationship in *Bos indicus* cows in a tropical region of Mexico. Ivette Rubio, Victoria Blas, Manuel D. Corro*, Clara Murcia, and Carlos S. Galina, *Faculty of Veterinary Medicine and Zootechnics National Autonomous University of Mexico, Mexico, DF, Mexico.*

With the aim of evaluate the relationship between body condition, subcutaneous fat and reproductive performance in *Bos indicus* cattle in the Mexican tropics. Sixty multiparous cows were selected, with an average of 186.5 ± 90.8 d postpartum, synchronized with intravaginal device with natural progesterone. Body condition (BCS) scale 1–9, subcutaneous body fat (BF) by ultrasonography and live weight (LW) were measurement at 3 different times during a 90 d breeding period in all cows. The BF was defined as the subcutaneous layer of fat between the skin and fascia of the *longisimus dorsi* muscle and measured between the 2nd and 3rd spinous of the lumbar vertebrae. We assessed the level of progesterone blood at the beginning of the breeding season. The cows were grouped, according to the BCS, group1 (n = 25) cows with less than 4.5 and group 2 (n = 35) more than 4.5. An ANOVA was used to determine the differences between BCS, BF and LW. A linear correlation was performed to assess the association between BCS, BF and LW. At the beginning of the breeding season a larger ($P < 0.05$) proportion of cows in group 2 were cycling, and responded to synchronization than

those in group 1. BF was higher ($P < 0.05$) in group 2 than group 1, 0.995 ± 0.091mm and 0.847 ± 0.114 mm, respectively. Although, there was a moderate positive relationship between BCS and BF, BCS can be a predictor of fat thickness as an indicator of body energy stored to maintain reproductive function. Because of this, Bos indicus cows with higher BF, at beginning of breeding season, would have a greater chance to become pregnant by the end of breeding season.

Key Words: body condition, subcutaneous fat, reproduction

T260 Effects of diet type and a yeast product in performance, nutrient digestibility, intestinal morphology, carcass composition and visceral organ mass by guinea pigs. Andres E. Idrobo, Karina M. Boada, Patricia X. Falconi, and Christian H. Ponce*, *Departamento de Ciencias de la Vida y Agricultura, Universidad de las fuerzas Armadas ESPE, Sangolqui, Ecuador.*

An experiment was conducted to evaluate the effects of a yeast culture/enzymatically hydrolyzed yeast product (Celmanax; Varied Industries Corp. Inc., Mason City, IA) and a diet type on performance, nutrient digestibility, intestinal morphology, carcass composition and visceral organ mass by guinea pigs. Eighty-eight guinea pigs (initial BW = 453.21 g ± 21.90 g) were group fed in 24 pens during a 69 d feeding period. Treatments were arranged in a 2 × 2 factorial and included a concentrate diet (C) or a mixture of forage and concentrate diet (M) and supplementation of Celmanax (Ce, 0 or 0.1% of diet DM). No type of diet × addition of Ce interactions were detected in any variable measured ($P \geq 0.157$). Animals fed the M treatment had greater CMS, ADG, and improved G:F during the feeding period ($P < 0.001$). Supplementation of Ce had greater CMS and improved G:F during the first 49 d of the experiment ($P \leq 0.048$). However, overall performance was not altered by Ce supplementation ($P \geq 0.247$). Fat digestibility was greater for C ($P < 0.001$), and crude fiber digestibility was decreased ($P = 0.004$) compared with M. Nutrient digestibilities were not altered by Ce supplementation ($P \geq 0.285$). Feeding M increased dressing percent, empty body weight, fractional mass of: liver, large intestine, portal drained viscera, and total splanchnic tissue ($P \leq 0.019$) compared with C. Carcass characteristics and visceral organ mas were not altered by Ce supplementation. Fatty acid profile from adipose tissue was not different across treatments ($P \geq 0.053$). The relation between n-3:n-6 fatty acids was greater for animal fed M compared with C ($P = 0.019$). Villus height and crypt depth were increased by Ce supplementation ($P \leq 0.019$). Animals fed M diet had greater crypt depth ($P = 0.05$). Results indicate that feeding a mixture of forage and a concentrate diet results in positive effects in performance and carcass characteristics, and supplementation of Celmanax may have positive effects on performance and intestinal characteristics under both feeding regimens.

Key Words: diet type, guinea pig, yeast product

T261 Energy flow analysis on dairy farms in North Carolina and Malawi. Shalimbala Chizonda* and Jonathan C. Allen, *North Carolina State University, Raleigh, NC.*

Milk production in developing and tropical countries is subject to different constraints than in the US. Even large, advanced dairies in Malawi have different inputs of energy and materials to optimize their milk output compared with moderate sized dairy farms in the US The objective of this study was to compare energetic inputs, outputs, and efficiencies of dairy farms in Malawi (southeast Africa) and North Carolina to assess sustainable milk production. Feed consumption and milk production data were collected from Katete Dairy herd in Lilongwe, Malawi, consisting of 408 cattle with 108 lactating cows, and the NCSU Dairy Research and Teaching Farm, housing 245 Holstein and 55 Jersey cows and 170 lactating cows. Both are teaching farms that employ extensive record keeping. Milk production averaged 34 and 19.5 kg/cow/day at NCSU and Katete, respectively. Feed energy intake was 85.8 Mcal/cow/d at NCSU and 135 Mcal/cow/d at Katete. Thus, return of feed energy as milk energy was 24.7% efficient at NCSU and 11.3% efficient in the lower producing cows at Katete. Manure is recycled for crop production at Katete, and is processed with a solids separation and lagoon system at NCSU. Additional factors that impact the overall farm efficiencies include inputs of petroleum fuels and electricity, and the number of calves, heifers and dry cows fed. The project identifies factors in dairy production that should be considered to improve efficiency, sustainability, and milk supply. Both farms had a substantial portion of the energy fed to the cows lost to the environment as composted manure in soils or lagoons that did not capture the heat or methane generated.

T262 Nestlé China Dairy Farming Institute: Development of collaborative, science-based, practical, sustainable courses. Karen Nielsen*, Pamela Ruegg, and David Combs, *University of Wisconsin, Madison, WI.*

The Chinese dairy industry has expanded rapidly as the growing middle class demands higher protein diets. However, because there were not many dairy farms in China's traditional agricultural system, few farmers and farm managers have the knowledge and experience to run dairy farms using modern, science-based practices. To improve dairy science knowledge, Nestlé opened a comprehensive, collaborative, science-based Dairy Farming Institute (DFI) in 2014 that includes farms, laboratories, classrooms, living quarters, offices, and cafeteria in Shuangcheng, Heilongjiang Province, in northeastern China. The University of Wisconsin-Madison was chosen to lead DFI course development. Faculty, staff and affiliates of the UW-Madison work on all elements of curriculum design, program planning, establishment of learning objectives and core competencies, and evaluation of training programs and trainers. Courses are developed by teams of UW subject matter experts, industry partners and DFI trainers, and include instruction at basic, intermediate, and advanced levels for farm workers, supervisors and managers, and for dairy professionals such as veterinarians and nutritionists. Courses developed are practical, hands-on, and science-based with a goal of consistency in content, evaluation, and excellence in course delivery. Courses are offered many times and the trainers delivering the lectures, and leading the group case study work and hands-on activities in the barns or laboratories may be different from one course to the next. Therefore, materials must include clear instructions for future trainers and train the trainer sessions are provided before every new course. New trainers are evaluated, suggestions and advice are provided, and those who receive favorable evaluations continue to teach the DFI courses, making the program sustainable. Participating DFI partners include Alltech, Alta Genetics, Avery Weigh-Tronix, Boehringer Ingelheim, Eastrock, Elanco, Foester Technik, GEA, Goke/Storti, IFCN, Land O'Lakes, SCR, Zoetis, and Northeast Agricultural University in Harbin.

Key Words: dairy course development, university-industry partnerships