

Production, Management and the Environment: Management

W333 Nutritive value and silage conservation of mango industrial by products as animal feed in ruminants. A. Conde^{*3,1}, A. P. Sandoval², M. C. Cueto¹, N. M. Rojas³, and L. M. Arevalo⁴, ¹Universidad de la Sabana, Bogotá, Colombia, ²Corpoica, Nataima, Colombia, ³Universidad de La Salle, Bogotá, Colombia, ⁴Universidad UDCA, Bogotá, Colombia.

Mango by-products were evaluated in order to define its potential as animal feed in ruminants. Seed and peels from Tommy Atkins and Keitt varieties in different days of industrial process were collected in Frutol Ltda, a fruit industrial company, located in Espinal - Tolima Colombia and analyzed in terms of chemical composition (dry matter DM, crude protein and its fractions A, B1, B2, B3 and C, residual insoluble ethanol RIE, NDF, ADF, lignin, structural carbohydrates: B2 and C, non structural carbohydrates (NSC): A and B, extract ether, ash and gross energy) and ruminal degradation kinetics with the methodology and model proposed by Orskov and McDonald. Tannins and saponins as antinutritive factors were analyzed. The effects of mango by-products as a feed supplement in dairy cows were simulated using the net carbohydrate and protein model, CNCPS. Different silage conservation conditions were evaluated in order to establish the best fermentation process. Peels showed better nutritional quality than seeds due to NSC, in special sugar fraction. Tommy Atkins variety had higher contents of DM, NSC and lower contents of NDF and lignin than Keitt. Higher degradability was found in peels 94%, 99% than in seeds 40%, 54% in Keitt and Tommy, respectively, when Orskov model parameters were estimated. Tannins and saponins were not detected. The principal problem in silage conservation was the low content of DM in mango agro-industrial by-products which was overcome with the 15% inclusion of rice meal before fermentation process. Simulations in the mechanistic CNCPS model predict that mango peels could be a good supplement in dairy cows because its metabolizable energy supply.

Key Words: carbohydrate fractions, mango by-products, silage conservation

W334 The ability of essential oils to inhibit *Salmonella* growth. K. S. Macklin^{*}, J. T. Krehling, Z. T. Williams, and M. A. Bailey, Auburn University, Auburn, AL.

Salmonella is one of the leading causes of bacterial origin food borne illness in the US. This genus of bacteria is often associated with poultry and the ability to limit or eliminate it is of importance to the consumer as well as to the poultry industry. Historically antibiotics have been added to poultry feed to improve gut health and bird weight gain. Typically antibiotics are not added to control *Salmonella*. Regardless, there is growing sentiment by consumer and government groups to prohibit the use of antibiotics in animal agriculture. This has prompted the need to find a viable alternative to antibiotics; one such alternative is essential oils (EO). EO have been shown to inhibit bacterial growth in vitro and alter the intestinal microbial profile in vivo. In this trial, 13 different subspecies of *Salmonella* were tested against 11 essential oils and 3 antibiotics in a disc diffusion test. The tested EO consisted of red thyme, white thyme, tea tree, black pepper, tarragon, clove bud, Spanish sage, lemongrass, Comoric basil, cinnamon bark and cinnamon leaf. Antibiotics tested included penicillin G at 2 and 10 units, tetracycline at 30ug

and chloramphenicol 30ug. EO discs were created by adding 5 ug of each oil onto a 6mm sterile disc and allowed to dry. Trypticase soy agar with 5% sheep blood plates were spread plated with each *Salmonella*. EO impregnated discs were then placed onto each agar plate (4/plate). Plates were then incubated aerobically at 37C for 24 hours. At that time the zone of growth inhibition (if any) for each disc was determined. In this trial, *Salmonella* isolates were considered susceptible if the zone of inhibition was greater than 15mm in diameter, anything less than is considered resistant. All of the essential oils and antibiotics were tested in triplicate against each *Salmonella* isolate. Among the EO tested, the three that *Salmonella* was most susceptible to were cinnamon bark, red thyme and white thyme oils. *Salmonella* isolates were resistant to tea tree, black pepper, tarragon, sage, and Comoric basil oils. The remaining four EO showed variable activity against the different subspecies of *Salmonella* tested.

Key Words: *Salmonella*, essential oils, disc diffusion

W335 Prediction of pregnancy by increased physical activity measured prior to timed insemination. A. H. Sanders^{*}, A. De Vries, and J. Block, University of Florida, Gainesville.

This study considered activity increases close to timed-AI (TAI) following Ovsynch as predictors of pregnancy. Identifying cows with a greater probability of pregnancy could improve TAI efficiency through select use of semen. Data were 632 breeding records and activity recorded at twice daily milkings as average steps/hr by S.A.E. Afikim pedometers. The percent deviation of activity from the previous 10d rolling average of the same (a.m. or p.m.) milking session was calculated for the day before and day of TAI (4 milkings). At 32d after TAI, pregnancy was diagnosed by ultrasound. Overall, 45% of cows were pregnant. Logistic regression was used to evaluate the effect of activity deviations (AD) on probability of pregnancy (P32). When AD was modeled as a continuous effect, the AD from the first milking on the day of TAI (TAI-AM), and the second milking the previous day (PRE-PM) were significant predictors of P32 but model fit for PRE-PM was poor. For TAI-AM, 5 thresholds for AD were considered for dichotomizing activity signals. Zero, mean AD and mean plus SD (56.8% and 128.7% increase in AD) were 3 thresholds. ROC analysis was used to estimate an optimized threshold. Model fit for ROC was improved by ignoring AD <19.5%, which is the SD of a normal distribution with $\mu=0$ and lower half defined by recorded AD <0 (i.e baseline or non-estrus AD). The resulting optimal threshold was at 84.2% increase in AD (AUC=0.62). Finally, SD_{base} (19.5% increase in AD) was also considered as a threshold. For TAI-AM, the adjusted OR for P32 was significant when the mean AD or those thresholds greater than the mean were applied to AD, but OR was maximized (2.28) with the ROC determined threshold. The binomial probability for P32 was 39% (CI = 35-44%) for cows with AD below this threshold (n=465) and 60% (CI = 52-57%) for cows with AD above this threshold (n=167). For PRE-PM, adjusted OR for P32 was also maximized (1.55) with 84.2% threshold for AP, but fit was poor and CI for binomial probabilities overlap at all thresholds considered. With twice daily milking, AD for the milking interval prior to TAI is a useful indicator of probability of pregnancy.

Key Words: activity, pregnancy diagnosis, pedometer