

594 Feedlot performance of Nellore cattle submitted to either nutritional restriction or intake of concentrate feedstuffs prior to adaptation period.

M. C. Pereira¹, A. L. Rigueiro¹, A. C. Melo², A. M. Silvestre², R. R. Ferreira Filho², C. H. Soares³, M. D. Arrigoni¹, and D. D. Millen⁴, ¹São Paulo State University (UNESP), Botucatu campus, Botucatu, Brazil, ²São Paulo State University (UNESP), Dracena campus, Dracena, Brazil, ³São Paulo State University (UNESP), Dracena campus, Dracena, BC, Brazil, ⁴São Paulo State University (UNESP) / Dracena Campus, Dracena, Brazil.

The study was conducted at the São Paulo State University feedlot, Dracena campus, Brazil. It was designed to compare the effects of nutritional restriction or intake of concentrate feedstuffs before the adaptation period on feedlot performance of Nellore cattle. The experiment was designed as a completely randomized block, which was replicated 8 times (4 animals/pen), in which 96 22-mo-old yearling Nellore bulls (365.5 ± 39.2 kg) were fed in 24 pens according to the treatments: Restriction (Tifton hay fed at 1.4% of BW + mineral supplement); Control (Tifton hay fed ad libitum + mineral supplement) and Concentrate (Tifton hay fed ad libitum + 0.5% of BW of a mix of concentrate feedstuffs and mineral supplement). This study lasted 144-d, divided into 2 periods: 32-d of pre-adaptation, in which cattle were submitted to the treatments, and 112-d of feeding high-concentrate diets, during which all cattle were fed the same diet. The adaptation program consisted of ad libitum feeding of two diets during the adaptation period with the concentrate level increasing from 72% to 86% of diet DM. The finishing diet contained: 73.5% cracked corn grain, 14.0% sugarcane bagasse, 9.0% cottonseed meal, 1.5% supplement, 1.2% urea and 0.8% limestone (DM basis). Cattle were fed ad libitum three times daily throughout the study. No significant treatment effect was observed for days to adapt to the finishing diet (Restriction = 14.6-d, Control = 14.9-d, Concentrate = 14.5-d). Nevertheless, cattle submitted to intake of concentrate tended to have greater ($P < 0.10$) initial BW (Restriction = 376.23^c, Control = 384.06^b, Concentrate = 397.21^a kg) at the beginning of the adaptation period, and also greater final BW (Restriction = 520.17^{ab}, Control = 503.23^b, Concentrate = 529.84^a kg) than cattle in the control group at the end of the study. Cattle submitted to nutritional restriction had greater ADG (Restriction = 1.29^a, Control = 1.06^b, Concentrate = 1.18^{ab} kg/d), DMI (Restriction = 9.19^a, Control = 8.56^b, Concentrate = 8.86^{ab} kg/d), and DMI expressed as % of BW (Restriction = 2.06^a, Control = 1.94^b kg, Concentrate = 1.91^b) than cattle in the control group. Likewise, cattle submitted to nutritional restriction had higher G:F ratios (Restriction = 0.140^a, Control = 0.124^b, Concentrate = 0.133^{ab}) during the period of feeding high-concentrate diets when compared to cattle on control group. Thus, cattle should be submitted to nutritional restriction or intake

of concentrate feedstuffs before the adaptation period to improve overall feedlot performance.

Key Words: adaptation, supplement, Zebu
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595 Does the supplementation during the growing phase and finishing phase influence the performance of Nellore cattle?

I. M. D. Oliveira^{1,2}, M. H. Moretti³, L. F. Prados¹, C. F. Nascimento^{4,5}, P. H. Gonçalves⁵, G. R. Siqueira^{1,5}, and F. D. D. Resende^{1,5}, ¹APTA - Agência Paulista de Tecnologia dos Agronegócios, Colina, Brazil, ²FAPESP (grant #2016/01961-2 and grant #2013/10340-3), São Paulo, Brazil, ³Agroceres, Rio Claro, Brazil, ⁴FAPESP (grant #2015/07046-1 and grant #2016/08867-1), São Paulo, Brazil, ⁵UNESP - Univ Estadual Paulista, Jaboticabal, Brazil.

The objective of this study was to evaluate the effect of the supplementation level during the growing and the finishing phase on the performance of Nellore bulls in pasture. Forty calves (172 ± 26 kg, 8 mo) were used in a randomized block designed study with a 2×2×2 factorial arrangement of treatments (2 supplementation levels in the cold, warm season and in the finishing phase). The growing phase comprises all the seasons of the year, so it was subdivided into cold (fall/winter) and warm (spring/summer) seasons. Thus, twenty animals were fed 1 g/kg BW per day (CP = 54%, TDN = 40%) and twenty animals were fed 5 g/kg BW per day (CP = 25%, TDN = 58%) during the cold season. Afterwards, in the warm season, the animals from each supplementation during the cold season were fed either mineral salt ad libitum or 5 g/kg BW. Then, in the finishing phase, the same animals of each supplementation strategies during the growing phase were fed with one of two levels of concentrate (15 or 20 g/kg BW per day, CP = 17% or 14%, TDN = 76 or 77%, respectively). At the end of the experiment (405 days) bulls were weighed and slaughtered. All parts of the body were weighed separately to quantify the empty body weight (EBW). All data (EBW, HCW, no-carcass components [NCC = blood, heart, lung, spleen, liver, kidney, gastrointestinal tract and KPH] and gut fill) were analyzed using the PROC MIXED of SAS with an alpha = 0.05. There were no interactions between supplementation levels during the phases ($P > 0.05$), so the factors were analyzed separated. The cold season supplementation did not affect any variables ($P > 0.05$). In the warm season, animals fed 5 g/kg BW had greater EBW (471 vs 425 kg, $P < 0.01$), HCW (303 vs 269 kg, $P < 0.01$) and NCC (168 vs 156 kg, $P = 0.01$) compared with animals fed mineral. On the finishing phase, animals fed 20 g/kg BW had greater EBW proportion (940 vs 923 g/kg BW, $P < 0.01$) and lower gut fill (30 vs 37 kg, $P = 0.03$) than those fed 15 g/kg BW. In conclusion, supplementation in the cold season does not influence the performance of finishing Nellore bulls in pasture. However, the

greater level of supplementation in the warm season and in the finishing phase produce animals with greater BW.

Key Words: *Bos indicus*, *Brachiaria brizantha*, nutritional strategies

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596 Effects of grinding versus steam-flaking on feeding value of blending barley and corn in low-forage diets fed to dairy cows.

K. Safaei¹, G. R. Ghorbani¹, M. Alikhani¹, A. Sadeghism¹, W. Yang^{*2}, and M. Saebi-Far¹, ¹Department of Animal Sciences, Isfahan University of Technology, Isfahan, Iran (Islamic Republic of), ²Lethbridge Research and Development Centre, Agriculture and Agri-Food Canada, Lethbridge, AB, Canada.

This study was carried out to evaluate the effects of processing method (grinding vs steam-flaking) on DM intake (DMI), ruminal pH and fermentation characteristics, total digestibility of DM, and milk production of dairy cows fed blended barley and corn-based diets. Eight multiparous mid-lactation Holstein cows (88 ± 12 DIM and 44.0 ± 1.5 kg milk/d) were used in a replicated 4 × 4 Latin square design with 21-d long of each period. Cows were fed ad libitum total mixed diet consisting of 25% corn silage, 15% alfalfa hay, and 60% concentrate with equal portion of barley and corn (DM basis). Treatments were: 1) ground barley and corn (GBGC), 2) steam-flaked barley and corn (SBSC), 3) ground barley and steam-flaked corn (GBSC), and 4) steam-flaked barley and ground corn (SBGC). Data were analysed using the MIXED procedure of SAS with model including treatment as fixed effect and the random effects of square, period within square and cow within square. The PDIF option adjusted by the Tukey method was included in the LSMEANS statement to account for multiple comparisons among treatments. Intake of DM (kg/d) tended ($P < 0.06$) to be less with SBSC (23.1) than other treatments (averaged 24.2). Digestibility of DM (% of intake) in the total digestive tract was greater ($P < 0.04$) with SBSC (73.9) and GBSC (73.4) than GBGC (70.3) and tended ($P < 0.10$) to be greater than SBGC (71.5). However, yield of actual milk (averaged 44.7 kg/d) and 3.5% fat corrected milk (FCM; 39.9 kg/d) as well as milk composition did not differ among treatments. Milk efficiency (milk yield/DMI) tended ($P < 0.09$) to be improved with SBSC (1.93) vs GBGC (1.85) or SBGC (1.84). Ruminal pH (averaged 6.45), total VFA (averaged 125 mM), and molar proportions of individual VFA were not affected except that molar proportion of acetate tended ($P < 0.06$) to be greater with SBGC (58.8%) than other treatments (averaged 56.0%). Cows fed GBGC diet had sorting index below 100 for the particles retained on 19- and 8-mm sieves, indicated that cows sorted for these particles. In contrast, cows fed SBSC diet had sorting index superior to 100 for the particles retained on 19 and 8-mm sieves, thus, cows sorted against these particles. These results suggest that

feeding cows with blend of steam-flaked barley and corn is beneficial to improve DM digestibility and milk efficiency.

Key Words: digestibility, grain processing, dairy cow
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597 Nutrient profiles, sub-fractions, energy values and degradation and digestion kinetics and their relationship with inherent molecular structures in chickpeas.

B. Sun^{1,2}, and P. Yu^{*1}, ¹University of Saskatchewan, Saskatoon, SK, Canada, ²South China Agricultural University, Guangzhou, China.

The objectives of this study were to (1) study chemical and nutrient profiles of CDC developed Chickpea variety (cv. Frontier Kabuli and Corinne Desi, with multi-year samples) in comparison with and a common CDC barley variety (cv. Cowboy) for ruminants in term of chemical profiles, protein and carbohydrate (CHO) sub-fractions, total digestible nutrients, and energy values, rumen degradation kinetics, and (2) quantify relationship between molecular structure spectral profiles and nutrient availability. The molecular spectral profile was carried out using Global sourced-Fourier transform infrared vibrational spectroscopy (GS-FT/VIR). The nutritive value for ruminants (nutrient profiles, CHO and Protein subfraction and rumen degradation) were determined using conventional rumen in situ and in vitro methods and CNCPS6.5 system. The results showed that: 1) chickpea had higher ($P < 0.05$) crude protein (CP), non-protein nitrogen, truly digestible CP, soluble CP, water-soluble carbohydrates, energy values, rumen degradable, bypass and intestinal digestible protein, lower ($P < 0.05$) carbohydrates, truly digestible non-fiber CHO, hemicelluloses, lignin, neutral detergent insoluble CP, and rumen bypass CHO compared with the CDC cowboy barley. CDC Frontier Kabuli chickpea had greater ($P < 0.05$) soluble CP, non-fiber CHO, total rumen degradable CHO, rumen degradable, bypass and intestinal digestible soluble protein, total digestible nutrients, truly digestible non-fiber CHO, energy values, and lower ($P < 0.05$) acid detergent fiber, acid detergent insoluble crude protein, cellulose than the Corinne Desi. 2) Molecular structure spectral profiles had a significant relationship with carbohydrate profiles, sub-fractions and rumen degradation, bypass, total digestible carbohydrate and protein. 3) Multiple regression study with parameter model selection indicated that molecular structure spectral profile could be applied to predict nutrient profiles and degradation characteristics for CDC chickpea and barley. In conclusion, CDC chickpea could be used as protein and energy source and Kabuli chickpea was better than Desi. Molecular structure spectral parameters had relationship with nutrient digestive features, could be used to predict nutrient availability in ruminants.

Key Words: Nutrient degradation and digestion, Molecular structure, Non-conventional feed
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