

**Protein metabolism of Nellore steers (*Bos indicus*) with low and high residual feed intake**

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Residual feed intake (RFI) is a feed efficiency trait independent of growth and mature weight. Genetic improvement in RFI may reduce the costs of feeding cattle, however a better understanding of biological processes underlying variation in RFI is necessary in zebu cattle. In this sense, it was aimed to evaluate myofibrillar protein metabolism in high- and low-RFI zebu (*Bos indicus*) cattle. Seventy-two Nellore steers (16 to 21 month-old, 334±19 kg initial body weight [BW]) were fed a finishing ration (74.5% TDN, 14.3%CP) on an ad libitum basis, for 70 days. Daily dry matter intake (DMI) and average body weight gain (ADG) were measured individually. RFI was calculated as the difference between actual DMI and the predicted DMI determined by linear regression of DMI on mid-test BW<sup>0.75</sup> and ADG. The lowest and highest 12 RFI steers were classed as low- (most efficient) and high-RFI (least efficient) groups, respectively. Total urine was collected for determination of daily 3-methylhistidine (3MH) excretion and myofibrillar protein breakdown rates. Initial and final skeletal muscle masses were estimated based on the BW. There were differences ( $P<0.01$ ) between low- and high-RFI groups for DMI (9.3 vs. 11.1 kg/d), feed:gain (6.4 vs. 7.6) and RFI (-0.80 vs 0.89 kg/d), but not for ADG (1.48 vs. 1.48 kg/d) and final BW (441 vs. 448 kg). High- and low-RFI cattle showed similar ( $P>0.05$ ) skeletal muscle protein gain (57.2 vs. 55.2 g/d), total 3MH in muscle (113 vs. 110 mmol) and total 3MH excretion in urine (1.96 vs. 2.06 mmol/d). There were no differences between high- and low-RFI cattle for fractional rates of myofibrillar protein degradation (1.76 vs. 1.85%/d), synthesis (2.01 vs. 2.09%/d) and accretion (0.24 vs. 0.24%/d). Myofibrillar protein metabolism did not differ between low- and high-RFI steers.

**Phenotypic correlations between residual feed intake, growth, carcass traits and reactivity in Nellore bulls (*Bos indicus*)**

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Residual feed intake (RFI) is a feed efficiency trait phenotypically independent of growth rate and mature weight. Breeding beef cattle for improved RFI may reduce feeding costs and increase profitability of beef business. However, associations between RFI with production traits and animal behaviour were not studied in Nellore cattle. A total of 96 Nellore young bulls, born in 2005 and 2006, that had measures on weaning weight (WW), birth weight (BW), yearling weight (YW), post weaning weight gain (WG) and reactivity score (animal agitation when restrained in the squeeze chute), were evaluated for RFI in 2007 and 2008, respectively. Bulls were fed individually for 68 days with a diet containing 68% of TDN and 14.3% CP. Body weight (BW) during the test and daily feed intake (DMI) were measured individually and RFI was calculated as the difference between actual DMI and predicted DMI for a common mid-test BW<sup>0.75</sup> and daily BW gain (ADG). All animals were weighed and ultrasonic measurements of Longissimus muscle area (REA) and backfat thickness (BF) on the 12th and 13th ribs were obtained every 21 days. Pearson correlation analysis was performed and probabilities lower than 5% were considered statistically significant. There were no correlations between RFI and WW ( $r=-0.04$ ), YW ( $r=-0.05$ ), and weight gain from 205 to 550 days of age ( $r=-0.02$ ). Also, RFI was not associated with ADG ( $r=-0.70$ ), backfat thickness ( $r=0.13$ ) and Longissimus area ( $r=0.15$ ). RFI was also not correlated to reactivity of the bulls ( $r=-0.001$ ). RFI was positively correlated with feed conversion ratio (DMI:ADG) ( $r=0.39$ ), feed intake ( $r=0.56$ ) and scrotal circumference ( $r=0.22$ ) and negatively correlated with feed efficiency ( $r=-0.42$ ) and birth weight ( $r=-0.22$ ). Therefore, RFI was not associated with growth, body weight and carcass traits in Nellore bulls.