

**Association of performance, visceral organ weights, plasma metabolites, and pancreatic enzyme levels with residual feed intake for different breed types of feedlot steers.**

C. J. Mader, G. Schick, S. P. Miller, and K. C. Swanson

Department of Animal and Poultry Science, University of Guelph, Guelph, Ontario, Canada.

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Variation of feed efficiency in beef cattle is well-documented, but little is known about what is responsible for this variation. This study attempts to identify physiological mechanisms associated with variation in residual feed intake (RFI). Crossbred steers (316.4±36.1kg) from Piedmontese (PI, n=14), Charolais (CH, n=20) and Angus/Simmental (AN/SM, n=12) sires were fed a corn-silage-based ration (56 d) before being adapted to a high-moisture-corn-based finishing diet (min 89 d) and individual feed intake was recorded. RFI was determined using a multiple regression prediction equation. At slaughter, visceral organ weights were recorded and tissue and blood samples collected. Pancreatic tissue was analyzed for total  $\alpha$ -amylase (AML) and trypsin (TRP) activity, and plasma was analyzed for urea nitrogen (PUN). CH had heavier colons (% of BW;  $p<0.001$ ) than AN/SM or PI and spleen weights (% of BW) differed between all treatments (CH>PI>AN/SM,  $P<0.0001$ ). AN/SM had higher PUN ( $P=0.04$ ) than CH or PI. RFI did not differ between breed types ( $p=0.28$ ). However, RFI was correlated with TRP ( $-0.3163$ ,  $P=0.04$ ) and marbling ( $0.3609$ ,  $P=0.01$ ). Results suggest that the partitioning of fat deposition may impact RFI. In addition, the process of protein digestion and utilization may be a significant contributor to variation in RFI.