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PSXII-19 Urine Metabolomics Analysis Associated with Feed Efficiency on Crossbred Steers during the Growing and Finishing Period on Forage- and Concentrate- Based Diets.

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A discovery project to identify non-invasive biomarkers that can detect subtle metabolic discrepancies for cattle feed efficiency was performed using untargeted and targeted urine metabolomics by ultra-performance liquid chromatography-mass spectrometry. Individual feed intake and body weight gain were measured in crossbred steers (n = 80) on a forage-based growing ration (stage-1) followed by a high-concentrate diet finishing ration (stage-2). Urine was collected on study days 0, 21, 42, 63, and 83 for each dietary stage. In total, 28 steers with the greatest and the least average daily-gain (ADG) within 0.32 SD of the mean of dry-matter-intake (DMI) were used. A principal component analysis of the untargeted metabolites fully segregated the highest-ADG and lowest-ADG animals, with overlap across diets (both stages). The urinary untargeted metabolites that segregated the ADG-groups (n = 199; P < 0.05), included steroid-hormones, bile-acids, alpha-linolenic acid metabolites, vitamin-B6, along with products of glycine, serine and threonine metabolism (metabolic pathway analysis: impact-value > 0.50; FDR < 0.10). Bile acids and steroids were then quantified in urine and their associations with animal performance and carcass composition evaluated by correlation and multiple logistic regression AUC-ROC curve analyses. In stage-1, urine concentration of cortisone was associated (P < 0.05) with ADG (r = -0.28), DMI (r = -0.40) and ribeye-area (r = -0.28); cortisol was associated with DMI (r = -0.32; P < 0.01) and testosterone was associated with ADG (r = -0.28; P < 0.01). The urine concentrations of 18 measured bile acids were negatively associated (P < 0.05) with DMI, and secondary bile acids were negatively associated (P < 0.01) with marbling and hot-carcass-weight. In stage-2, negative association between the bile acids glycocholic acid and deoxycholic acid with marbling and hot-carcass-weight were identified. Urine metabolomics provide new insight into the physiological mechanisms and potential biomarkers of cattle feed efficiency. USDA is an equal opportunity provider and employer.

Keywords: beef biomarkers feed efficiency

CORRIGENDUM

Corrigendum to: PSXII-19 Urine Metabolomics Analysis Associated with Feed Efficiency on Crossbred Steers during the Growing and Finishing Period on Forage- and Concentrate-Based Diets

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Corrigendum to: “PSXII-19 Urine Metabolomics Analysis Associated with Feed Efficiency on Crossbred Steers during the Growing and Finishing Period on Forage- and Concentrate-Based Diets” by Harvey C. Freetly et al. *Journal of Animal Science*. 2021. doi: 10.1093/jas/skaa278.

In the originally published version of this abstract, the author order was incorrect. The correct author order is Virginia Artegoitia, John Newman, Ron Lewis, Andrew P. Foote, Harvey C. Freetly. This has been corrected online.