
Does Processing of Low-quality Forages Impact Enteric Methane Emissions and Animal Efficiency?

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Abstract

The objective of this study was to investigate the use of bale processing technology and its impact on feed efficiency and enteric methane (CH₄) emissions in gestating beef cows. It was hypothesized that beef cows fed a diet containing processed straw would have a greater feed intake, improved performance, and show indications of improved NDF digestibility which could contribute to lower enteric methane emissions. 82 multiparous Angus cows were enrolled 90 days (\pm 20 days) to calving and randomly assigned to a dietary treatment of processed straw (PS: ~2-inch) or unprocessed straw (UnS: ~7-inch). The ration contained 33% straw, 64% mixed haylage, and 3% supplement pellet (DM basis) and was fed free choice to the cows until parturition. Weight, ultrasound (rib fat and rump fat), and BCS were collected every 28d to assess animal performance. Feeding behaviour and intake were measured daily by automated feed bins. Enteric emissions were collected every 14 days using a GreenFeed trailer (C-Lock Inc.). Statistical analysis used PROC GLIMMIX in SAS with cow and pen as random effects and diet as a fixed effect. Tukey-Kramer adjusted p values were used to compare treatment means and significance was declared at $p < 0.05$. Results showed that the ADG of the PS cows was 36.7% greater than that of the UnS cows ($p = 0.04$). This gain was likely a result of higher DMI for PS cows compared to UnS cows ($p < 0.01$). PS cows consumed 1.17 kg/d more than UnS cows which could indicate increased palatability. The average CH₄ emissions (g/d) per animal were higher for PS cows compared to UnS cows ($p < 0.01$). However, no difference in CH₄ (g/d) per DMI (kg) ($p = 0.82$) were observed, which could indicate that the differences in CH₄ (g/d) were due to the higher DMI in the PS group. This work provides evidence of improved palatability, feed intake, and animal performance for gestating beef cows fed processed low-quality forages and could present an opportunity for the use crop residues as a sustainable feed ingredient for cows without concern for reduced intake and performance.

Keywords: Forage processing, enteric methane, palatability, intake, crop residue.