COMPARING METHODS OF TOTAL DAILY URINE ESTIMATION BETWEEN BEEF STEERS FED CONSERVED ALFALFA-BERMUDAGRASS DIETS IN THE SOUTHEAST

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Introduction

- The Deep South faces harsh summers due to extreme temperatures and low-quality perennial forages.
- Incorporating alfalfa = economically advantageous
- **Objectives:**
  1. Compare methodology for estimating total urine output
  2. Analyze the relationship between total urinary output and dry matter digestibility of conserved forage diets with varying inclusion rates of alfalfa

Figure 1. Method of urinary spot sampling of steers in stanchions receiving designated diets

Experimental Design

Completely Randomized Design

- 4 replicates (n = 4)
  - Steers (average 909.1 lbs +/- 90.9 lbs)
- 3 diets
  - Alfalfa-bermudagrass baleage (ABG); alfalfa baleage, bermudagrass hay
- 3 periods
  - 1 diet / period due to potential spoilage

Methods

Figure 2. Colorimetric assay for creatinine concentration in urinary spot sample

- **Period** = 21-day adaptation + 5-day collection phase
- **Feed and ort analysis:**
  - feed intake and refusal weights
  - Feed nutritive value: NDF, ADF, ADL, DM, CP
- **Collection phase analysis =**
  - Total fecal weights
  - Total urine
  - Rumen fluid
- Steers were randomly allocated to diets using BW
  - Initial BW and final BW were measured each period
- **Urinary Analysis:**
  - Daily average
  - Composite
- **Statistics:**
  - R Core Team (2023)
  - $\alpha < 0.05$

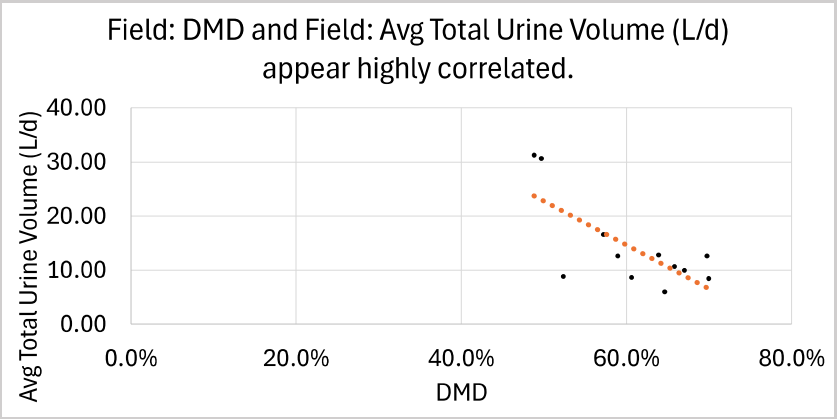

Figure 3. Correlation between dry matter digestibility (DMD) and average total urine volume for the 3 diet treatments – alfalfa-bermudagrass baleage, alfalfa baleage, and bermudagrass hay ($R^2 = 0.48$, *P = 0.007)*

Results

Methodology comparison: (*P = 0.33)*

- No difference was found between total urine estimation from an average of daily samples or composite

Forage quality: (*P < 0.04*)

- Alfalfa baleage had a significantly higher DMD than ABG baleage or bermudagrass hay

Total urinary output estimation:

- No significant difference between diets or animals

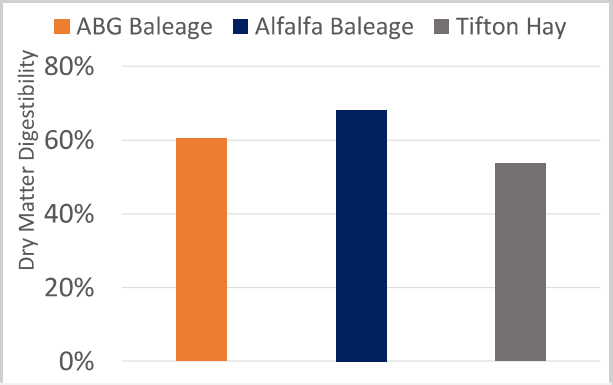

Figure 4. Mean Dry Matter Digestibility (DMD) for the 3 different treatments – alfalfa-bermudagrass baleage, alfalfa baleage, and bermudagrass hay (*P < 0.04*)

Conclusion

Alfalfa significantly increased nutritive value and daily dry matter intake. However, we found a negative relationship between DMD and total urinary output.

Additional research should be conducted to determine the effects of conserved forage type and the relationship between DMD and urinary output. It is also necessary to determine the efficacy of creatinine excretion in a urinary spot sample as a true estimate of total urine output.

Funding source: USDA-NIFA Alfalfa Forage Research Program