

Salt Limited Intake: Impacts of Salt Level, Frequency, and Form of Supplement on Intake, Nutrient Digestion, and Variability of Supplement Intake in Beef Cattle



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Introduction

- Beef producers are faced with the challenge of developing strategies to maximize the use of forage resources while minimizing supplement inputs (DelCurto et. al., 2000).
- Salt is commonly used as a supplement intake limiter, but research is limited. Studies have shown salt to increase supplement intake (Pickett and Smith, 1949), and that it can also decrease intake (Riggs et al., 1953; Kunkle et al., 1999).
- Current data being analyzed in the lab at Montana State University has shown that supplement intake is highly variable when using salt as an intake limiter (DelCurto, unpublished data).
- Additionally, minimal research is available on the impact of high salt diets on rumen microbial populations and nutrient digestibility. Cardon (1953) observed that digestibility was not altered by diets with added salt, but (Moseley and Jones, 1974) observed a decrease in digestibility as salt increased in the ration.

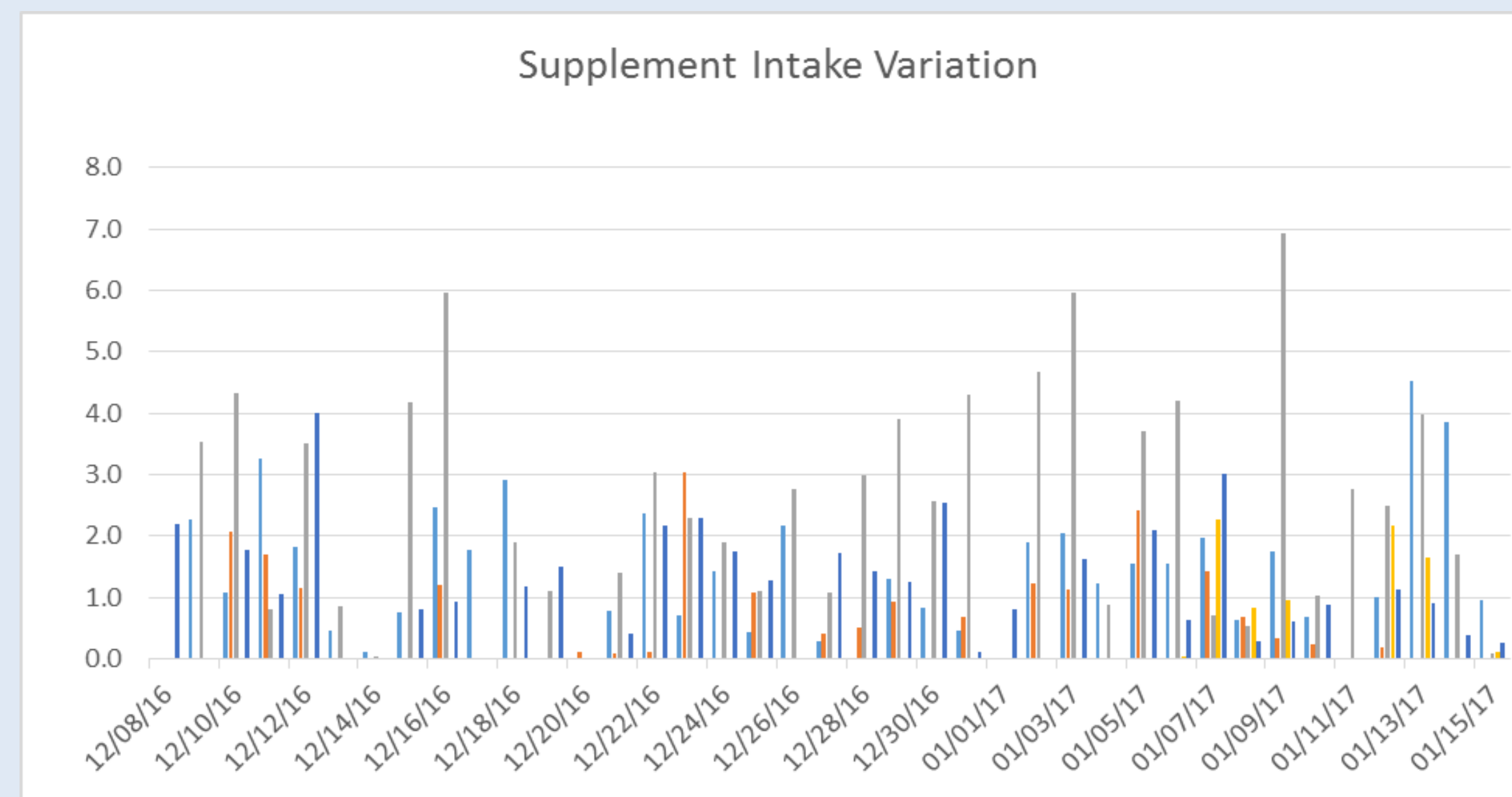


Figure 1. Individual intake (kg) variability for 10 random animals. DelCurto, unpublished data 2017.

Objectives

- Determine the impacts of utilizing salt as an intake limiter on nutrient digestion and intake variability, and evaluating the difference between loose form and pelleted form of a salt-limited protein supplement.
- Evaluate the impact of salt consumption on forage dry matter intake, digestion, digesta kinetics, microbiology, and ruminal fermentation characteristics.
- Provide insight into how to effectively use supplements to improve livestock production.

Materials and Methods

Intake Variation Study:

➔ 60 heifers will be used to compare intake and intake variation of a pelleted or loose form of the same salt-limited, energy supplement over an 84-day trial. Heifers will be allotted to one of 3 treatment groups:

- 1) Control, no supplement
- 2) Pelleted form
- 3) Loose form

Heifers will be weighed and body condition scored on days 0, 42, and 84. Individual dry matter supplement intake, frequency of feed events, and total number of feed events will be measured for each heifer.

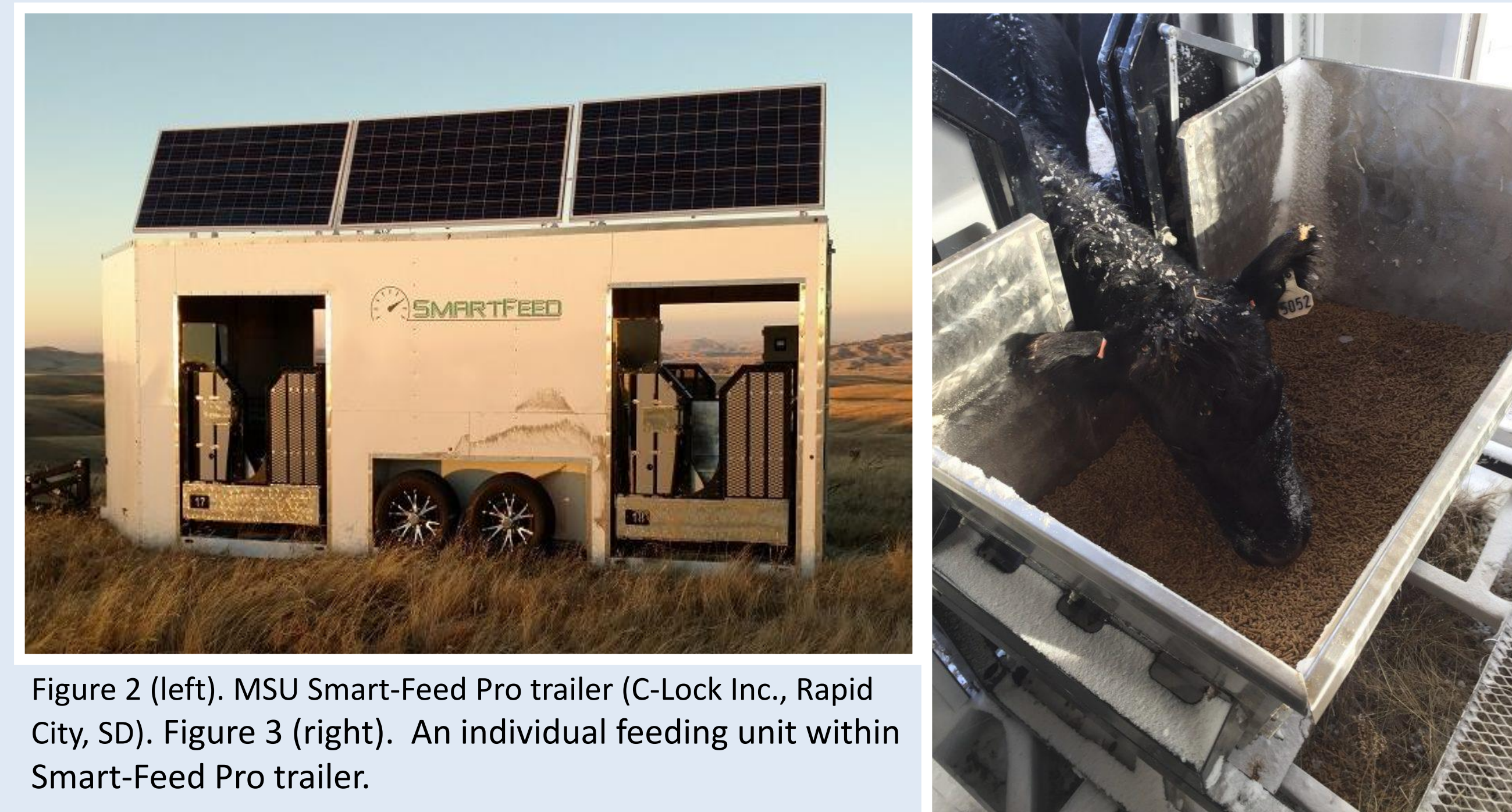


Figure 2 (left). MSU Smart-Feed Pro trailer (C-Lock Inc., Rapid City, SD). Figure 3 (right). An individual feeding unit within Smart-Feed Pro trailer.

Digestibility study:

➔ Eight fistulated heifers will be used in 2 incomplete 5X4 Latin Squares with a 2X2+1 factorial treatment design. Animals in sq. 1 will be fed low quality hay (<7% CP hay) and sq. 2 moderate quality (8 to 10% CP hay) to determine the impacts of the amount and frequency of salt. Within squares, treatments will be:

- 1) Control
- 2) 0.23 kg daily
- 3) 0.45 kg alternating days
- 4) 0.45 kg daily
- 5) 0.90 kg alternating days

Each period will be 20 days in length with a 10 day adaptation period, 7 day total dry matter, water intake, and total fecal collection, and 2 day collection of rumen fluid samples.

Potential Application

- The proposed research will increase our knowledge of how to effectively use salt as an intake limiter and may improve supplement composition to better utilize salt, which might ultimately improve strategic supplementation practices and beef production.
- The proposed research will provide insight into the impacts of different levels and frequencies of salt on digestibility and the ruminal microbe population.



Figure 4. MSU research heifers (Intake Variation Study) located at Fort Ellis, Bozeman, MT, May 2017.

Acknowledgements

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Contact Information

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