

# Evaluation of Alternate Weaning Techniques with Fecal Cortisol Metabolites

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## Introduction

Weaning in beef cattle is defined as the physical separation of the cow-calf pair and is normally associated with dietary, social, environmental, and immunological changes in the calf. Abrupt weaning leads to behavioral changes, decreased weight gain, and increased levels of stress-associated hormones.

Alternative weaning methods are utilized to decrease stress on calves. Fenceline weaning is moving the calf into an adjacent paddock which ends suckling, but allows the calf to maintain social contact with its dam. Fenceline weaning reduces the time calves spend walking and vocalizing, and increases the time calves spend eating and lying down. Measurement of blood cortisol can be problematic due to the acute nature of cortisol release which may reflect handling and response to blood collection in addition to baseline cortisol status. The utilization of fecal cortisol metabolites allows determination of cortisol status hours prior to sampling. The objective of this study was to compare fecal cortisol metabolite concentrations in beef calves weaned abruptly and by alternate techniques.

## Materials and Methods

The study was performed over two years. In year 1, 12 heifers (410 ± 47 lb [186.3 ± 21.3 kg], 174 ± 16 days of age) were blocked by weight and age and randomly allotted within blocks into two weaning treatments, fenceline (FL) or abrupt (AB). Fenceline heifers were separated from their dams on day -6 by a single fence. On day 0, all heifers were separated from their dams and shipped for two hours for the remainder of the study. Fecal samples were collected on day -7, day 1, and day 3. In year 2, 21 angus and angus-cross calves (7 heifers and 14 steers: 398 ± 59 lb [180.9 ± 26.8 kg], 148 ± 17 days of age) were blocked by sex and weight and randomly allotted within blocks into two treatment groups, fenceline (FL) and abrupt (AB). Fenceline calves were separated from their dam at day -6 by a single fence. All calves were removed from dams on day 0 and remained on the farm of origin for the study. Fecal samples were collected on day -6, day 1, and day 3.

Fecal cortisol metabolites were measured via an EIA validated for cattle. Briefly, cortisol metabolites were extracted in 80% methanol and samples were stored at -4°F (-20°C) until analysis by EIA. All samples were run in duplicate and the analysis was repeated when the CV between samples exceeded 15%.

Statistical analysis was performed with the PROC MIXED procedure of SAS. The repeated measures model included weaning treatment, date and the weaning treatment \* date interaction. Calf (treatment) was the subject and date was the repeated term. The SLICE option was utilized to compare treatments within date when a treatment \* date interaction was detected. Each year was analyzed separately due to unequal numbers of calves and representation of steers and heifers in year 2.

## Results

In year 1, treatment ( $P < 0.01$ ) and date ( $P < 0.001$ ) and a treatment\*date ( $P < 0.004$ ) effects were detected. Fecal cortisol metabolites were higher ( $P = 0.002$ ) in abruptly weaned calves on the day after separation from dams than fenceline-weaned calves (61 + 7 vs 24 + 7, respectively). No difference was detected between treatments on day -7 or day 3.

In year 2, treatment ( $P < 0.0005$ ) and date ( $P < 0.0001$ ) and a treatment\*date ( $P < 0.0001$ ) effects were detected. Fecal cortisol metabolites were higher in abruptly weaned calves on the day after separation from dams than fenceline-weaned calves (211 + 17 vs 58 + 15, respectively). No difference was detected between treatments on day -6 or day 3.

## Significance

Fenceline weaning resulted in decreased stress on calves as measured by fecal cortisol metabolites in the present study. Of interest, fecal cortisol metabolites had declined on day 3 post-weaning to concentrations measured at the start of the study. In general, calves in this study were exposed to minimal additional stressors such as commingling with other cattle or change in diet. Further evaluation of additional stressors and management techniques is warranted.