

Analysis of the Stability of Rumen pH Measurements Obtained Post-Mortem

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Introduction

There has been an ongoing debate about the value rumen pH values post-mortem as a diagnostic aid in feeder cattle. Obtaining a rumen pH measurement as part of a post-mortem examination has been described to help determine cause of death due to digestive system disorders, such as acidosis. Some dispute the use of pH readings because they think rumen pH will continue to change after death thereby yielding inaccurate results. There has been no published scientific evidence available to support either view. Therefore, the objective of this study was to monitor rumen pH in post-mortem cattle.

Materials and Methods

This study was conducted at a commercial feedlot located in central Kansas on six head of crossbred feeder calves. During a 48-hour time period all cattle that were found dead were utilized for the study. Also, any chronically ill cattle that were humanely euthanized by feedlot staff were used in this study. Dead cattle were moved to the necropsy blind at the feedlot. The carcasses were only partially opened via a ventral midline incision to visualize the rumen to ensure proper placement of the needle. A 14-gauge, 4-inch stainless steel hypodermic needle was placed into the rumen low enough to enter the fluid area of the rumen. A standard bore 3-way stopcock with extension set was then applied to the needle to maintain the anaerobic rumen environment as much as possible. Samples were obtained through the needle via negative pressure. The first 2 mL of fluid obtained was discarded to ensure that the fluid tested was that from the rumen and not the needle each time. Samples were taken at 30 minute intervals for six hours

on each animal and the pH was recorded. The pH was measured using a portable electronic pH meter (TwinpH waterproof, Spectrum Technologies, Inc), which was calibrated via a two step technique using pH 4 and 7 standard solutions. After the rumen fluid sample was taken, a full necropsy on all animals was performed, and a cause of death was determined. Data was analyzed using the PROC MIXED procedures of SAS with the repeated measures for sample times. Diagnosis, time and the diagnosis by time interaction were included in the model statement.

Results

The time of death for cattle that were euthanized was known, and the first measurement occurred within 30 minutes. Cattle that died naturally had died at some point during the night before so the exact time of death was not known. There was no evidence of a bloat by time interaction ($P = 0.97$). The average pH reading for cattle diagnosed for bloat was lower than rumen pH of cattle diagnosed for other causes of death (5.1 and 6.6, bloat deads and non-bloat deads, respectively; $P = 0.02$). There was no change in rumen pH over time for any of the cattle during the post-mortem sampling periods ($P = 0.99$). The results of this study show that rumen pH, regardless of cause of death, is quite stable for at least a period of six hours.

Significance

Based on this study the use of rumen fluid pH as an ancillary diagnostic in the routine post-mortem examination of feedlot cattle is warranted and accurate for at least six hours post-mortem.