



■ REVIEW >

A Comparison of Purina® Outlast™ Gastric Supplement and Calcium Carbonate on TCO₂ Levels in Horses

A SUMMARY OF RESEARCH CONDUCTED AT THE PURINA ANIMAL NUTRITION CENTER EVALUATING MULTIPLE LEVELS OF A PROPRIETARY MINERAL COMPLEX AND CALCIUM CARBONATE ON TCO₂ CONCENTRATIONS IN HORSES.¹

< INTRODUCTION >

When equine athletes exercise, they accumulate lactic acid and hydrogen ions in their tissues as a metabolic product of energy expenditure. The body naturally buffers this acid over time, but a buildup can lead to fatigue and muscle soreness. To combat this acid accumulation, the illegal practice of “milk-shaking” in horse-racing has been described. Briefly, the procedure involves administering large quantities of alkalizing agents via a nasogastric tube to buffer the hydrogen ions and provide a potential ergogenic effect to exercising horses. The TCO₂ blood test allows regulatory agencies to detect this practice, as indicated by concentrations of CO₂, CO₃, H₂CO₃ and HCO₃ above 37 mmol/L plasma. Suggestions have been made that feeding smaller amounts of buffers or minerals to horses can increase TCO₂ and result in positive tests in the absence of “milk-shaking.” The objective of this study was to test the hypothesis that feeding a mineral complex (Purina® Outlast™, OL) or isocalcemic amount of calcium carbonate (CC) would not increase TCO₂ due to relatively low feeding rates.

< MATERIALS AND METHODS >

In trial 1, 9 mature, unfit QHs were fed the active ingredient of Purina® Outlast™ Gastric Supplement in a cross-over design, at a rate of 0, 50 and 200 g in a one-time meal mixed with molasses and beet pulp. Blood samples were taken pre-feeding and 4, 6 and 8 hours post-feeding. In a second trial, 47 unfit, mature QHs and TBs were fed either 50 g/head/day of the active ingredient in OL or an isocalcemic amount of CC in 2 meals, or 150 g/head/day OL or isocalcemic amount of CC in 4 meals for 85 days. Blood samples were taken prior to and after 34 and 83 days on diets, with all samples obtained 4-5 hours after 0700 feeding. All blood was taken via jugular venipuncture into 10 mL heparinized tubes, immediately cooled and shipped to the NY Drug Testing and Research Program for analysis via Nova 4 Electrolyte Analyzer. ANOVA was done with mixed models using GLIMMIX procedure in SAS, and least squares means were compared using Fisher's LSD (P<0.05).

¹Gordon, ME, Jerina, ML, Jacobs, RD. HR 240. 2016. Purina® Outlast™ feeding study. (Published in abstract form in the 2017 Equine Science Society Proceedings as: *Feeding natural-source minerals or calcium carbonate to horses: is there a relationship with TCO₂?*)

< RESULTS >

All horses remained well below 37 mmol/L of TCO₂ which is the legal limit established for milk-shaking. Horses on the 200 g feeding rate of OL in the first trial did have a small increase in TCO₂ (P = 0.0347, Figure 1). Horses on OL and CC in the second trial also had small increases (P<0.0001) in TCO₂ over time, but there were no treatment (P = 0.4468) or treatment*time differences (P=0.8276, Figure 2). Mean baseline samples were reported as 28.48 ± 0.19 mmol/L, 34 day samples were 29.90 ± 0.19 mmol/L, and 83 day samples were 30.14 ± 0.19 mmol/L.

< IMPLICATIONS >

These results indicate that feeding Purina® Outlast™ Gastric Supplement or CC as directed does not result in positive TCO₂ results under these scientific conditions. This was expected considering the low feeding rates of the minerals that are congruent with typical diets for horses.

FIGURE 1 TCO₂ concentration in horses following a single meal with three levels of Purina® Outlast™ Gastric Supplement active ingredient

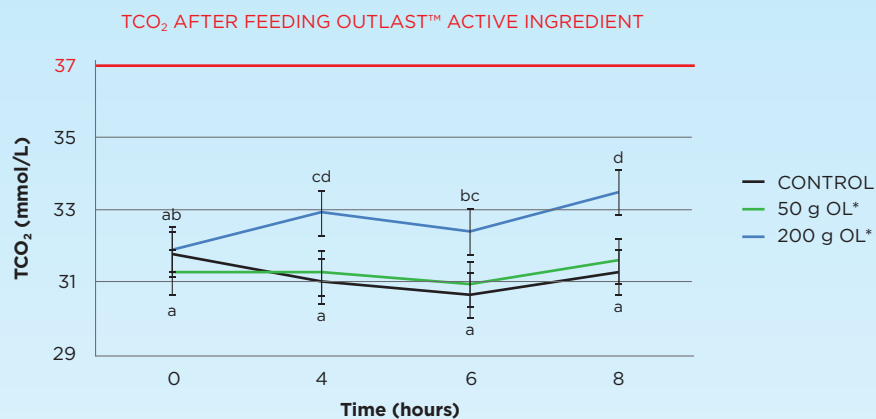
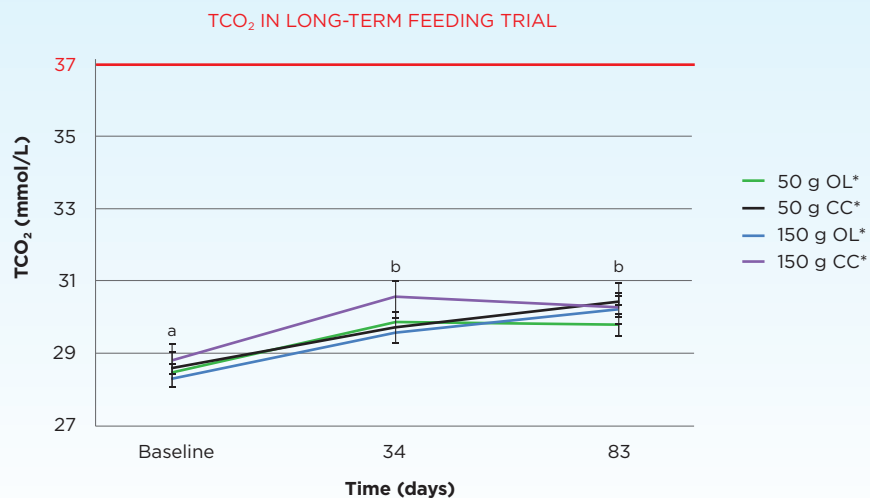


FIGURE 2 TCO₂ concentrations in horses following long-term feeding for 83 days



< **AVAILABLE UPON REQUEST** > Contact your local Purina representative if you would like more information about this study.