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Purina® Outlast™ Gastric Supplement Buffers a Simulated Gastric Environment More Effectively than Similar Products when Challenged by an Acid Addition Test

A SUMMARY OF RESEARCH CONDUCTED AT THE PURINA ANIMAL NUTRITION CENTER EVALUATING THE EFFICACY OF PURINA OUTLAST™ GASTRIC SUPPLEMENT.¹

< INTRODUCTION >

As grazing animals, horses are designed to consume a forage-based diet continually throughout the course of a day. To allow for this, certain physiological mechanisms are in place including the near constant secretion of gastric acid into the lumen of the stomach. However, modern management practices typically restrict horses from maintaining gastric fill, allowing stomach acidity to increase and the pH to drop to levels that may be a causative factor for gastric ulceration. Previous research conducted by Purina Animal Nutrition has found that feeding horses Purina® Outlast™ Gastric Supplement supported a more optimal gastric pH and altered gastric health parameters.^{2,3} The objective of the current study was to evaluate the buffering ability of Purina® Outlast™ Gastric Supplement when challenged by an acid test in a simulated equine stomach.

< MATERIALS AND METHODS >

The experiment was conducted in a reaction vessel that was designed to mimic the equine gastric environment. Four separate gastric buffers were evaluated including Purina® Outlast™ Gastric Supplement and alfalfa pellets.¹ For all supplements, a ratio was determined based on the manufacturers recommended dosages and the size of the equine stomach in relation to the reaction vessel. All supplements were ground to simulate chewing and placed in a continually stirring (mimicking gastric motility) and heated (37°C; internal body temperature) beaker containing 1 L of a pH=2.0 hydrochloric acid solution. The supplements were left in the reaction vessel for 6 hours to allow them to reach their maximum buffering capability as determined in a previous experiment.¹ At 6 hours, 5 mL of a pH=1.0 hydrochloric acid solution was added every minute and pH measurements recorded until the pH in the vessel no longer remained above 4.0. For all time points, pH was measured via a digital pH analyzer (Hach, Loveland CO), and an average of two pH measurements was utilized.

¹ Jacobs, RD, Gordon, ME. HR 246. 2016. Purina Outlast pH comparison.

² Gordon, ME, Andrews, F. HR 198. 2015. LSU gastric pH study.

³ Gordon, ME, Jerina, ML, Young, JK, Andrews, F. HR 229, 2016. Draft Horse Field Trial. (Published in abstract form in the 2017 Equine Science Society Proceedings as: *The effect of a natural-source mineral supplement on gastric ulceration in horses.*)

< **RESULTS** >

Results are depicted in Figure 1 below. In this in vitro trial, all other supplements tested against Purina® Outlast™ Gastric Supplement required less acid addition to reach a pH of 4.0. In addition, all other supplements reached a pH of 4.0 more quickly than Outlast™ Gastric Supplement showing the ability of Outlast™ Gastric Supplement to continue buffering for longer periods of time in this simulated environment.

< **IMPLICATIONS** >

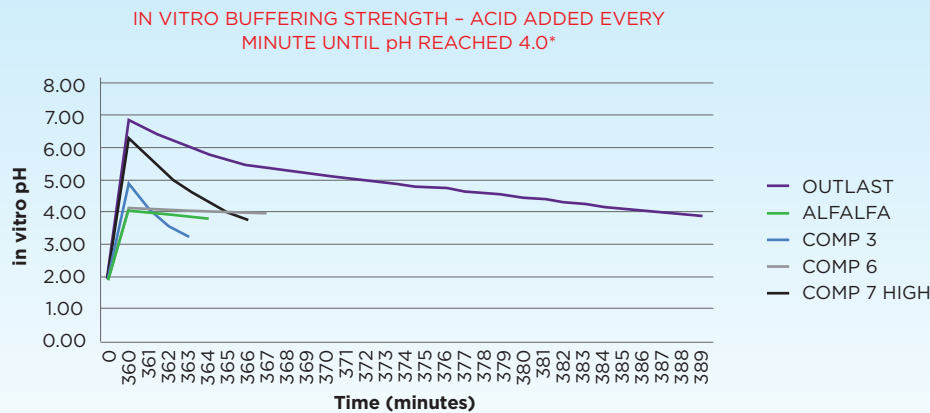
The constant acid secretion by the equine stomach has been identified as a causative factor in gastric ulceration and Equine Gastric Ulcer Syndrome (EGUS). Horses suffering from EGUS may show signs of reduced performance, decreased feed intake, discomfort and other signs. Data from this study demonstrates that Purina® Outlast™ Gastric Supplement can more effectively overcome an acid challenge as compared to similar supplements in a simulated environment. More acid was required to drop the pH below 4.0 and the simulated gastric environment remained above a pH of 4.0 for a longer period of time when challenged by continual acid secretion. These data indicate that Purina® Outlast™ Gastric Supplement may be effective in buffering the acid secreted by the equine stomach, creating a more favorable gastric environment.

TABLE 1 AMOUNT OF ACID (mL) AND TIME NEEDED TO DROP THE pH OF A SIMULATED IN VITRO GASTRIC ENVIRONMENT BELOW 4.0

	TOTAL ACID ADDED (mL)	TOTAL TIME TO pH < 4.0 (MIN)
OUTLAST ^a	140	38
ALFALFA ^b	10	2
COMP 3 ^b	10	2
COMP 6 ^a	30	6
COMP 7 HIGH ^b	20	4

FIGURE 1

In vitro buffering ability of Purina® Outlast™ Gastric Supplement and similar supplements when allowed to equilibrate for 6 hours and acid added every minute until pH fell below 4.0.



*Comp 3, 6, 7 (high) were chosen for comparison as they were the top performers in HR 246. To review the full data set, see the research review titled "Purina® Outlast™ Gastric Supplement Optimized pH in a Simulated Gastric Environment More Effectively than Other Similar Products"

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