



RESEARCH >

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Purina® Outlast™ Gastric Supplement Optimized pH in a Simulated Gastric Environment More Effectively than Other Similar Products

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

< INTRODUCTION >

It has been estimated that over 90% of horses suffer from gastric discomfort related to the stomach lining.² While a variety of risk factors exist for horses to develop gastric imbalance, a commonality amongst all horses is the constant secretion of acid into the gastric lumen. Historically, alfalfa hay and other alfalfa derived products have been identified for their ability to successfully buffer the equine stomach, and recently a number of products have been marketed with similar effects. Previous research conducted by Purina Animal Nutrition has found that horses consuming Purina® Outlast™ Gastric Supplement experienced changes in gastric pH and gastric comfort.^{3,4} The objective of this study was to evaluate the efficacy of Purina® Outlast™ gastric supplement in a simulated gastric environment by measuring the buffering ability, capacity and speed in comparison to a number of currently marketed gastric buffer supplements.

< MATERIALS AND METHODS >

All experiments were conducted in a reaction vessel that was designed to mimic the equine gastric environment. Nine separate gastric buffers were evaluated including Purina® Outlast™ gastric supplement and alfalfa pellets. For all supplements except one (which was tested at a low and high concentration), 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. During experiment 1, pH readings were obtained prior to and every 30 min following placing the supplements into the beaker for 6 hours for a total of 13 measurements. This data was utilized to calculate a buffering capacity with the following equation: (Max pH-Min pH)/Time to reach max pH. For experiment 2, Purina® Outlast™ gastric supplement and the top four performers from experiment 1 were subjected to an identical experimental protocol except that pH readings were obtained prior to starting and then again every 2 minutes for 60 minutes resulting in a total of 30 measurements. For all timepoints, pH was measured via a digital pH analyzer (Hach, Loveland CO), and an average of two pH measurements was utilized.

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

²Murray, M.J., Schusser, G.F., Pipers, F.S., et al., 1996. Factors associated with gastric lesions in Thoroughbred race horses. *Equine Vet J* 28, 368-374.

³Gordon, ME, Andrews, F. HR 198. 2015. LSU gastric pH study.

⁴Gordon, 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.*)

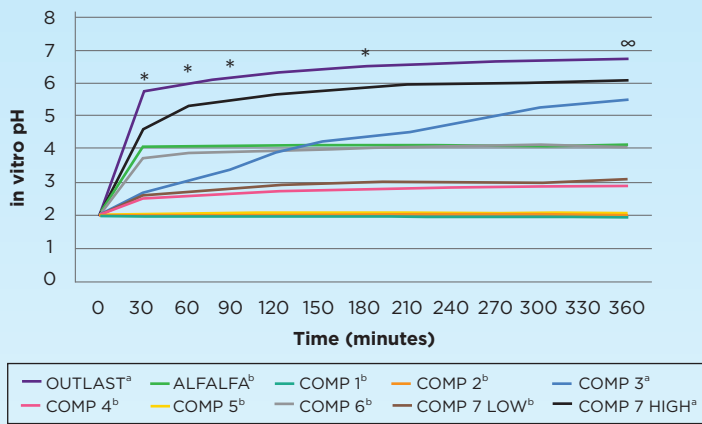
< RESULTS >

Results from experiment 1 are presented in Figures 1-2 below. Results from experiment 2 are presented in Figure 3. In experiment 1, Purina® Outlast™ gastric supplement buffered the simulated gastric environment to a higher level than all other measured supplements. Additionally, the buffering capacity of Purina® Outlast™ gastric supplement was higher than that of the other supplements. In experiment 2, Purina® Outlast™ gastric supplement buffered the simulated gastric environment more quickly than the other supplements tested reaching 78.4% of its maximum buffering capacity at 2 minutes.

< IMPLICATIONS >

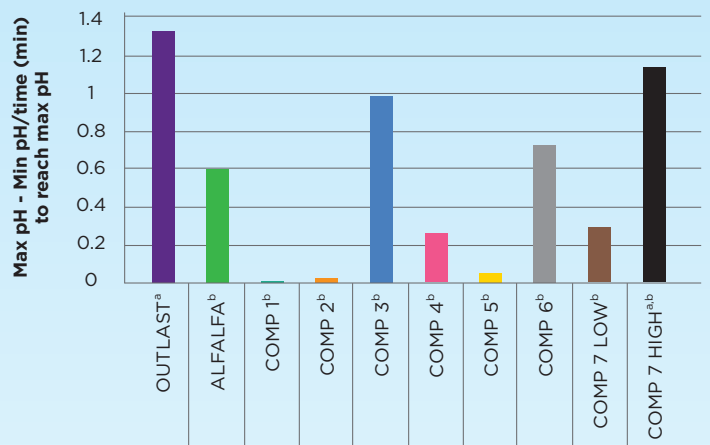
The continual presence of gastric acid in the equine stomach, even during times when the horse is not eating can be considered a major factor in the development of gastric ulcers. Data from this study indicate that Purina® Outlast™ gastric supplement buffered the simulated gastric environment to a higher level than other products tested, and does so quicker and to a greater extent than the other supplements tested, including alfalfa. For horses experiencing stressors such as trailering, exercising, confinement, weaning and others Purina® Outlast™ gastric supplement may have the ability to buffer the gastric acid in the stomach, producing a more favorable gastric environment and reducing the potential for gastric ulceration.

FIGURE 1 In vitro buffering ability of Purina® Outlast™ Gastric Supplement compared to similar supplements.



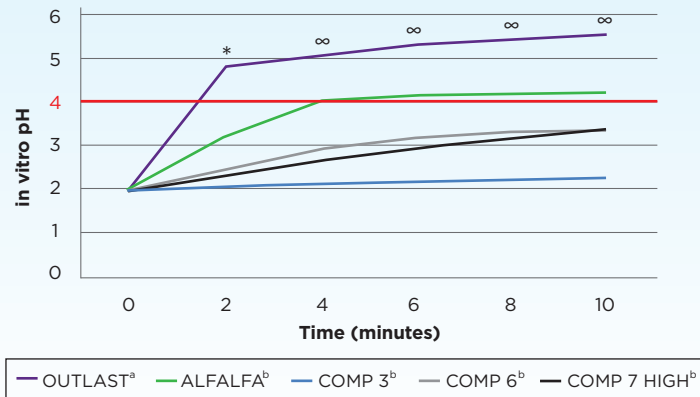
Differing superscripts indicate differences based on a dummy regression at $P < 0.05$ ($R^2 = 0.92$)
 * Indicates differences between Purina® Outlast™ and other treatments at $P < 0.05$
 ∞ Indicates differences between Purina® Outlast™ and other treatments at $P < 0.10$

FIGURE 2 In vitro buffering ability of Purina® Outlast™ Gastric Supplement over time compared to similar supplements.



Differing superscripts indicate differences at $P < 0.05$

FIGURE 3 In vitro Buffering Speed of Purina® Outlast™ Gastric Supplement Compared to Similar Supplements.**



**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"
 Differing superscripts indicate differences based on a dummy regression at $P < 0.05$ ($R^2 = 0.92$)
 * Indicates differences between Purina® Outlast™ and other treatments at $P < 0.05$
 ∞ Indicates differences between Purina® Outlast™ and other treatments at $P < 0.10$

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