



RESEARCH

## REVIEW >

# Supporting Equine Plasma Antioxidant Status by Feeding Purina® Omega Match™ Ration Balancing Horse Feed

A SUMMARY OF RESEARCH CONDUCTED AT THE PURINA ANIMAL NUTRITION CENTER EVALUATING THE EFFECT OF FEEDING PURINA® OMEGA MATCH™ RATION BALANCER ON PLASMA ANTIOXIDANT STATUS IN HORSES.<sup>1,2</sup>

### < INTRODUCTION AND BACKGROUND >

Pasture grass is a natural forage source for horses and is inherently high in antioxidants such as vitamin E and beta-carotene. However, many horses do not have access to adequate quality or quantity of pasture grass to obtain their necessary daily antioxidants. For some horses, pasture is not appropriate due to metabolic considerations (ie: high starch and sugar), while for others, lifestyle or competition schedule would preclude them from having access to adequate pasture. For these reasons, Purina developed a grass-based feed for horses that mimics the nutrient profile of fresh pasture grass. Additionally, this feed is fortified with natural-sourced vitamin E with the intent of providing a similar antioxidant profile to that pasture.

Purina® Omega Match™ Ration Balancing Horse Feed is a unique approach to feeding concentrate to horses. This Timothy grass-based formula is enriched in omega-3 fatty acids from ground flaxseed. It also contains 500 IU per pound of naturally sourced vitamin E that can be used as a readily available antioxidant in the horse. The objective of these studies was to evaluate whether feeding horses Purina® Omega Match™ Ration Balancing Horse Feed would support the oxidative capacity in the horse's system as measured via markers of oxidative stress.

Measuring the oxidative status in horses is typically done by measuring the levels of antioxidants circulating in the horses' blood. Along with measuring for levels of circulating vitamin E, it is also possible to measure various markers of oxidative stress. Some of the most common are:

SUPER OXIDE DISMUTASE (SOD)	GLUTATHIONE PEROXIDASE (GPX)	THIOBARBITURIC ACID REACTIVE SUBSTANCES (TBARS)
This enzyme acts to specifically target superoxide molecules that are a byproduct of oxygen metabolism. Higher levels generally indicate better antioxidant status.	This family of enzymes is responsible for reducing the free radicals produced during lipid metabolism and are important selenium-containing enzymes. Higher levels generally indicate better antioxidant status.	These are compounds that are naturally produced as a byproduct of lipid metabolism. These substances are markers of oxidative stress and lower levels are indicative of less oxidative stress in the body.

### < MATERIALS AND METHODS >

Two identical trials were completed between 2017 and 2019. In both trials, mature American Quarter Horses (n=10 per trial; 610.5 ± 14 kg BW) were offered 2 lb per 1000 lb BW Purina® Omega Match™ Ration Balancing Horse Feed and 2.0% BW as Timothy grass hay split into equal meals daily (AM at approximately 0700 and PM at approximately 1300) starting on day 1 of the trial.

<sup>1</sup>HR 217 - Project Gold Omega Nugget. Internal Research, PANC. 2017

<sup>2</sup>HR 292 - The effects of feeding Dr. Green on body measurements, blood values and glucose/insulin response to feeding. Internal Research, PANC. 2019

Baseline blood samples were obtained via jugular venipuncture from all horses prior to transition to the experimental diet (day 0), and all horses were consuming similar diets prior to transition. Blood samples were subsequently collected on day 30 (timepoint 1) and day 60 (timepoint 2) post dietary transition. Additionally, at timepoint 2, blood samples were obtained from 10 horses at the Purina Animal Nutrition Center in Gray Summit, MO, that had free choice-access to a mixed fescue pasture. These 10 horses were also supplemented with 4 lb of Purina Strategy GX in order to meet all nutritional needs and maintain optimal BW and BCS. Samples were immediately centrifuged, and plasma collected for analysis. Serum samples were allowed to coagulate and centrifuged for processing of serum and analysis of vitamin E levels. Plasma samples were analyzed for TBARS, SOD, and GPx by ELISA. Data were analyzed using an ANOVA in SAS 9.4.

## < RESULTS >

All data are presented as averages of data from both trials.

SUPER OXIDE DISMUTASE	GLUTATHIONE PEROXIDASE	THIOBARBITURIC ACID REACTIVE SUBSTANCES	VITAMIN E
Plasma SOD levels increased from baseline to timepoint 1 in horses consuming Purina® Omega Match™ Ration Balancing Horse Feed but returned to baseline levels by timepoint 2 (Figure 1; P<0.05). At timepoint 2, horses consuming Purina® Omega Match™ Ration Balancing Horse Feed had similar circulating levels of SOD compared to those on pasture (Figure 2; P=0.54).	Plasma GPx1 levels remained steady across all timepoints in horses consuming Purina® Omega Match™ Ration Balancing Horse Feed. (Figure 3; P=0.68). At timepoint 2, horses consuming Purina® Omega Match™ Ration Balancing Horse Feed had similar circulating levels of GPx1 compared to those on pasture (Figure 4; P=0.48).	Plasma TBARS levels remained steady across all timepoints in horses consuming Purina® Omega Match™ Ration Balancing Horse Feed. (Figure 5; P=0.43). At timepoint 2, horses consuming Purina® Omega Match™ Ration Balancing Horse Feed had similar circulating levels of TBARS compared to those on pasture (Figure 6; P=0.50).	Serum vitamin E levels remained within optimal levels through the course of the supplemental period. There was a numerical increase in serum vitamin E levels over the course of the trial (Figure 7).

FIGURE 1

Plasma SOD levels in horses consuming Purina® Omega Match™ Ration Balancing Horse Feed.

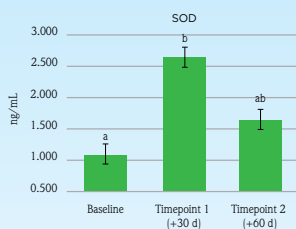


FIGURE 2

Plasma SOD levels in plasma of horses consuming Purina® Omega Match™ Ration Balancing Horse Feed vs. horses on pasture.

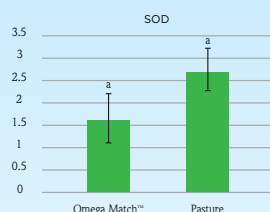


FIGURE 3

Plasma GPx1 levels in horses consuming Purina® Omega Match™ Ration Balancing Horse Feed.

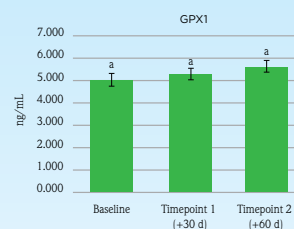


FIGURE 4

Plasma GPx1 levels in plasma of horses consuming Purina® Omega Match™ Ration Balancing Horse Feed vs. horses on pasture.

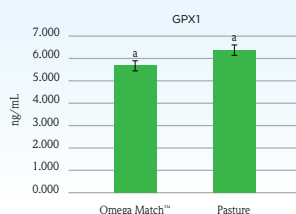


FIGURE 5

Plasma TBARS levels in horses consuming Purina® Omega Match™ Ration Balancing Horse Feed.

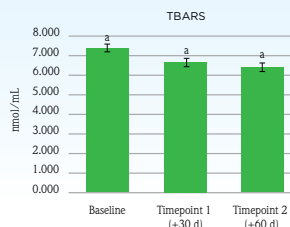


FIGURE 6

Plasma TBARS levels in plasma of horses consuming Purina® Omega Match™ Ration Balancing Horse Feed vs. horses on pasture.

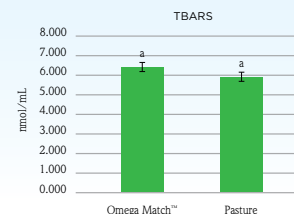
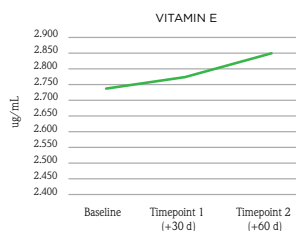


FIGURE 7

Serum vitamin E levels of horses consuming Purina® Omega Match™ Ration Balancing Horse Feed.



## < IMPLICATIONS >

The objective of these trials was to evaluate whether feeding horses Purina® Omega Match™ Ration Balancing Horse Feed would support the oxidative capacity in the horse's system as measured via markers of oxidative stress. Taken together these data indicate that feeding 2 lb per 1000 lb BW of Purina Omega Match Ration Balancing Horse Feed per day to horses results in an oxidative profile similar to horses on pasture. Oxidative stress is an important factor for all horses and can limit performance and increase the effects of aging on senior horses. Ensuring that a horse's diet can support the antioxidant status necessary to combat oxidative stress is important for their health and well-being.

< FOR MORE INFORMATION > Contact your local Purina representative if you would like more information about this study.