

research abstract WELLSOLVE L/S® HORSE FEED

Recent research efforts in equine nutrition, as well as industry trends, have focused attention on feeds lower in sugar and starch (SS) and how these feeds may benefit some horses. It has been suggested that horses with insulin resistance, osteochondritis desiccans, laminitis, Cushing's Syndrome, Metabolic Syndrome, obesity and certain tying-up syndromes receive a diet lower in SS, and possibly higher in fat. However, with the exception of tying-up syndromes, few of these recommendations (especially in terms of % SS in the total diet) are currently substantiated by research. Given the large amount of variation individual horses demonstrate in glucose and insulin response to meal feeding, additional research was necessary to determine general metabolic responses to feeding low SS meals in order to develop appropriate feeding recommendations for horses with special needs. Therefore, a series of studies were designed and conducted to evaluate the effects of various diets and feed forms on the glucose and insulin responses in horses.

In experiment 1, the effects on glucose and insulin response to a meal were compared when feeding two iso-caloric diets at the same rate, with a ~50% difference in sugar and starch, (Diet A, 18% SS, 2.42 Mcal/kg; Diet B, 9.4% SS, 2.42 Mcal/kg), to determine if feeding a ~50% lower SS concentrate feed would cause a lower glucose and insulin response. In experiment 2, the effects of feeding Diet A and B at a rate to provide 0.3 g/kg BW SS per meal were examined. The objective was to test the hypothesis that feeding meals equal in SS content would create similar responses in glucose and insulin dynamics. In both experiments, blood samples were taken every 30 min for 6 h after feeding to determine blood glucose and insulin response. Additionally, consumption time was recorded to determine if time spent eating is correlated with glucose/insulin response.

In experiment 1, feeding a meal lower in SS resulted in a lower glucose and insulin response to the feed (figure 1). In experiment 2, glucose responses were similar, however, the meal containing more SS/kg and fed at the smaller rate resulted in a substantially lower insulin response (figure 2). Consumption time also was found to be significantly different between treatments, but was not strongly correlated with glucose/insulin response.

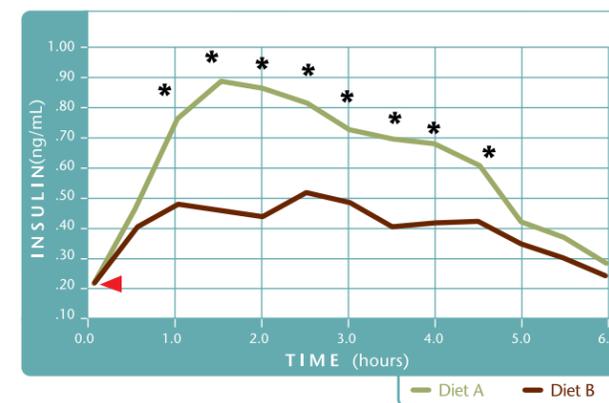


Figure 1. Plasma insulin response to feeding (time 0) equivalent amounts of a higher SS feed (Diet A) or a lower SS feed (Diet B). * = P<0.05 Diet A versus B, pooled SE = 0.075 (Adapted from Gordon et al. JEVs. 2007; 27:489.)

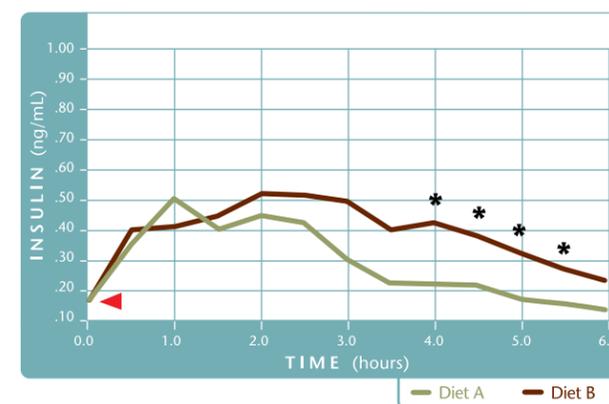


Figure 2. Plasma insulin response to feeding (time 0) 0.3 g SS/kg BW from a higher SS feed (Diet A) or a lower SS feed (Diet B). * = P<0.05 Diet A versus B, pooled SE = 0.06 (Adapted from Gordon et al. JEVs. 2007; 27:489.)

◀ RED ARROW INDICATES TIME OF FEEDING

From the first two studies it can be concluded that a 50% reduction in SS even in a diet considered low in SS (diet A, 18% SS : diet B, 9.4% SS) and small meal size appear to be sensible recommendations for horses that may benefit from a low glucose and insulin response to feeding. In addition to SS content, meal size, and nutrient:calorie ratio, nutrient requirements of the individual horse and the entire nutritional balance of the diet also should be addressed.

The objective of an additional study was to determine if the form of the concentrate feed would affect consumption rate of the meal and/or resulting glucose and insulin responses. Three forms of identically formulated, low sugar and starch concentrates were compared: 3/16" extruded (E), 11/64" pellet (P), and 3/4" oval (O). Horses received 4 pounds of each treatment feed in a randomized, cross-over design, with blood samples taken every 30 min for 6 h to determine blood glucose and insulin response. The average glucose concentration for the duration of the test was lower (P = 0.02) for P versus O. Average insulin concentration for the duration of the test was lower (P = 0.01) for P versus O.

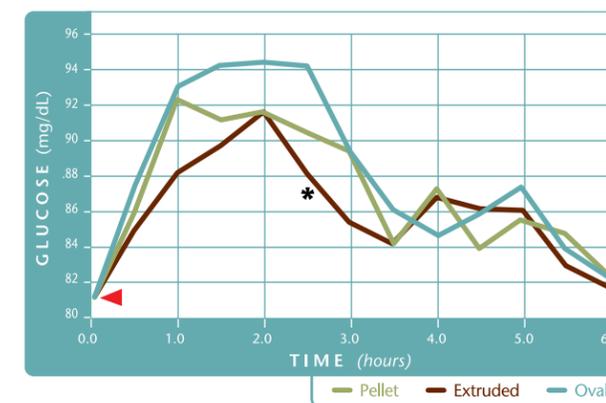


Figure 3. Glucose response to dietary treatments in 3 feed forms. * = P = 0.01 pellet vs oval

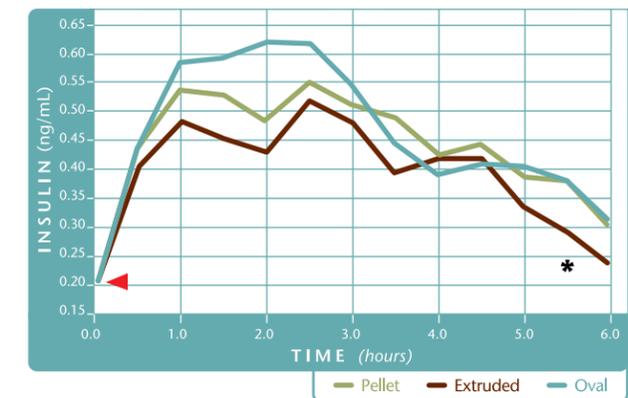


Figure 4. Insulin response to dietary treatments in 3 feed forms. * = P < 0.05 pellet versus oval

From these studies, we have developed WellSolve L/S® Horse Feed with less than 11% sugar and starch. Utilizing the data presented here, feeding WellSolve L/S® horse feed resulted in 1) a lower glucose and insulin response than an 18% SS feed 2) a lower average glucose and insulin response when fed in a pellet form versus other forms. Additionally, data demonstrated that feeding smaller meals may result in lower insulin responses.

Therefore, it is with confidence that we present WellSolve L/S® Horse Feed - an extensively researched product supported by data on the precise glucose and insulin response to feeding. A veterinary researched, nutritional solution for wellness in horses.



research abstract WELLSOLVE W/C® HORSE FEED

A recent study from Virginia Tech and the University of Maryland indicated that 51% of horses examined (out of 300 horses) were found to be overweight or obese. Any practitioner can tell you how difficult it is for some horses to lose and maintain proper amounts of weight. We understand this struggle for both horses and their owners and embarked on an ambitious research study to determine the proper diet and management practices necessary to promote healthy weight loss in horses. Through these experiments, Purina and the WellSolve® research team were able to conceptualize and develop WellSolve W/C™ Horse feed – the only product on the market proven to support weight loss in controlled scientific studies.

We started with 3 mixed groups of healthy quarter horses and thoroughbreds.

- 1) A group of horses (n=8) that received WellSolve W/C® horse feed + grass hay in amounts to encourage weight loss Weight Reduction Control (WR-CON).
- 2) A group of horses (n=7) that received WellSolve W/C® horse feed + grass hay in amounts to encourage weight loss, in addition to forced walk/trot exercise on an Equi-ciser® Weight Reduction Exercise (WR-EX).
- 3) A negative control group (n=8) that received a steady amount of calories from Strategy® Horse Feed + grass hay Weight Maintenance Control (WM-CON).

Horses underwent measurement for body weight, body condition score, rump fat thickness, insulin sensitivity and baseline plasma concentrations of glucose, insulin, cortisol, leptin, non-esterified fatty acids (NEFAs), and triglycerides (TGAs). The weight loss portion of the study lasted 12 weeks.



Figure 1 Results. WR-CON horses on WellSolve W/C® Horse feed lost an average of 32.5 kg (72 lbs) or 5.6% of their original body weight. WR-EX horses on WellSolve W/C® Horse feed plus forced exercise lost an average of 52 kg (114 lbs) or 9.0% of their original body weight during the trial. WM-CON horses lost an average of 24.6 kg (54 lbs) or 4.0% of their original body weight during the trial, mostly related to adverse weather conditions.

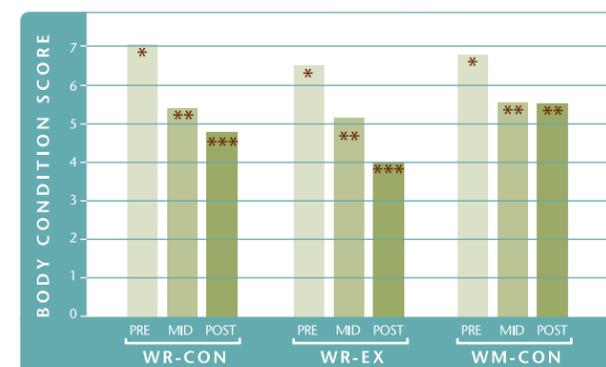


Figure 2 Results. WR-CON and WR-EX horses receiving WellSolve W/C® Horse Feed had significant decreases in body condition score at the midpoint and end of the study. WM-CON horses initially had a decrease in body condition score, then maintained body score for the duration of the study.

Within groups, differing numbers of asterisks indicate a statistically significant difference at $P < 0.05$.

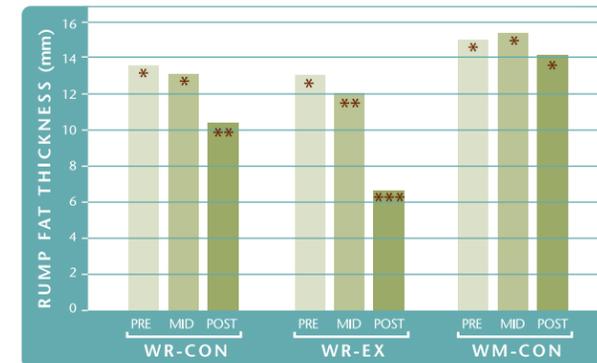


Figure 3 Results. WR-CON horses on WellSolve W/C® Horse Feed had a significant decrease in rump fat thickness by the end of the experiment. WR-EX horses on WellSolve W/C® Horse Feed had significant decreases in rump fat thickness evident at the midpoint and the end of the experiment. WM-CON horses had no significant changes in rump fat thickness throughout the trial.

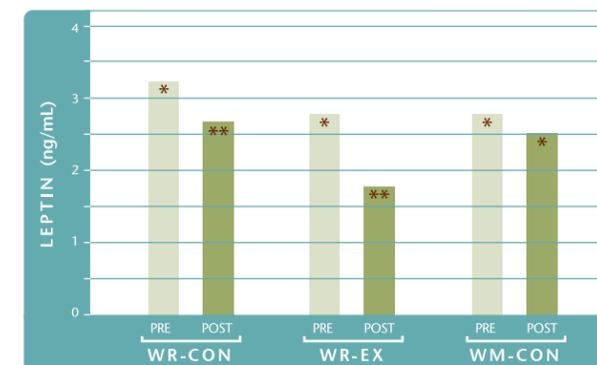


Figure 4 Results. WR-CON and WR-EX horses on WellSolve W/C® horse feed had significant decreases in plasma leptin concentration after weight loss. WM-CON horses had no changes in leptin concentration.

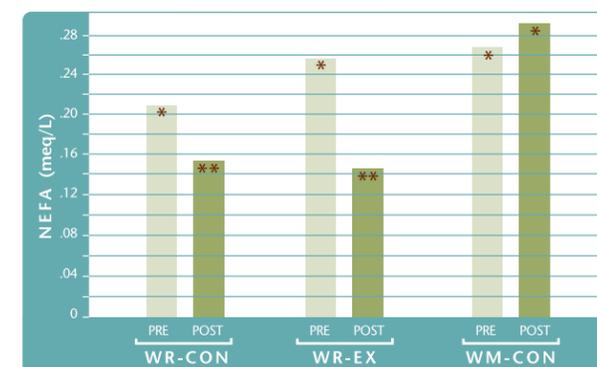


Figure 5 Results. WR-CON and WR-EX horses on WellSolve W/C® horse feed had significant decreases in plasma NEFA concentration after weight loss. WM-CON horses had no changes in NEFA concentration.

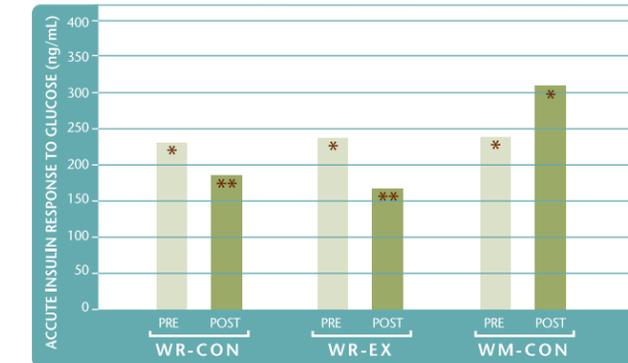


Figure 6 Results. WR-CON and WR-EX horses on WellSolve W/C® horse feed had significant decreases in their acute insulin response to a glucose challenge after weight loss. WM-CON horses had no changes in acute insulin response. Acute insulin response was measured by using a Frequently Sampled Intravenous Glucose Tolerance Test with analysis by MinMod Millennium® software.

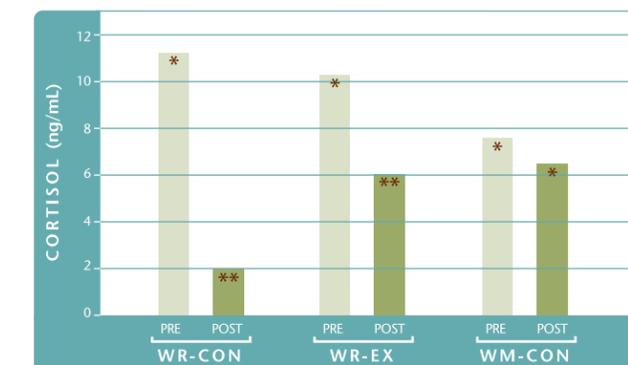


Figure 7 Results. WR-CON and WR-EX horses on WellSolve W/C® horse feed had significant decreases in their baseline cortisol concentrations after weight loss. WM-CON horses had no changes in cortisol.

As obesity appears to be on the rise in horses, veterinarians need a plan to help horses reach and maintain a healthy weight. WellSolve W/C® horse feed can be an integral part of that plan. As seen in the data presented here, WellSolve W/C® horse feed as part of a total weight management strategy, helped support measurable weight loss and reduction of body weight, body fat and body condition score. The average weight loss was 1.0-1.5 lbs/day and horses on WellSolve W/C® horse feed demonstrated an improved insulin response to a glucose load. Other variables measured such as leptin, cortisol, and NEFAs also showed favorable changes with weight loss. Hence, WellSolve W/C® horse feed is proven to help support weight loss in horses as well as promote a healthier well-being.

WellSolve W/C® Horse Feed – a veterinary researched, nutritional solution for wellness.