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DOES IT WORK? TESTING THE EFFICACY OF FEED SUPPLEMENTS

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Advancements in equine nutrition have boomed in the last several years. In the past, nutritional research focused on the nutritional content and availability of various feedstuffs with an eye on providing a balanced ration to meet the energy and nutrient needs of the equine athlete. More recent research has followed the example of human sports nutrition and has examined the physiology of energy homeostasis with the goal of understanding how to improve the delivery of metabolic substrates to increase performance and to speed recovery from exercise. To that end a whole new industry has grown up around dietary supplements that purportedly alter metabolic pathways to improve nutrient utilization and to ultimately enhance performance.

The blitz of advertising that usually accompanies such miracle ergogenic (i.e., performance-enhancing) products would make one think that a great deal of scientific research has been published to support those claims. Unfortunately, many of the new dietary supplements and other products that have come on the market are being pushed with little scientific basis for the assertions made on their labels. In many cases, horses were not used in trials to demonstrate efficacy of these new and often expensive avant-garde dietary supplements and nutraceuticals. So how can we determine if a new supplement improves performance or has true potential to improve athletic capacity? This paper will outline some basic principles that can guide future research. These same guidelines can also be used to evaluate the soundness of information touted on new products designed for the equine athlete.

One recently published source suggests that a series of questions should guide the decision to use new dietary and other supplements in human athletes (Robertson, 1991). Robertson (1991) asks, “Is the purported performance-enhancing product safe or unsafe? Is it legal or illegal? And lastly, is it effective or ineffective?” All are valid questions that should be asked by horse owners and trainers. Unfortunately, many of the nutritional products being given to horses have not been tested for safety. Some may actually be “natural” sources of banned substances and thus illicit according to rules of competition. However, if a product is safe and legal, the last question is the one most horse owners want to have answered before they buy a product. So, how do we know if a product can help a horse perform better?

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The best way to answer this question is to collect data during a competition or race against peers. However, those types of field studies have a great deal of experimental variation and require large numbers of subjects to determine if there are beneficial effects. Furthermore, how many horse owners are going to volunteer to have their animal placed in the group that gets the control if the treatment is going to help them win? Also, most racing jurisdictions are not going to allow the administration of a supplement to only a fraction of the competitors. Therefore, most recent research involves experiments conducted using smaller representative populations or studies conducted in a treadmill lab where experimental variation can be minimized. Nevertheless, planning for those types of studies and evaluation of the resulting data should be done after asking a series of questions:

1. Is there a sound biochemical or physiological basis for claims that a product can improve performance?
 - a. Does the claim make physiological sense?
 - b. Or does the claim contradict what we already know from basic metabolic physiology and nutrition?
 - c. Are there sound peer-reviewed studies from other species that suggest that the product may have an effect when used in an athletic horse?
2. Does the horse utilize the substance in the same way as other species?
 - a. Do we know the pharmacokinetics of the substance?
 - i. Do we know the best route of administration?
 - ii. Do we know the bioavailability of the substance?
 - b. Do we know the pharmacodynamics of the substance? How much do we need to produce a beneficial effect?
 - c. Is there a dose-dependent relationship?
3. Has the product been tested in horses using properly designed studies?
 - a. Is there a sound rationale for the efficacy of the product?
 - b. Are the studies hypothesis-driven?
 - c. Are the methods acceptable, accurate, and repeatable?
 - d. Are there proper controls?
 - e. In field studies (or even controlled treadmill studies), is the number of subjects large enough to ensure proper statistical power to detect a difference?
 - f. Were the studies conducted in a blind fashion?

- g. Were the treatments assigned in a random fashion?
 - h. Were there environmental controls?
 - i. Were the horses in the same state of fitness?
 - j. Were the horses familiar with the experimental surroundings?
 - k. Does the study measure physiological capacity or athletic performance?
 - l. Are the measured parameters really appropriate? Do they really serve as markers of aerobic or anaerobic capacity or athletic performance?
4. Is there specificity as far as the types of tests used to evaluate the effect on performance?
- a. The concept of specificity dictates that the test used to evaluate performance and the training used to condition the horse should match the type of competition to be performed. Thus, do the tests simulate the specific type of competition?
 - b. Is the breed of horse used in the experiment appropriate?
 - i. Thoroughbreds and Standardbreds vs. Quarter Horses vs. Arabians, etc.?
 - ii. Are the animals middle-distance athletes vs. sprint athletes vs. endurance athletes?
 - c. Are the physiological markers to be measured appropriate? Are those markers representative of the physiological processes that limit the ability to win in a specific type of competition?
5. Are proper statistical methods being used, and are they interpreted correctly?
6. If the studies have been designed and conducted properly, have the results been interpreted properly?
- a. Are the results being applied to the correct type of activity (sprint, jumping, endurance, etc.)?
 - b. Is the interpretation applied correctly to metabolic action of a substance and how it should affect pathways that impact performance?

These are just a few of the questions that should be asked when designing a study and/or interpreting scientific results used in an efficacy claim for a new nutritional product. Too often, the research that serves as the basis for efficacy claims does not follow even the basic rules of experimental design. For example, one product insert that I have used to teach students at Rutgers lists only one subject per treatment group. Some studies have even tried to apply data in an inappropriate manner. In one instance, a product claimed to benefit the performance of racehorses when the efficacy of the product was established using endurance horses. However,

the most common problem associated with the marketing of these products is an excessive reliance on anecdotal information gained from testimonials. Research on the use of ergogenics and nutraceuticals in human sports medicine has shown efficacy for many of the most popular products on the market. The most classic examples are the long list of ubiquitous nutritional beverages that provide electrolytes and carbohydrates. Research has also shown that many of these products have no beneficial effect. Equine sports nutrition should use the same sound scientific principles to provide information to horse owners and trainers.

References

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