



TruEquine™

Postbiotic

Closer Look at Apparent Nutrient Digestibility



What Are the TruEquine™ Postbiotic Products?

TruEquine is a natural* postbiotic horse feed additive that works with the biology of the animal to maintain immune strength and promote digestive health. No matter their class, type, or life stage, TruEquine supports optimal digestive function in all horses, and can lead to proper joint support, gut health, and stress management.

TruEquine postbiotic is available in multiple active ingredient concentrations and product profiles to facilitate optimal inclusion in all equine feeds and supplements.

Backed by nearly 80 years of research and development, TruEquine postbiotics provide the critical nutritional support to promote gut health, manage stress, and support joints. These improvements translate into better performing horses that are more capable of reaching their genetic potential.



The Relevance of Nutrient Digestibility

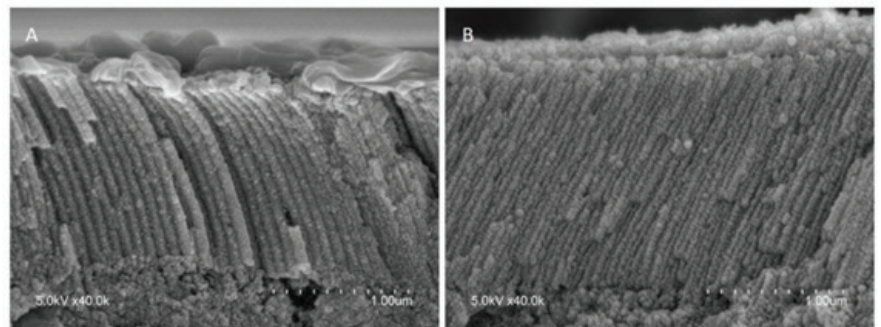
Horses, like all animals, have a daily requirement for a specific level of essential nutrients that must be provided by the various components of the diet. This requirement varies depending on lifestage and lifestyle demands. Therefore, when formulating a daily ration, it is important to consider each component and estimate the ability of the horse's digestive processes to access and absorb the nutrients provided by the various dietary inputs.

The ability of the horse to derive an optimal level of nutrient intake is dependent on many factors, among which are the key elements of ingredient quality and the horse's inherent digestive process to assimilate and absorb nutrients. Ingredient quality of the forage and concentrate constituents of the total diet can be influenced by several variables such as the age of the ingredient (e.g. new vs old crop corn), moisture content, fibre content (e.g. whole oats vs oat groats), mold/toxin contamination, rotting, infestation, and foreign matter, just to name a few. These factors collectively can affect nutrient concentration and influence digestive processes both positively and negatively.

The horse's innate ability to digest and absorb nutrients is not the only consideration though. Beyond the ingredients themselves, there is a commensal community of many species of microorganisms living within the gastrointestinal tract of the horse, referred to as the gut microbiome. This can be thought of collectively as a living organism within the horse that helps the horse derive nutrients, and this is achieved in a number of ways. One way is by the microbes utilising dietary ingredients—a process referred to as fermentation, resulting in the natural production of metabolites. These metabolites include volatile fatty acids (VFAs), enzymes, peptides, and many other nutrients which the horse can utilise directly along with other microbes within the community.

These metabolites created by gut microbial fermentation also indirectly affect digestibility by "feeding" the cells lining the intestinal wall where nutrients are absorbed. Therefore, a healthier gut enables the horse to be better equipped to absorb nutrients. Electron microscopy of gut tissue from other monogastrics has illustrated obvious improvements in gut architecture (Figure 1).

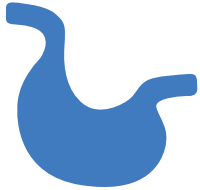
Figure 1: Electron microscopy - gut architecture



* Natural as defined by the Association of American Feed Control Officials (AAFCO).

The Relevance of Nutrient Digestibility- continued

Finally, a more resilient gut is also an important immune barrier to pathogens that would otherwise be able to breach the barrier and enter the circulatory system which has an indirect and negative influence on digestibility and efficiency of utilisation of nutrients. Therefore, a stable gut microbiome is essential for the horse to be able to use feed more efficiently on many fronts, which is the foundation for peak health and performance.



How Does TruEquine™ Postbiotic Influence Digestibility?

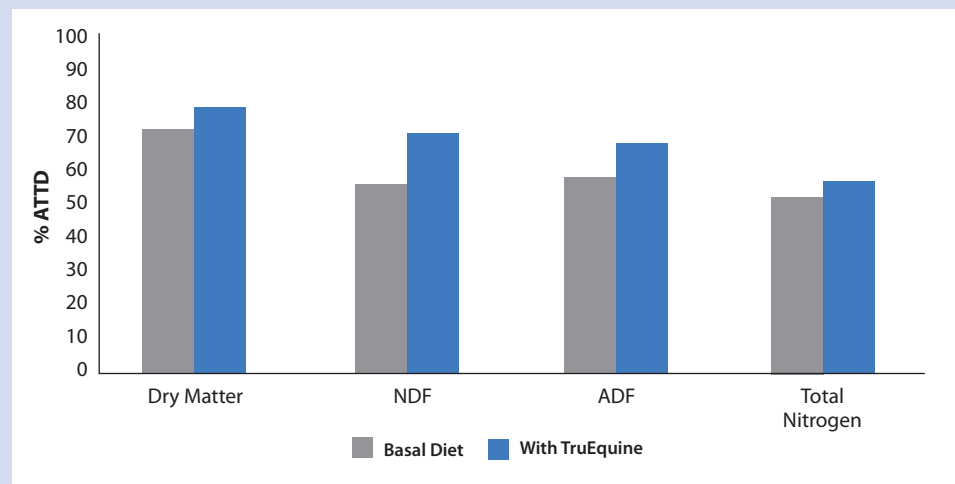
TruEquine postbiotic is a unique, rich, and consistent mixture of hundreds of beneficial metabolites formed through Cargill's proprietary fermentation process utilising a specific strain of *Saccharomyces cerevisiae*. Like the metabolites created by the gut microbiome, the metabolites in TruEquine Postbiotic also exert an influence on many digestive and immune functions including those associated with the aforementioned aspects of nutrient digestion and absorption. TruEquine postbiotic beneficially modulates the gut microbiome by giving a "competitive edge" to beneficial populations to maintain and promote their abundances and stimulate positive outcomes, such as enhanced VFA production. Butyrate is one such VFA that has been shown to enhance the epithelial cells lining the intestine and modulate immune responses and systemic metabolic processes. In total, TruEquine postbiotic nurtures the gut microbiome and helps it flourish. A more robust and thriving gut microbial community is able to feed on and more fully digest ration feedstuffs. As a result, more nutrients, such as carbohydrates, proteins, vitamins, and minerals become available. These nutrients are used to support growth, maintenance, reproduction, and performance of the horse. TruEquine postbiotic digestibility benefits have been documented in controlled research across all major equine life stages.

TruEquine Postbiotic Improves a Key Driver of Growth Efficiency in Yearlings

The table below provides the key nutrient content of a basal diet and a basal diet containing TruEquine.

Total Diet Nutrient Content	Basal Diet	Basal Diet + TruEquine
NDF, %	38.9	38.6
ADF, %	24.2	23.9
Total Nitrogen, %	2.7	2.09

The graph below shows the digestibility of a basal diet and a basal diet containing TruEquine, relative to the key nutrients. TruEquine numerically improved apparent total track digestibility (ATTD) of DM by 9.2%, NDF 25.7%, ADF 18.1% and total nitrogen 8.9%.



M.J. Glade and Biesik, L.M. (1986) J. Anim. Sci. 62:1635-1640.

Growing Horses



**Adult
Horses**



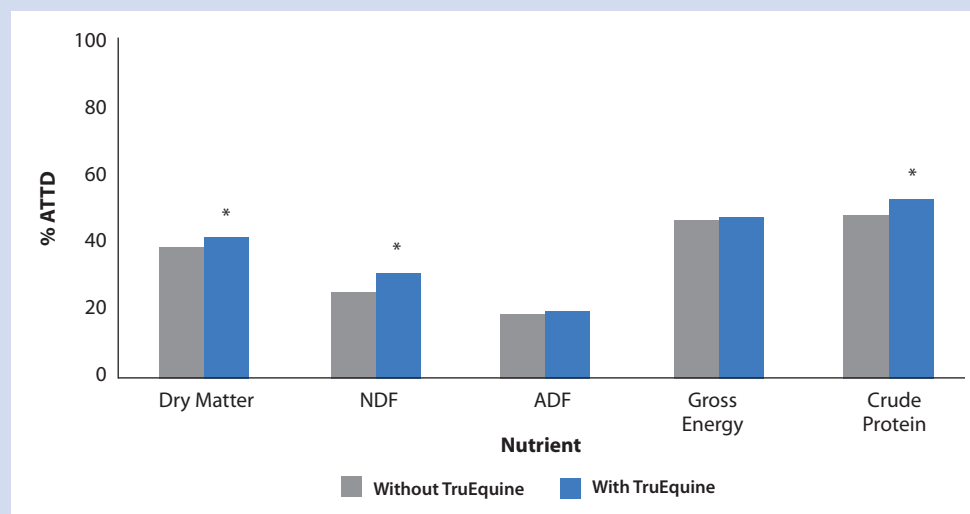
TruEquine™ Positively Influences Apparent Digestibility of Diets for Mature Horses Containing Lower Quality Seasonal Forage

The table below provides the key nutrient content of a low quality forage diet.

Total Diet Nutrient Content	Low Quality
Dry Matter, %	89.7
ADF, %	62.0
NDF, %	30.9
Lignin, %	5.2
Ash, %	4.2
Crude Protein, %	9.2
Gross Energy, Mcal/kg	4.2

The graph below shows the digestibility of a low quality forage diet and a low quality forage diet containing TruEquine, relative to the key nutrients.

Seasonal pressures such as temperature and rainfall and post-harvest age are factors that affect forage quality. Increased lignification and reduction of key nutrients such as energy and protein are typical outcomes which ultimately depress the quality and digestibility of the daily total ration of the horse. In this study, TruEquine postbiotic improved dietary dry matter digestibility by 8.5% ($P = 0.07$), NDF by 19.9% ($P=0.08$) and crude protein by 10.1% ($P=0.05$).



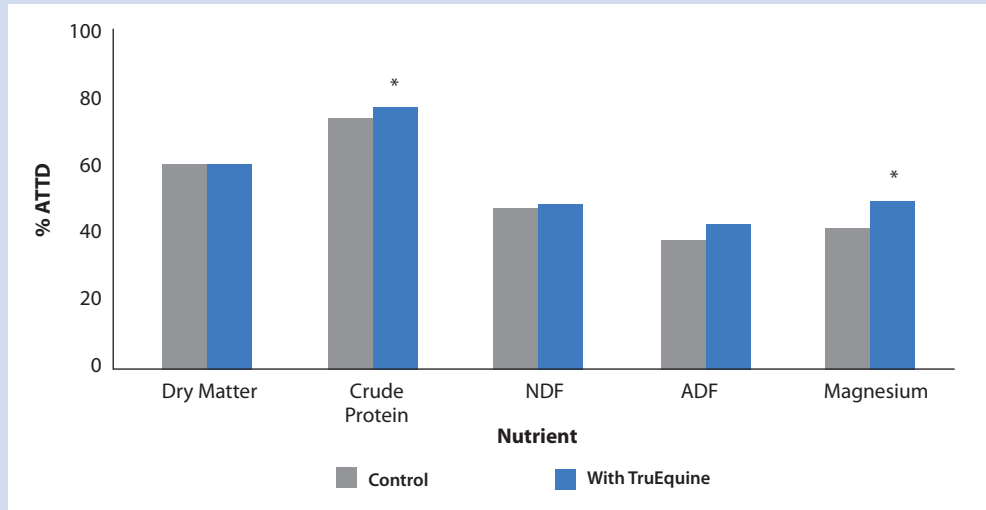
L.M Morgan et al.(2007) J. Equine Sci. 27(6) 260-265.

Senior Horses



TruEquine™ Improves Apparent Digestibility in Senior Horses Fed 50:50 Forage: Concentrate Diets

This study demonstrated a significant improvement in crude protein (+5.1%) and magnesium (+18.6%) apparent digestibility in senior horses supplemented with TruEquine postbiotic in the concentrate portion of the total daily ration. Numeric improvements in % ATTD were observed for dry matter (+0.83%), NDF (+2.5%) and ADF (+10.3%).



S.T. Switzer et al. 2003 (Internal Report, unpublished).

Summary

Providing horses with diets containing the right level of digestible nutrients is always important. Now more than ever, with skyrocketing ingredient prices and environmental challenges limiting the availability of high-quality forages, maintaining good to excellent diet digestibility may be difficult. Thankfully, TruEquine postbiotic is an ideal, cost-effective measure to help support optimal nutrient digestibility in the face of feed and forage quality challenges.

If you would like more information, please contact your local Diamond V representative.

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