

Equine Industry Roundtable

**“Using Pre- and Probiotics and
Other Products to Improve Gut
Health in Equine Feeds”**

Improving Gut Health with Equine Feed Additives... Are We There Yet?

Mary Beth Gordon, Ph.D.

Director of Equine Research and New Product Development, Purina Animal Nutrition

Currently, no feeds manufactured for the Purina Animal Nutrition line of horse feeds contain pre- or probiotics or similar nutritional aids. Purina is currently researching the use of pre/probiotics and other digestive aids, but we require much stronger data supporting their use before adding them to our horse feeds. As with a lot of nutritional research, studies contradict each other in the results and implications of feeding these additives. For example, with yeast culture (prebiotic) research, Purina recently conducted an in-depth digestibility study that demonstrated no benefit in apparent digestibility of DM, ADF or NDF from the inclusion of yeast culture in the diet of mature horses (data under review, JAS). These results agree with the work reported by Hall, (1990); Markey, (2006) and Webb, (1985) who reported no significant differences of apparent digestibility of nutrients by mature horses, 3 year olds, or yearlings, respectively. Conversely, a series of experiments performed by Glade (1986, 1990, 1991) and Jouany (2008) suggested some benefits of yeast supplementation, including increased rate of gain in foals and improved fiber digestibility. Therefore, if research is equivocal across studies (NRC, 2007) should it automatically be added to feed? The answer for us is multi-factorial, but stems around more research, cost and need. Obviously, more persuasive data would help, but if it is going to add significant cost to a feed and horses generally may not need supplementation, why add it? Another point to make is how research is used to justify a need. Several companies cite the work of Medina (2002) that demonstrated a decrease in expected hindgut acidosis of horses fed very high starch diets along with *S. cerevisiae* supplementation. It is important to point out that the high starch diet in this study was fed at a rate of 3.4g starch/kg BW, which is within the suggested upper limit for starch overload of ~2.0-4.0g starch/kg BW (NRC, 2007). In reality, a horse would need to eat approximately 12 lbs of Omolene 200 in one meal to provide a similar amount of starch, which is at least twice the recommended feeding rate for one meal. One could also argue that feeding yeast culture to help a horse fed meals too high in starch is not a good solution. Changing other nutritional or management factors such as feeding a feed higher in fat/fiber and lower in starch, and/or feeding smaller meals, will be of more benefit to the horse in terms of decreasing the risk of hindgut acidosis. Therefore, due to the conflict in reported data on the efficacy of yeast culture, and other nutrition and management factors that may be more beneficial to the horse (i.e. feeding more digestible or different feedstuffs to begin with), we do not include yeast culture in our feeds at this time.

Direct fed microbials (DFMs/probiotics) are designed to provide live colonies of lactic acid and other bacteria for improved gut or animal health. However, the issue of product viability must be addressed first as there is questionable quality of commercial products when only 2 of 13 products tested met label claims in research conducted by Weese, (2002). Recent research demonstrated no benefit of DFMs on gastrointestinal microflora, cortisol response to transport stress, or antibody response (Saul, 2012). Further, the author of this study communicated that multiple commercial products claiming to have live cultures were found to be sterile upon culture testing. Therefore, work must be done and validated to ensure that products contain the live colonies claimed on labels. Once a viable organism is found, questions then need to be answered around both the proper inclusion rate in a feed and the organism's survival during storage and manufacturing processes. If the product passes this test, *in vitro* and *in vivo* experiments would be necessary to determine efficacy and mechanisms of action. To date, there are very limited studies in horses that clearly show colonization and health benefit, and in fact, administration of a probiotic to foals increased

incidence of diarrhea and colic compared to placebo (Weese 2005). Therefore, much more work is necessary in the DFM field before we can recommend these with confidence.

Due to lack of these additives in our feeds, Purina takes no steps to ensure quality control of pre- and probiotic containing products. However, we do have a commitment to research to continue looking at these products. When we find a product that meets our criteria for efficacy and benefit to the horse, as opposed to simply creating an interesting marketing story, it will be incorporated into our feeding programs.

For future research, the following issues should be addressed for pre- and probiotics: 1) viability and mechanism of action in the gut to produce desired effect 2) data to show stability in a plant environment and manufacturing system such as pelleting/extrusion 3) benefit, safety, efficacy, and dosage studies in horses in typical feeding practices over and above current beneficial feeding practices. In order to improve gut health in horses, current practices of feeding high quality feedstuffs in appropriate amounts, along with good nutritional management can help horses to maintain a healthy gastrointestinal environment that allows them to digest, absorb and assimilate nutrients.

References:

Glade M.J. and Biesik. 1986. Enhanced nitrogen retention in yearling horses supplemented with yeast culture. *JAS*. 62:1635.

Glade, M.J. and Sist. 1990. Supplemental yeast culture alters the plasma amino acid profiles of nursing and weanling horses. P 369-379 in Proc. 11th ENPS.

Glade, M.J. 1991. Dietary yeast culture supplementation of mares during late gestation and early lactation. *JEVS* 11:10.

Hall, R.R., et al 1990. Influence of yeast culture supplementation on ration digestion by horses. P130-134 in Proc. 11th ENPS.

Jouany, et al. 2008. Effect of live yeast culture supplementation on apparent digestibility and rate of passage in horses fed a high-fiber or high-starch diet. *JAS* 86(2):339-347.

Markey, A.D. and Kline. 2006. Effects of dietary fat and yeast culture supplementation on total tract digestibility by horses. *PAS* 22:261-266.

Medina, B., et al. 2002. Effect of a preparation of *Saccharomyces cerevisiae* on microbial profiles and fermentation patterns in the large intestine of horses fed a high fiber or a high starch diet. *JAS*.80:2600.

NRC. 2007. *Nutrient Requirements of Horses* (6th Ed.). National Academy Press, Washington, D.C.

Saul, J. et al. 2012. Effects of probiotic supplementation on stress and immune responses in horses. Abstract, ASAS.

Webb, S.P., et al. 1985. Digestion of energy and protein by mature horses fed yeast culture. P 64-67 in Proc. 9th ENPS.

Weese, J.S. 2002. Microbiologic evaluation of commercial probiotics. *J. Amer. Vet. Med. Assoc.* 220:794-797.

Weese, J.S. and Rousseau. 2005. Evaluation of *Lactobacillus pentosus* WE7 for prevention of diarrhea in neonatal foals. *JAVMA*. 226(12):2031-4.