



## Micro-Aid<sup>®</sup> and Intestinal Efficiency

### Micro-Aid<sup>®</sup>

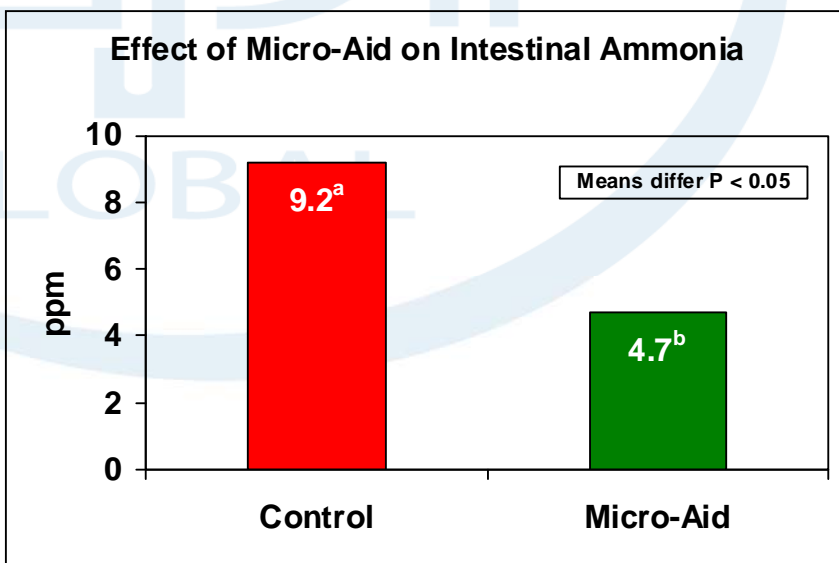
Micro-Aid<sup>®</sup> is an all-natural, feed additive that is safe and effective for all animals, including young animals with developing digestive systems. Micro-Aid<sup>®</sup> is not absorbed from the intestinal tract and therefore produces no residues in meat and requires no withdrawal time. Leading scientists have classified Micro-Aid<sup>®</sup> in the safest classification for feed additives, “Generally Recognized as Safe.”

Micro-Aid<sup>®</sup> is manufactured from an all-natural phytogetic extract that grows in the Southwest United States and Mexico. American Indians have used the plant as a herbal medicine for hundreds of years. The phytogetic compound has been used in humans to reduce cholesterol, aid in the solubilization of fats including Trans Fats and to relieve stomach cramps, arthritis and muscle pain. Scientific studies continue on its use to inhibit the growth of cancer cells, boost the immune system and to act as a natural antibiotic.

Micro-Aid<sup>®</sup> contains saponins that have natural detergent or surfactant properties because they contain both water- and fat-soluble components. Micro-Aid<sup>®</sup> in the intestinal tract provides a protective coating over the intestinal mucosa cells and acts as a wetting agent for intestinal flora. The surfactant properties of Micro-Aid<sup>®</sup> improve the utilization of fat and other fat-soluble substances in the gut through enhanced emulsification by forming mixed micelles containing bile salts, fatty acids, diglycerides and fat soluble vitamins. This is especially important in young animals starting out on dry diets typically high in fat and fat-soluble vitamins.

### Intestinal Efficiency

Scientific research studies have shown that Micro-Aid<sup>®</sup> significantly reduces intestinal ammonia. Intestinal ammonia causes damage to epithelial cells within the mucosa that line the intestinal tract and are responsible for the digestion and absorption of nutrients. This affects the animal in two ways. First, damage to the intestinal mucosal cells reduces their absorptive capacity and results in reduced nutrient utilization, reduced growth, and reduced efficiency. Secondly, damage to intestinal mucosal cells increases intestinal turnover rate, which requires additional energy and amino acids to replace the damaged tissue. This increased maintenance cost also results

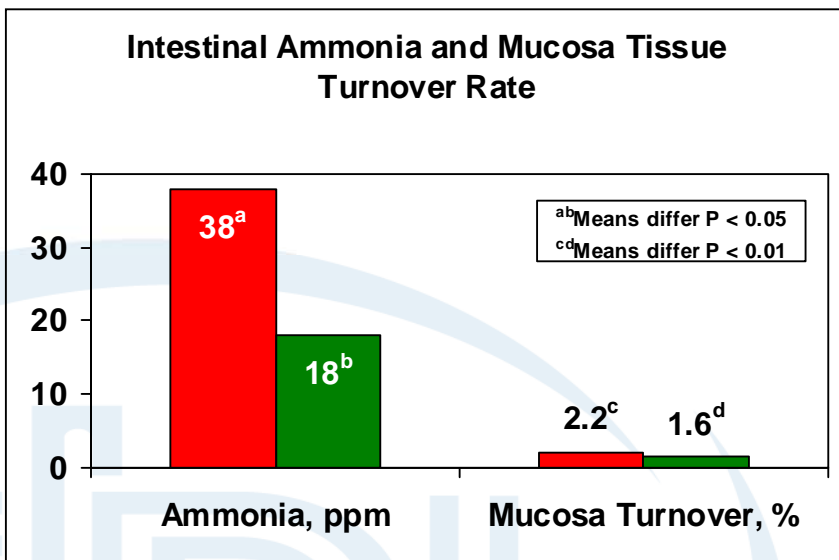


Micro-Aid<sup>®</sup> in all feed, all the time



in reduced growth and efficiency. By reducing intestinal ammonia, Micro-Aid<sup>®</sup> reduces maintenance cost, improves the efficiency of nutrient utilization, enhances animal performance and maintains gut health.

It is well known through multiple research studies that the saponins contained in Micro-Aid<sup>®</sup> affect the permeability of intestinal cells by forming complexes with sterols (e.g., cholesterol) in mucosal cell membranes. This increases the permeability of intestinal mucosal cells and may facilitate the uptake of substances to which the gut may normally be impermeable. This results in improved uptake of essential nutrients and other feed substances, resulting in improved animal performance. Saponins similar to those in Micro-Aid<sup>®</sup> are commonly used as adjuvants in oral vaccines to facilitate the absorption of large molecules.



Recent research has shown that Micro-Aid<sup>®</sup> has a pronounced effect on intestinal microbial populations. Intestinal microbial populations consist of both flora (bacteria) and fauna (protozoa). The microbial population of the gut is very important in both the utilization of feed nutrients and in maintaining gut health and efficiency.

Research studies show that Micro-Aid<sup>®</sup> suppresses protozoa by complexing with cholesterol in the protozoal cell membrane. This causes a breakdown in the cell membrane and the subsequent death of the protozoa. Protozoa compete with bacteria for nutrients within the gut. They also engulf bacteria, causing proteolysis of bacterial protein and an increase in intestinal ammonia. Protozoal diseases in which part of the life cycle occurs in the gastrointestinal tract would therefore be expected to be responsive to the saponins in Micro-Aid<sup>®</sup>. An example of such a protozoal disease is coccidiosis, which routinely affects young animals across several species.

Current research studies have also shown Micro-Aid<sup>®</sup> to have a positive effect on bacterial populations within the gastrointestinal tract. Bacterial populations routinely reside within the intestinal tract and play a significant role in the utilization of nutrients and the health of animals. The ability to maintain a healthy population of non-pathogenic bacteria within the intestinal tract enhances animal growth and efficiency and reduces the risk of disease. Micro-Aid<sup>®</sup> has been shown to provide an environment conducive to the health of the bacterial populations normally residing within the gut.

Because Micro-Aid<sup>®</sup> is not absorbed from the intestinal tract, it passes through the animal into the manure. Micro-Aid<sup>®</sup> continues to work within the manure in a similar fashion to enhance bacterial populations which in turn utilize undigested nutrients to prevent the formation of noxious gases and reduce odors.



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