

Why Animals Need Enzymes in the Feed?



Dr. Nelson Ward
Marketing Development Manager
Feed Enzymes,
North America, DSM
Nelson-E.Ward@dsm.com

The majority of pig and poultry diets are composed of about 70% maize or wheat, 20% soybean meal or other similar protein sources, and 10% micro-ingredients. Although this is a simplification, it illustrates the point that the majority of pork, poultry, and eggs are produced using a limited range of ingredients. In addition, it is important to note that feed cost is about 60-70% of overall production cost. And, as feedstuff prices continue to be prohibitively high, with detrimental effects on producer profitability and consumer prices, even the slightest saving in feed cost (without sacrificing animal performance, of course) brings significant changes in production profitability – in a sector where net profit is usually below 5%.

The first action after feed is consumed is that of digestion. The animal's stomach and small intestine secrete a wide range of enzymes that break down starch (major source of energy), protein (amino acids), fats (lipids) and salts (minerals) into their simple components, which are subsequently absorbed. What remains undigested passes on to the hind gut where it is used by the microflora for their growth, whereas everything in there is later excreted in the environment. Digestion efficiency can be as low as 30% in the case of phytate (vegetable) phosphorus or as high as 90% in dairy products (used in piglet diets). Of course, crude fiber is virtually non-digestible, and this is a clear waste of an energy source for non-ruminants.

As animals derive nutrients from feed by the process of digestion, through secretion of enzymes, improving digestibility of these nutrients is the most obvious, and easiest, way to improve the 'net benefit' animals obtain from their feed. And, the best way to achieve this goal has been the use of enzymes that can be added in their feed. Indeed, this has been proven beneficial in most cases bringing about 5% improvement in feed efficiency, and thus approximately 5% reduction in feed cost. Commercial enzymes exist today that enhance digestibility of energy, protein, and phosphorus – the three

most expensive components of any animal's feed. For energy, exogenous carbohydrases (unlike those secreted by the animal) help break down indigestible fiber. In addition, amylase (which is secreted by the animal) is also used in very young animals that do not produce enough of this enzyme to handle the large concentration of starch in their feed early in life. In a very interesting note, recent studies have demonstrated an even stronger amylase effect in the grower/finisher period, and as such amylase appears to be required in all high-energy diets. For proteins, exogenous proteases mimic the action of endogenous proteases, enhancing thus protein digestibility. In the case of phosphorus, phytases help release phytate phosphorus, reducing thus phosphorus excretion in the environment by 30% or more. Apart from improved nutrient digestibility, enzymes confer side benefits: (1) they reduce the amount of nutrients available to gut microflora, restricting the growth of potentially pathogenic bacteria, (2) reduce gut viscosity enhancing nutrient absorption and reducing bacterial proliferation, and (3) reduce ammonia build up inside facilities due to less nitrogen being excreted.

These have indirect but marked beneficial effects on animal health that improve animal health. Today, there is no doubt pigs and poultry benefit from enzymes in their feed, especially as feed ingredient prices soar and when ingredient quality tends to be below average. The addition of enzymes improves feed quality, reduces feed cost, safeguards animal health, protects the environment, and above all brings about higher profitability from farming!



DSM

BRIGHT SCIENCE. BRIGHTER LIVING.