Enzymes – the journey from the shelf to the gut

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The recent price spikes in the cereal and soybean markets have increased awareness in the use of enzymes as perhaps the currently only practical means of alleviating feed cost pressure on animal production.

For anyone considering using or buying enzymes, the following list can offer some interesting points of discussion with their supplier:

1. Cost of enzyme
Any feed enzyme product that is sold at a 'bargain' must come with a clear balance of cost savings versus quality so that it remains 'profitable' to the buyer. On the other hand, very expensive enzymes must identify and support claims of superior performance.

2. Efficacy
A large number of studies under different conditions, encompassing not only *in-vitro* (e.g. in a tube) but especially *in-vivo* (animal tests) is required. University trials, customer testimonials and commercial trials are interesting, but not sufficient alone. It is also important to assess the ratio of return-on-investment or the total cost saving. If this ratio is not significant, then using an enzyme (or any other product) is futile.

3. Stability
In order to utilize enzymes to their full potential, it is important that they are stable. Factors such as pH, temperature and water activity affect enzyme stability. Any enzyme that becomes inactivated (even partially) during feed manufacturing (pelleting, extrusion, prolonged storage, high-heat or high-humidity storage conditions) should be identified. Naturally, highly stable enzymes come at a premium for their superior qualities.

4. Product form
If feed is to be fed in meal form within hours from manufacturing it makes very little sense to pay for a heat-stable product designed to withstand the rigours of a pelleting machine. Several enzyme products are available for mild process conditions and even for liquid application.

5. Formulation
Dry feed enzyme products are available in powder or granular from. To ensure good flowability and mixing uniformity, they need to be of optimal particle size and particle number. Otherwise, homogeneity in feed cannot be ensured especially in small animals, and this is invariably a costly problem affecting animal performance and quality control procedures.

6. Dust free
Often enzymes are added at such small quantities that it requires human operators to manually weigh and add them in the feed mixer. Even when enzymes are part of larger premix packages, airborne dust that carries enzyme particles is considered undesirable as it can be the source of allergies. Consequently, a product that is virtually dust-free is required to ensure worker safety.

7. Protection
Enzymes need to reach the right part of the gastrointestinal tract before they can exert their beneficial effects. If they start degrading along the path before they reach their destination, then they offer limited value. This is the reason why *in-vivo* tests are required, and also it is here where practical customer trial-testimonials become of commercial value.

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