Aiming for optimal performance with NSP degrading enzymes

To formulate feed for commercial poultry production, nutritionists are under constant pressure from the commodities market and regulatory hurdles. Cost-effective and safe feeds can be a challenge in the current circumstances.

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Nutritional strategies to support the production of high quality, low cost and safe animal products are a must nowadays and the relationships between health, nutrition, welfare and environment need to be taken into account.

Non-Starch-Polysaccharide degrading enzymes (NSPases), such as xylanase or xylanase-based enzymatic complexes, are therefore of special interest to optimise animal production, as their use will bring an economic advantage via increased zootechnical performance or via lower feed costs (due to the ability of the enzymes to improve metabolisable energy content of the feed).

NSPase's mode of action includes the hydrolysis of soluble arabinoxylans, which minimises the negative impact of increased intestinal viscosity – an increase in intestinal viscosity can reduce the pancreatic enzyme activities and the digestibility of carbohydrates, proteins and fats. Additionally, a slower feed transit can result in an increased proliferation of the gut microflora and poor absorption of nutrients.

Together with the efficient reduction in viscosity, NSPases will hydrolyse insoluble arabinoxylans – this action will unlock nutrients (mainly starch, proteins and lipids) which are trapped in the cell walls of the vegetable feed ingredients.

Different NSPases will have different efficiency rates in the hydrolysis steps depending on several factors, such as microbial origin of the enzyme, type of enzyme, substrate selectivity properties, etc.

The most common use of NSPases is by feed reformulation strategy – ascribing a nutritional matrix to an enzymatic product, which will directly impact feed costs without compromising animal performance and may allow the use of alternative raw materials and less energy-dense diets.

		ME (% of GE)		DM		Fat	
	Inclusion (%)	Control	NSPase	Control	NSPase	Control	NSPase
Wheat	65	77.3	78.4	75.0	75.6	84.3	85.9
Maize	65	79.7	82.2	77.5	79.6	84.6	90.0
Barley	65	74.9	77.2	72.1	74.1	84.2	87.4
Soybean meal	30	77.3	79.3	73.7	75.6	89.0	90.2
DDGS	30	69.0	71.8	65.9	68.1	76.5	84.2
Rapeseed meal	10	73.0	75.4	69.7	71.9	82.7	87.5
Rapeseed meal	20	77.3	79.0	74.3	75.8	87.0	89.9

Table 1. Effect of Hostazym X on the digestibility of nutrients of different raw materials.

In a study designed to test the efficacy of Hostazym X in releasing nutrients and energy from different raw materials, 336 Ross 308 broilers were allocated to a digestibility trial.

Treatment diets were formulated based on one target raw material (65% cereal combined with 35% base protein complementary feed or by-product combined with base wheat and maize complementary feed) with or without NSPase at 1,500 EPU/kg. The broilers digestibility study was done from 18-22 days old. The results of the study are shown in Table 1 and Fig. 1.

The results show that Hostazym X can efficiently release nutrients (energy) from different raw materials and support its flexibility to be used over a wide range of diet formulations, being a reliable nutritional tool for feed costs reduction and consequently animal production optimisation. ■

References are available from the author upon request

Fig. 1. Effect of Hostazym X on faecal droppings of birds from 18 to 22 days.