

New generation phytase

makes economic sense



A novel 6-phytase produced in yeast is shown to be at least 20% more efficient than other phytases available on the market. According to L.Z. JIN* it allows the feed manufacturer to further reduce the use of inorganic phosphorus sources.

Key words: Phyzyme XP (poultry non EU), phytase, broiler, phosphorus, calcium, competitor enzyme, toe ash, bone mineralisation, dose rate, bioefficacy

While most phytases are manufactured industrially in fungi, Phyzyme XP (Danisco Animal Nutrition) is a novel phytase produced in the yeast *Schizosaccharomyces pombe*.

In a study at Purdue University, USA, broilers were fed a negative control diet reduced in total phosphorus by 0.26% in starter and 0.19% in the grower diet, and in calcium by 0.37% in the starter diet and 0.31% in the grower diet. The negative control diet was supplemented with three levels of Phyzyme XP. Feed intake, body weight, tibia ash and FCR were significantly poorer in birds fed the negative control diet (Table 1).

The lowest level of phytase (500 FTU/kg feed) more or less restored bird performance to that of the positive control, suggesting that this phytase had an extremely powerful nutrient-releasing capacity.

Data from broiler feeding studies show that there is a clear difference between Phyzyme XP and other phytases used in the feed industry.

Performance data from 10 broiler trials conducted at research centres and universities across the world have shown a clear difference between birds fed different sources of phytase, in terms of body weight gain, feed intake and feed conversion over a 42-day growth period.

The trials compared the efficacy of Phyzyme XP with a 3-phytase product in predominantly corn/soybean meal-based diets. All diets had reduced levels of phosphorus and calcium, plus the phytase, included at different levels, from zero (control) to 800 FTU/kg feed. A total of 89 treatment comparisons were made, 61 with Phyzyme XP and 28 with the 3-phytase. The relative bioefficacy between the two phytases was calculated by comparing the slopes of linear regression equations for the percentage response of the two products.

The response to Phyzyme XP was greater than the competitor. Figure 1 shows the relative improvement in body weight gain. At the recommended dose of 500 FTU/kg feed, Phyzyme XP was 1.44 times (44%) more effective than the competitor phytase. Similarly, feed intake was increased and feed conversion improved by Phyzyme XP 1.32 (32%) and 1.65 times (65%) more effectively than the competitor phytase, respectively. At any stage of growth, Phyzyme XP was at least 20% more efficient than the 3-phytase in improving weight gain and feed intake.

Savings in practice

At the recommended dose of 0.01% Phyzyme XP (500 phytase

Figure 1: Phyzyme XP improves broiler body weight gain more effectively than a 3-phytase (0-42 days).

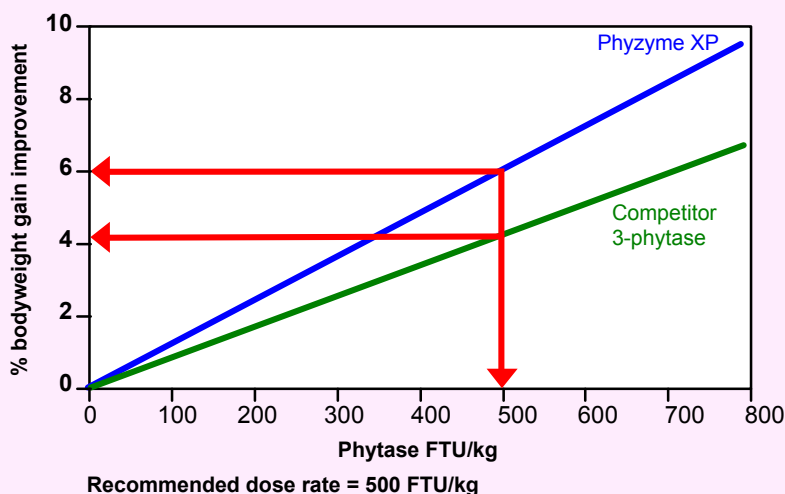
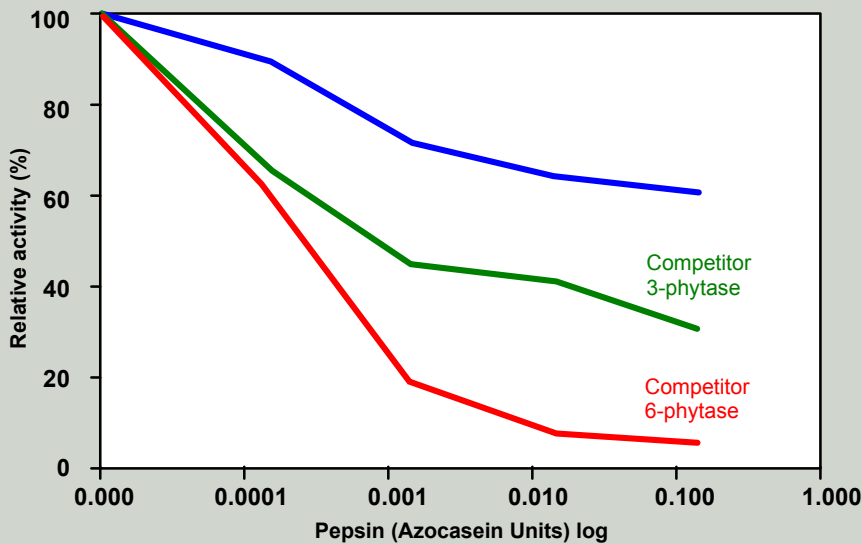


Figure 2: Sensitivity of different phytases to pepsin at pH2.



digestive proteases. Phyzyme XP is more resistant to degradation by the endogenous protease pepsin than other phytase products (Figure 2).

Secondly, it retains its high relative activity over a broader pH range (Figure 3). This means that it can remain active longer within the different parts of the digestive tract where pH levels vary.

Adding Phyzyme XP to broiler diets clearly has superior advantages, offering the feed manufacturer and poultry producer flexibility of cost savings whilst improving performance and reducing phosphorus waste.

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units per kg feed), the total P level of the feed can be reduced by 0.138%, if DCP is used in the formulation.

Assuming a DCP cost of US \$0.25/kg, addition of 500 FTU/kg feed of Phyzyme XP replaces 7.7kg DCP in the formulation and provides a gross cost saving of US \$1.93/tonne of feed. When compared to the saving of US \$1.60/tonne from the same amount of 3-phytase activity, Phyzyme XP saves an extra US \$0.33/tonne, if the cost of both phytase products is comparable.

Existing users of phytase in broiler diets can choose not to maximise the feed cost saving afforded by Phyzyme XP and instead include a 20% lower phytase activity in the feed. In practice, this would mean using 400 FTU/kg feed (a dose of 80g/tonne) of Phyzyme XP to replace 500 FTU/kg feed (100g/tonne) competitor 3-phytase, or 750 FYT/kg feed (300g/tonne) competitor 6-phytase, to achieve the same performance as the competitor product, but at a 20% lower dose.

Why is it so effective?

Danisco Animal Nutrition's scientists have identified a number of possible reasons for the superior efficacy seen in poultry trials. For example, because all enzymes are proteins, they are at risk in the digestive tract from degradation by

Table 1: The effect of Phyzyme XP on performance and tibia ash of broilers at 42 days

	Feed intake g	Weight gain g	FCR*	Tibia ash %
Positive control	3722 ^a	2198 ^a	1.64 ^b	53.4 ^a
Negative control	3430 ^b	2005 ^b	1.71 ^a	48.9 ^b
Negative control + Phyzyme XP (500 FTU/kg feed)	3674 ^a	2134 ^a	1.65 ^{ab}	51.3 ^a
Negative control + Phyzyme XP (750 FTU/kg feed)	3796 ^a	2246 ^a	1.62 ^b	52.4 ^a
Negative control + Phyzyme XP (1000 FTU/kg feed)	3740 ^a	2209 ^a	1.60 ^b	52.8 ^a

^{ab} P<0.05. Corrected for different body weight (3 points in FCR for every 100g body weight)

Figure 3: pH profile of relative activity of three phytases over a broad pH range.

