

Enzymes help unlock energy in corn-based duck feeds

Like broiler producers, duck producers are looking to maximise efficiency, and in respect of feeding, this means finding a balance between optimising bird performance and minimising feed cost.

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Enzyme supplementation of duck feeds not only improves overall performance, but also increases body weight uniformity and provides excellent opportunities to reduce feed costs.

In broiler production the use of enzymes to help achieve this balance is relatively commonplace, particularly in wheat-based diets and increasingly in corn and sorghum-based diets. But enzyme usage within the duck sector is much less widespread, even though there is increasing evidence that the application of enzymes in duck diets can produce a significant lift in bird performance and help reduce feed costs.

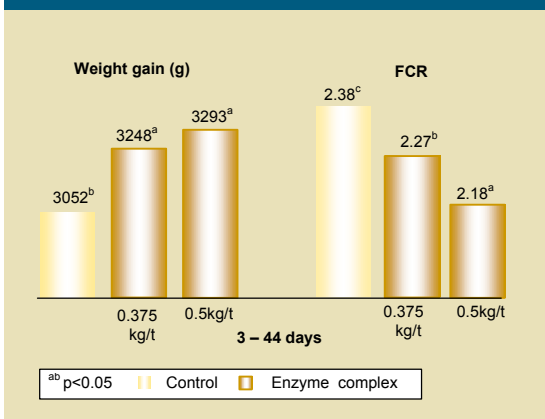
In wheat-based diets, enzymes are used primarily to improve performance and reduce its variability, caused by soluble fibre in wheat that increases intestinal viscosity and reduces nutrient digestibility. In birds fed corn/soy-based diets, intestinal viscosity levels are much lower and so variability in performance associated with grain viscosity is likely to be less of an issue.

However, corn-based diets can result in variable bird performance due to the differences in the starch and protein digestibility of corn, sorghum and soybean meal. Contrary to the popular perception that cornstarch is readily digested and has a relatively consistent energy value, research has shown that the variability in digestibility between samples of corn can actually be as great as for wheat.

Studies have also shown that at the terminal ileum, cornstarch digestibility rarely exceeds 85% in poultry. Since starch contributes around 65% of the energy content of corn, there is considerable scope to improve the release of the remaining 'locked' energy, which can then be utilised by birds.

Similarly for soybean meal, dry matter digestibility is variable and this variability is most commonly attributed to protein-based anti-nutritional factors (e.g. trypsin inhibitors, lectins, antigenic factors), oligosaccharides and other fibrous components.

Figure 1. Enzyme supplementation improves performance of ducks fed corn-based diets (Purdue University, USA)



Performance improvement

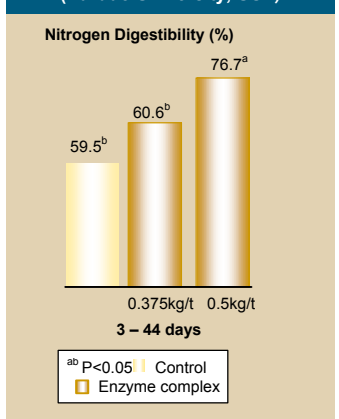
A recent study conducted at Purdue University, USA (Hong et al, 2002, in press) has shown an average 4 - 5% improvement in duck performance as a result of supplementing corn/soy diets with an amylase, protease and xylanase based enzyme complex (Avizyme®). The study used one-day old mixed sex Peking ducklings and compared the performance of birds reared on a corn/soy diet without enzyme supplementation (control) and the

control plus enzyme added at 0.375kg/tonne and at 0.5kg/tonne (Figure 1).

After 42 days, the results showed that enzyme addition significantly (P<0.05) improved feed conversion ratio (FCR) of the ducks by 11 points with the lower dose of enzyme and 20 points with the higher dose (control = 2.38: vs the enzyme complex at 0.375kg/tonne = 2.27; vs the enzyme complex at 0.5kg/tonne = 2.18).

Additionally, the study revealed improvements in ileal nitrogen retention with enzyme addition, by 6.6% (from 74% with the

Figure 2. Enzyme supplementation reduces nitrogen excretion (Purdue University, USA)



control diet to 78.9% with control plus Avizyme at 0.5kg/tonne). Ileal energy digestibility was also improved by 3.8 % (69.83 vs 72.46%) with enzyme addition.

Importantly for an industry that is facing increasing environmental pressure, this study further showed that feed enzymes can significantly reduce excreta nitrogen content. Excreta nitrogen digestibility was increased by 28% in ducks fed the diets supplemented with enzyme at 0.5 kg/tonne (control = 59.5% vs the enzyme complex at 0.5kg/tonne: = 76.7%) (Figure 2).

Production uniformity

As well as lifting overall performance, achieving uniformity of production is a key issue for producers. Variable bird performance can result in potential losses in revenue, either because a higher percentage of birds take a longer time to reach the specified target weight range, resulting in increased overhead costs; or because birds fall outside the target weight range preferred by the slaughterhouse, supermarket or consumer.

A trial at the Roslin Research Institute in the UK demonstrated how the application of an enzyme in corn-based diets could reduce variability in performance. This is because enzymes have a greater effect on poorer quality batches of corn compared to higher quality corn, and smooth out differences in feed value by releasing more energy from the lower energy corns. Consequently the overall performance of the birds fed enzyme-supplemented diets is improved and the range between the best and worst performing birds is narrowed.

In the trial, 288 one-day old mixed sex Peking ducks were allocated to two treatments - the corn-based pellet control feed and the control with the enzyme complex added at 1kg/tonne. As well as improving average FCR by 5 points, the enzyme-supplemented feed also increased bodyweight uniformity. The percentage of birds falling within average bodyweight (±

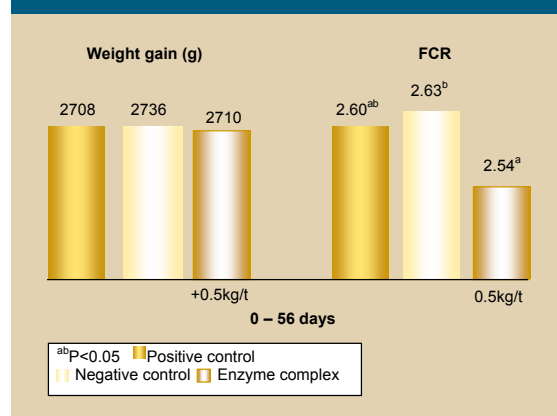
Table 1. Enzyme supplementation allows dietary energy to be reduced in corn-based duck diets (Commercial poultry producer, Taiwan)

	Starter 0 – 21 days		Grower/Finisher 22-56 days	
	Control	Reduced ME	Control	Reduced ME
Corn	579	595.8	612.3	625.9
Soybean meal, 48%	167.4	225.6	10	82.5
Full fat soy	123.3	50.8	166	78
Wheat bran	-	-	50	50
Fish meal	30	30	-	-
Molasses	-	-	5	6
Corn gluten meal	44.4	41.9	-	-
Rapeseed meal	20	20	-	-
Animal fat	5	5	-	-
DL-methionine	0.3	0.3	0.9	0.9
Lysine-HCl	-	-	1	1.3
Other	24.7	30.8	35.4	36
Enzyme complex	-	-0.5	-	-0.5
ME, kcal/kg	3080	3018	2950	2862
ME, MJ/kg	12.81	12.65	12.36	11.99
Crude Protein,%	22	22	16	16
Lysine, %	1.2	1.2	0.94	0.94
Methionine, %	0.45	0.45	0.39	0.39
TSAA, %	0.85	0.85	0.72	0.72

15%), at 42 days of age increased from 91%, in the control diet to 93% in the enzyme-supplemented diet.

These recent research findings clearly show that duck producers can benefit from using an appropriate enzyme blend in corn-based feeds to achieve an improved and more consistent feeding value. Enzyme supplementation of duck feeds not only improves overall performance, but can also increase body weight uniformity and provide excellent opportunities for reducing feed costs.

Figure 3. Enzyme supplementation allows dietary energy to be reduced (Commercial poultry producer, Taiwan)



Keywords: Avizyme 1500, Avizyme 1502, Avizyme 1510, Corn, Duck, Digestibility, Nitrogen, Recommendation for use, Uniformity, Variability, Energy