



Technical Update

Technical Services Department, Wenger's Feed Mill, Inc.

Impact of Feed Enzymes on the Performance of Egg Laying Birds

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The use of feed enzymes is a common practice in wheat and barley-based poultry diets worldwide; however, enzyme producers have found it quite difficult to develop efficacious cost effective products for corn-soybean meal and sorghum-soybean meal based diets.

Finnfeeds International has developed Avizyme 1500 specifically for use in poultry diets containing corn and soybean meal. This product contains Amylase (improves corn starch utilization), Xylanase (reduces viscosity and breaks down cereal cell walls), and Protease (targets soybean meal anti nutritional factors and storage proteins).

Because of the difficulty of measuring responses in laying hens, acceptance of enzyme products designed for corn-soy diets has been slow in the

layer industry. However, research has suggested that Avizyme 1500 may improve energy utilization in commercial layer feeding programs. In an Australian study, Avizyme 1500 was added to a rather low energy control diet and a diet formulated with 5.0% lower energy and amino acids. Egg production, egg weight, egg mass, and feed efficiency were all significantly reduced by reducing dietary energy and amino acid density by 5.0% (Table 1). However, supplementing the down-spec diet with Avizyme 1500 raised all performance parameters to such a level that they were not significantly different from that of the control diet. Although not statistically significant, supplementing Avizyme 1500 into the control diet did improve egg production and

feed efficiency while lowering feed intake.

In a study conducted at the University of the Philippines using white egg layers fed corn-soy based diets from 24 to 44 weeks of age, the researchers used a similar experimental design to that used in the previously discussed Australian trial. The results from this study are presented in Table 2. As with the previous study, reducing dietary energy and amino acid density adversely impacted performance and supplementing the down-spec diet with Avizyme 1500 returned performance to the level of the positive control. As with the previous study, supplementing Avizyme 1500 into the control diet improved egg production and feed efficiency while lowering feed intake.

The two studies discussed previously indicate that dietary supplementation with Avizyme 1500 may improve dietary energy utilization in laying hens. After calculating the

potential cost savings of applying this technology, we decided to conduct a research trial evaluating the effect of Avizyme 1500 on layer performance. Our research houses have six rows of 10,000 birds and three feeding systems each supplying two rows. Each treatment is gathered and graded separately.

We initiated a trial in which we studied the impact of supplementary dietary Avizyme 1500 on the performance of Hy-Line W-98 layers from 17 to 46 weeks of age. Each of the three experimental treatments was fed to two rows of birds with 10,000 birds per row. The experimental treatments were: 1) The control (normal peaking and post peaking diets); 2) The control with 3% less energy plus Avizyme 1500; and 3) The control plus Avizyme 1500.

The results from this study are presented in Table 3. There was no difference in egg production, hen-housed eggs,

feed intake, feed efficiency, mortality and egg quality between the control and the reduced energy diet plus Avizyme 1500 (treatment 2). There was some indication that egg weight may have been slightly reduced in treatment 2. This may be explained by the fact that when the energy of the basal diet was reduced by 3%, the supplementary dietary fat level was reduced resulting in a decreased dietary linoleic acid level. For example, our regular 20lb/100 peaking diet contains 1.80% linoleic acid and the reduced energy Avizyme 1500 20-lb/100 peaking diet contains 1.45% linoleic acid. The results from treatment 2 indicate that in this study, Avizyme 1500 was effective in liberating dietary energy from the soybean meal and corn.

When Avizyme 1500 was simply supplemented on top of the basal diet, it did not improve egg production, hen-housed eggs, case weight, mortality, or egg quality. However, it did reduce feed intake and improve feed efficiency as measured by lbs/doz and lb/lb (Table 3). The reduced feed intake and improved feed efficiency indicate that Avizyme 1500 is improving energy digestibility.

The results from this study demonstrated to us that

Avizyme 1500 would effectively improve energy utilization in a well-managed, stand-alone research house. We then elected to conduct a trial at two layer complexes to study the efficacy of Avizyme 1500 under more stressful conditions. Two houses (one at each of two complexes) were placed on the 3.0% lower energy plus Avizyme 1500 diets to be fed from housing to 65 weeks of age. These flocks are now approaching 60 weeks of age and are performing as well as current and previous flocks at the complexes in which they are housed.

At current Northeastern feed ingredient prices, dietary supplementation with Avizyme 1500 and 3.0% lower dietary energy provides significant cost savings during peak and post-peak (approximately 17 to 45 weeks of age). As the protein and amino acid levels drop in the later cycle diets, the cost savings diminish somewhat and even disappear completely in the higher intake diets. We anticipate that the use of Avizyme 1500 during the first half of the production cycle will be an effective means of reducing the cost of egg production.

Table 1: Effect of Avizyme 1500 added to corn-soy based layer diet fed to ISA Brown layers from 74 to 86 weeks of age.

	Control diet*		Down-spec. diet	
	-Az1500	+Az1500	-Az1500	+Az1500
H.D.Egg production %	77.6 ^a	78.7 ^a	70.7 ^b	75.6 ^a
Egg weight, g	67.2 ^a	67.0 ^a	64.6 ^b	67.1 ^a
Egg mass, g/d	52.1 ^a	52.7 ^a	45.7 ^b	50.7 ^a
Feed intake, g/d	114.7 ^a	113.0 ^a	115.0 ^{ab}	117.3 ^b
FCR, g:g	2.20 ^a	2.14 ^a	2.52 ^b	2.31 ^a

*The control diet contained 17% crude protein, 0.94% lysine, 0.65% met+cys and 2,750 kcal/kg ME (1,247 kcal/lb). The down-spec diet was formulated with 5% lower energy, protein, and amino acids.
Research coordinated at the Queensland Poultry Research and Development Centre, Australia

Table 2: Effect of Avizyme 1500 added to a corn-soy based layer diet fed to Babcock White layers from 24 to 44 weeks of age.

	Control diet*		Down-spec diet		P value for Az effect
	-Av 1500	+Av 1500	-Av 1500	+Av 1500	
H.D.Egg production %	90.5	91.6	88.3	90.5	0.003
Egg weight, g	58.6	57.8	58.2	58.8	0.350
Egg mass, g/d	53.0	53.0	51.4	53.2	0.110
Feed intake, g/d	107.7	104.9	108.1	106.5	0.001
FCR, g:g	2.03	1.98	2.11	2.00	0.010
Feed cost/kg, Peso	19.19	18.96	17.61	16.94	-

*The control diet contained 18.8% crude protein, 1.05% lysine, 0.69% met+cys and 2,775 kcal/kg ME (1,260 kcal/lb). The down-spec diet was formulated with 5% lower energy, protein, and amino acids.
Research conducted at the University of Philippines, Los Banos

Table 3: Impact of Avizyme 1500 on performance of Hy-Line W-98 layers from 17 to 46 weeks of age.

Treatment	Av. Egg Prod.	Egg Wt. at 46 wk.	HH Eggs	Feed Intake	Feed Efficiency	Mortality
	%	lb/case		lb/100	lb/doz	%
1 Normal diets*	81.2	50.4	163	21.9	3.02	0.94
2 Trt. 1+Av-1500 - 3.0% ME	80.7	49.8	163	21.9	3.03	0.87
3 Trt. 1+Av-1500**	81.6	50.1	163	21.5	2.95	0.87

*Normal diets with 3.0% less metabolizable energy plus Avizyme 1500
** Normal diets plus Avizyme 1500
Research conducted at Wenger's Feed Mill, Inc. research farm