

Enzyme utilisation in hen diets

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Unlike broiler production, the use of enzymes in wheat and barley based breeder and layer diets is not yet widespread.

This is due to a number of different reasons:

- Trials to evaluate enzyme efficacy in layers and breeders are much longer than those for broilers.

The NSPs are not digested by the animals but, furthermore, interfere with the digestion of the other nutrients of the ration.

Soluble components

The NSP fraction can be further divided into soluble and insoluble components.

The soluble fraction is

	Control diets	Avizyme supplemented diets
Digesta viscosity (cPs)	7.5	4.6
Excreta dry mater (%)	26.5	27.2

Table 1. Effect on dry matter excretion.

- Measurement of feed intake is not always well controlled on a daily basis.
- Technical problems due to wheat grist size are not always overcome.
- Yolk pigmentation preferences in many markets favours the use of corn.

However, an understanding of the mode of action of enzymes and an economic analysis shows a great potential for enzymes to be used in layer feeds.

responsible for intestinal viscosity and the gel which interferes with nutrient diffusion in the gut.

It has been clearly shown that the main mode of action of enzymes in broilers is due to a

disorders and drier litter. Recent research has also demonstrated the importance of viscosity in layers (**Table 1**) and the efficacy of Finnfeeds enzymes in low viscous grain based diets.

Research data further suggests that Avizyme not only has an action on the soluble part of the polysaccharides but also affects the non-soluble fraction by breaking down the cell walls and releasing nutrients to the hen.

Other research conducted on both wheat and barley based diets has shown performance improvements when adding enzymes in layer feed.

Research conducted in Australia has shown increased weight gain of layers during the early laying period clearly demonstrating a better

shown a 2% increase in excreta dry matter of wheat and barley based diets supplemented with enzymes against untreated control diets.

Water excretion lowered

With lower viscosity diets, as typically seen in France, the total water excretion has been lowered by utilisation of feed enzymes in broilers.

The reduction of intestinal viscosity and, consequently, of intestinal fermentation leads to fewer dirty eggs.

Clearly of economical value to the layer producer it also has an impact for breeders with increased income from improved hatchability.

Trials conducted in Spain have improved yolk colour (**Table 2**) which can be explained by the enzyme

	Maize control	Barley control	Barley + Avizyme	Barley control	Barley + Avizyme	Barley control	Barley + Avizyme
Yellow colour (added ppm)	0	8	8	4	4	2	2
Yolk colour (Roche scale)	13.5	13.3	13.5	12.9	13.1	12.8	13.1

Table 2. Influence of Avizyme 2100 and yellow pigmentation on yolk colour.

Two major groups

The main components of the plants known as polysaccharides can be divided in two major groups: Starch is a very important energy carrier in plants.

The animal's enzyme system usually breaks down these molecules into simple sugars that are absorbed by the animal.

Non starch polysaccharides (NSPs) have a structural function and are found in cell walls.

reduction in the viscosity of intestinal contents through the partial destruction of soluble NSPs such as beta-glucans in barley and arabinoxylans in wheat.

Furthermore, the reduction of fermentation through reduction of intestinal viscosity decreases the microbiological content of the gut and leads to fewer digestive

utilisation of the feed.

One of the targets when feeding modern laying hens is to ensure a good growth during the early period of lay.

It is an insurance for good livability and persistency.

Reduction of viscosity has a direct effect on excreta dry matter. Australian results have also

effect of reducing digesta viscosity and the subsequent improvement in fat digestibility.

Roche scale improvement

The addition of enzymes allows an average improvement of 0.2-0.3 points on the Roche scale.

In a trial done in Australia at a lower Roche scale level, the

improvements were as high as 0.5-1.0 point.

Although not demonstrated yet one can also expect better shell quality through improved vitamin D absorption.

The use of wheat and barley cereals can be maximised when competitively priced, while also improving egg production and FCR.

Feed enzymes reduce the variability of AME in cereals between different cereal samples giving the producer more consistent results.

This was illustrated in recent Canadian broiler trials presented in Table 3.

Benefits of enzymes

There are two opportunities to benefit from the use of enzymes in laying and breeding hen feeds.

The first opportunity is to add the enzyme to the existing diet and evaluate the benefits of improved performance as illustrated in Table 3.

Alternatively, the energy value of certain raw materials can be increased.

This allows the producer to reformulate the diet with a decrease in the feed price but no negative impact on

production.

Our research and field trials have shown that the energy value of wheat can be increased by 6% and barley by 10%.

Fig. 1 shows the possible savings in feed formulation when taking into account the revised energy value for wheat compared to the standard formulation.

It assumes that yellow pigment sources are available in order to reach 8 on the Roche scale - the supplementary points being obtained by adding red pigments.

It also assumes a soybean/cereal price ratio of 1.4:1.0.

High value in layer feed

As the wheat has a high value in layer feed it is of interest to see if its use can be expanded with enzymes.

Fig. 1 assumes that one can use full wheat without any enzymes and includes enzyme cost. The chart can be read as follows:

- 2% energy uplift plus Avizyme - this pays for the enzymes as long as the wheat/corn price ratio is not higher than 93%.

This strategy can be followed considering that supplementary energy gain

Table 3. Reduction of variability in wheat AME with Avizyme

		Feed:Gain (0-21 days)	AME (MJ/kg, 35 days)
Wheat 1	Control	1.50	12.8
	+ Avizyme	1.52	13.2
Wheat 2	Control	1.58	12.9
	+ Avizyme	1.53	13.1
Wheat 3	Control	1.53	12.0
	+ Avizyme	1.49	13.1
Wheat 4	Control	1.55	11.8
	+ Avizyme	1.48	12.6
Wheat 5	Control	1.55	11.9
	+ Avizyme	1.50	13.4
All wheats	Control	1.54	12.3
	+ Avizyme	1.50	13.1
P value	Control	>0.05	0.003
	+ Avizyme	0.02	0.001

is going in better feed efficiency for the layer producer.

- 4% energy uplift plus Avizyme - wheat is as economical as corn as long as it is lower than 99% of corn price.

It can be a very safe economical strategy when using good quality wheat.

- 6% energy uplift plus Avizyme - wheat is more interesting than corn even

when a little more expensive.

Along with the lower feed price one can also expect to obtain additional benefits in terms of egg quality and drier excreta from the addition of the enzymes.

Wheat and barley are now widely used in layer and breeder feed. The utilisation of enzymes must be evaluated according to the feedstuffs prices.

Specific enzymes for barley and wheat (dry and liquid form) have been developed in order to match feed manufacturer competitiveness and egg producer needs. ■

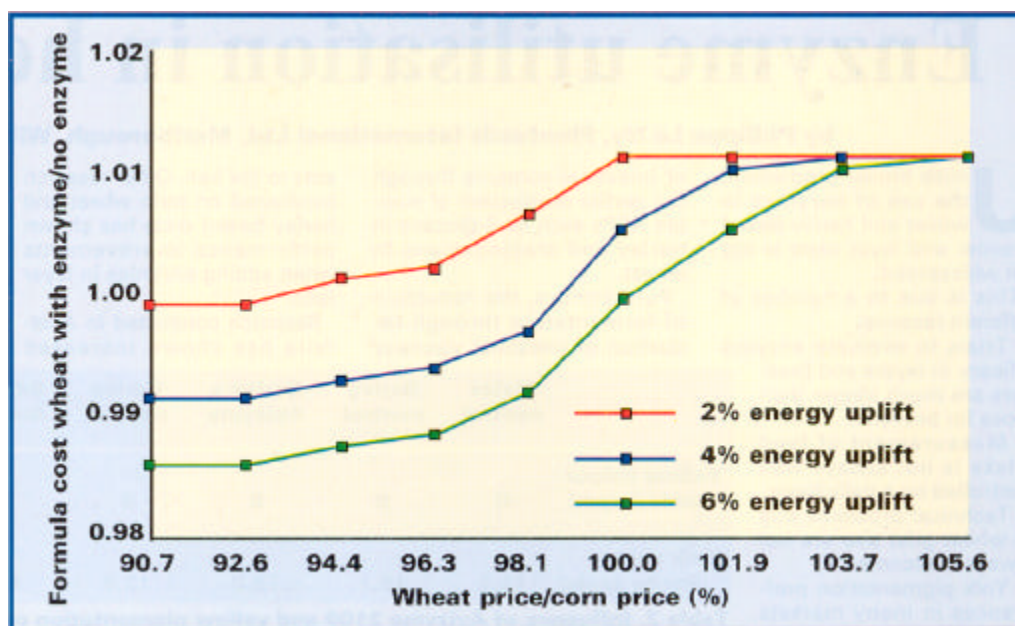


Fig 1. Feed formula cost ratio for different energy uplift.

KEY WORDS

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