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QUIZ: Wheat viscosity reduction with xylanase

An *in vitro* trial was performed at Schothorst Feed Research to evaluate the ability of different commercial enzymes to reduce the viscosity of a wheat extract. Hostazym® X, Belfeed and Natugrain were compared with a control.

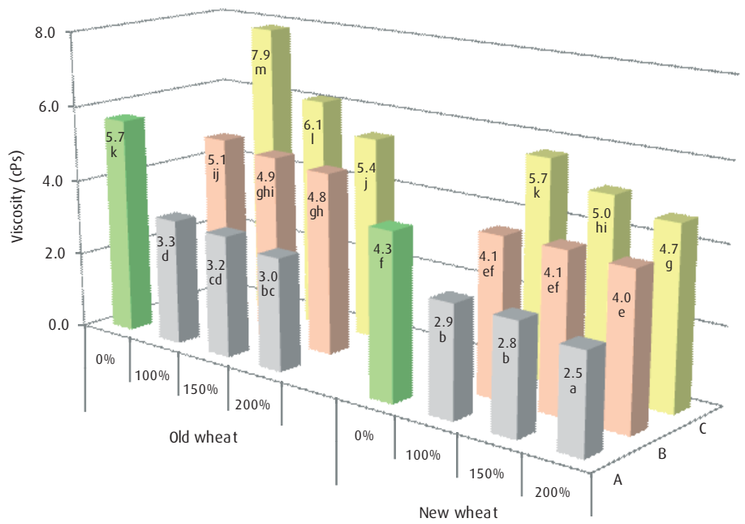
Trial set up information and results

Wheat sample	Moisture (g/kg)	Crude protein (g/kg)	Crude fibre (g/kg)	Starch (g/kg)	Soluble NSP (g/kg)	Insoluble NSP (g/kg)
Old harvest	142	107	22	576	6	100
New harvest	162	90	26	568	9	96

For the trial, two wheat samples were used: a fresh sample (harvested in August 2013) and an old sample (harvested in 2012) both supplied by SFR.

The trial comprised in total twenty treatments based on supplementation of three different NSP-enzymes (Hostazym® X 15000, Belfeed B 1100 ML and Natugrain Wheat TSL) at three graded levels (100%, 150% and 200%, with "100%" being considered as the normal recommended application dose) in two different wheat samples (fresh harvest vs old harvest).
For all the analysis, reference methods were used.
The *in vitro* viscosity assay was carried out according to the method of Bedford & Classen (1993) which mimics the gastrointestinal conditions of the animal. Figure 1 shows the results obtained.

Figure 1. Effect of different doses of Hostazym® X, Natugrain and Belfeed on viscosity of fresh and old harvested wheat suspensions



From the products used in the trial and the results obtained which is the most probable coding of the products? Why?

a. **Product A = Hostazym® X, Product B = Natugrain and Product C = Belfeed because...**
b. **Product A = Belfeed, Product B = Hostazym® X and Product C = Natugrain because...**
c. **Product A = Natugrain, Product B = Belfeed and Product C = Hostazym® X because...**

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Huvepharma® – NSP Enzyme Conference 2014

On the 4th of June 2014, about 120 leading nutritionists attended the NSP enzyme seminar organised by Huvepharma in Vienna, Austria. The lecturers on this seminar took the audience through the whole process of use and application of NSP enzymes in the feed mill, both for poultry as well as for pigs. Starting with pure scientific basics of the mode of action of NSP enzymes followed by the nutritional application in poultry- and pig-diets and the full process of applying enzymes to the feed was discussed.

The science part was handled by **Prof. Christophe Courtin** from Leuven University, who showed NSP enzymes have 3 major effects: Viscosity reduction, release of nutrients (cage effect) and production of oligo-saccharides which can act as prebiotics and benefit the positive gut flora.

The application in poultry feeds was discussed by **Prof. Geert Janssen** from Ghent University. He showed high fibre contents in poultry feeds coincide with low digestibility and growth. Poultry cannot ferment fibre so it needs to be supported with NSP enzymes to break these fibres down and improve digestibility of the diet.

The influence of NSP enzymes on the gut microbiota of poultry was presented by **Dr. Damian Jozefiak** from Poznan University. He showed the gut microbiota can change under influence from diet and enzymes. The mode of action for the enzymes is most probably the formation of oligosaccharides originating from the NSP's that are broken down by the enzyme. These oligo saccharides can act as prebiotic.

Dr. Amy Batal presented the use of NSP enzymes in the USA poultry industry. NSP enzymes are widely used, but the industry is careful to even conservative in applying matrix-values for energy and other nutrients. Dr. Batal showed results of a big field trial with use of Hostazym® X in a broiler-integration for more than 1 year. Hostazym® X could compensate for an energy reduction of 40 kcal/kg in the feed, with even increasing white meat yield of 0.32%. These improvements save up to €2.0 per ton of feed and bring, depending on meat-price, up to €0.30 extra revenues.

Prof. Geert Janssen gave a second lecture, now about NSP enzymes in pig nutrition. For evaluating NSP enzymes in pigs you need trials in pigs, translating poultry data into pig-data is not correct. Pigs are fermenters and respond differently to NSP enzymes in the diet. NSP enzymes can improve feed intake of pigs, resulting in better growth. Prof. Janssen believes also in pigs the oligosaccharide formation by NSP enzymes can be an important factor.

Dr. Paul Bikker from Wageningen University elaborated about the use of NSP enzymes in pigs. NSP's act as negative compounds in pig diets, however NSP enzymes to resolve this issue are still not widely accepted in the pig feed industry. Viscosity is not a factor to worry about in pig diets. On top feeding of NSP enzymes is the most save way for application, however Dr Bikker estimates the effect of NSP enzymes as a 1-3% increase on nutrient digestibility

NSP enzymes and pelleting processes were discussed by **Dr. Mia Eeckhout**, Ghent University. Enzymes are easily destroyed during pelleting process due to steam conditioning and friction that occur in the die of the pellet press. To solve this enzymes have to be protected by coating, or overdose or applied as liquid post pelleting.

Doug Decksheimer from COMCO systems showed liquid application of enzymes post pelleting avoids all problems with pelleting-stability of the enzyme. However the dosing and spraying should be very accurate, and for this specialised equipment is needed.

Dr. Lode Nollet closed the seminar by presenting the Huvematic®, a revolution in liquid application of enzymes (see article Huvematic® in this newsletter on page 1)

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HUVEPHARMA
We add performance to your business

Hostazym® X versus competitors

In a recent trial Hostazym® X was challenged against Axtra® XB and Rovabio® Excel. The trial took place in Poland at Piast and was set to measure broiler performance and nutrient digestibility.

Trial design:

- 960 Ross 308, female
- 10 replicates per treatment
- Real production environment with trial pens installed in a 10.000 birds house
- 3 phases feeding, all diets with OptiPhos® (250 OTU/kg)
- Test Products: Hostazym® X, AXTRA® XB and Rovabio® Excel
- Measurements: Zootechnical performance (BWG, FI, FCR) and nutrient digestibility (TiO_2 method, measured during finisher phase)

Diet	Starter	Grower	Finisher
Wheat/Maize/SBM	50/15/30	40/25/30	35/30/30
CP (%)	21,5	19,6	18,5
dLys	1,31	1,08	0,95
AME (kcal/kg)	2900	3050	3100

CONCLUSION:

Hostazym® X proved once more to be a reliable enzymatic complex, to support optimal animal performance or to be used as cost saving tool, via feed reformulation with a validated nutritional matrix.

Results:

The results of the trial are shown in Figure 1 and Table 1.

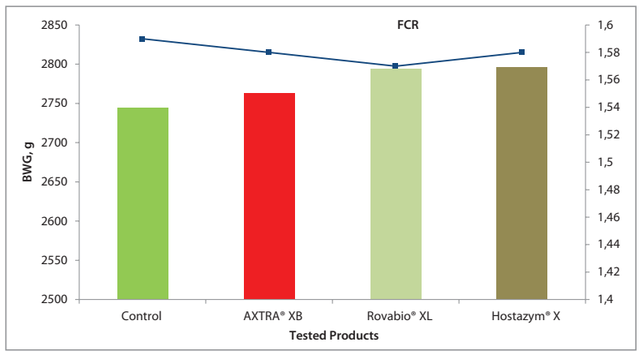

Figure 1. Broilers performance results

Table 1. Nutrient digestibility results

Treatments	Dose	Dose	Digestibility	
			Ileal CP [%]	AME [kcal/kg]
Control	-	-	70.87[A]	2834
AXTRA® XB	2x min. EU registered dose	1220 UX/kg 152 UG/kg	72.39[A]	2904
Rovabio® XL	minimum EU registered dose	1100 VU/kg xylanase 1500 VU/kg glucanase	70.03[A]	2784
Hostazym® X	minimum EU registered dose	1500 EPU/kg	74.43[B]	2899

Columns with different superscripts are significantly different at P<0.1

Key observations:

- Overall performance was very good and significantly above breed specifications
- Birds' performance responded to all tested products. Highest BWG registered for Hostazym® X treatment (+51 g over control)

  FCR didn't differ significantly amongst treatments

  Hostazym® X was the only tested product with a significant response on ileal crude protein digestibility (+4,4% points), supporting the use of an amino acids matrix

  Rovabio® Excel didn't show any response on nutrient digestibility
- AXTRA® XB energy matrix (104 kcal/kg) for 100 g/t dose was not confirmed in this trial
- Hostazym® X results were consistent between performance and digestibility data, the same cannot be said for the other tested products

Trial facilities at Piast

Do we under-estimate the effectivity of OptiPhos® in poultry?

As phytase liberates phosphorus from the phytic-acid molecule, it replaces the inclusion of inorganic phosphorus (for instance from mono-calcium phosphate (MCP)) in feed formulations. To calculate how much MCP can be taken out of the feed formula, many trials have to be performed with different inclusion levels of phytase.

The available phosphorous value (aP) of a phytase can be determined with the bone ash measurement method. Starting with a feed low in phosphorus (the negative control (NC)), the response of the animal is measured by using several positive control feeds which are based on the NC feed supplemented with different levels of a mineral phosphorus source like MCP (MCP-P). Increasing levels of phosphorus in the feed will lead to increased levels of bone ash, and so a correlation between bone ash and added MCP-P can be determined (Fig. 2). When in this set up a phytase like OptiPhos® is added to the negative control, it also yields an increase in bone ash content. Based on this increase and the established correlation between added inorganic phosphorus and bone ash, the inclusion of OptiPhos® can be translated into an amount of phosphorus equivalent to the added amount of MCP-P (striped line in Fig. 2). This is called the aP matrix value of OptiPhos®.

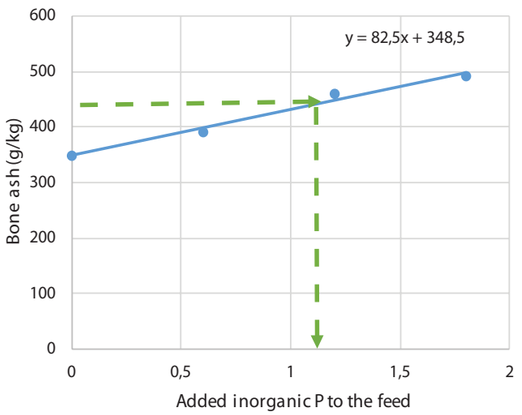

Fig. 2: The effect of increasing inorganic P on bone ash concentration; the striped line demonstrates the estimation of a P value for a certain inclusion of OptiPhos®

Several studies with OptiPhos® have been conducted in the period 2000-2011 which have led to the matrix values we are now using. At that moment Huvepharma decided to propose matrix values which were safe (conservative) and were an underestimation of real potential of OptiPhos®. Recent studies with OptiPhos® have shown much higher matrix values than the current used ones (table 2).

Table 2: Current used matrix values of aP g/kg for OptiPhos® and values obtained in three recent studies (Technical Bulletins (TB) 21, 24 and 27)

OptiPhos® (g/kg)	Matrix values			
	Currently	TB 21	TB 24	TB 27
250	1,25	1,43	1,40	1,32
500	1,48	1,77	1,63	1,62
750	1,68	1,97		

KEY FACTS:

- ***The current matrix values of OptiPhos® are originating from studies conducted between 2000 and 2011.***
- ***Recent studies have demonstrated higher efficacy of OptiPhos® regarding P release from phytic acid.***
- ***A re-evaluation of the current matrix values of OptiPhos® including the latest research data is ongoing.***

Conclusion

Recent trials performed with OptiPhos® show a higher aP release than currently advised by our matrixvalues. A re-evaluation of the matrixvalues for OptiPhos® is ongoing.

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