Table 1. Typical enzyme production by *Trichoderma longibrachiatum*

Carbohydrate fraction in feed	Enzyme name	EC number	Trichoderma longibrachiatum
Beta-glucan	endo-1,3(4)-beta-glucanase	3.2.1.6	+
	endo-1,3-beta-glucanase/laminarinase	3.2.1.39	
Arabinoxylan	xylanase	3.2.1.8	Declared
	beta-xylosidase	3.2.1.37	+
	alpha-L-arabinofuranosidase	3.2.1.55	+
	alpha-glucuronosidase	3.2.1.131	+
	feruloyl esterase	3.1.1.73	
Cellulose	endo-1,4-beta-glucanase/cellulase	3.2.1.4	+
	cellobiohydrolase/exoglucanase	3.2.1.91	+
	xyloglucanase	3.2.1.155	+
	beta-glucosidase	3.2.1.21	+
Pectic substances	polygalacturonan hydrolase	3.2.1.15	
	polygalacturonan lyase	4.2.2.2	
	rhamnogalacturonan hydrolase	n.d.	
	rhamnogalacturonan lyase	n.d.	
	exopolygalacturonan hydrolase	3.2.1.67	
	exopolygalacturonase lyase	4.2.2.9	
	endo-1,5-alpha-arabinanase	3.2.1.99	
	endo-1,4-beta-galactanase	3.2.1.89	
	pectin methyl esterase	3.1.1.11	
Starch	alpha-amylase	3.2.1.1	
	glucoamylase	3.2.1.3	+
	alpha-glucosidase	3.2.1.20	
Mannan	beta-mannase	3.2.1.78	+
	beta-mannosidase	3.2.1.25	+
Fructan	inulinase	3.2.1.7	
	levanase	3.2.1.65	
	fructan beta-fructosidase	3.2.1.80	
Galactosyl oligosaccharides	alpha-galactosidase	3.2.1.22	+

Enzymes Newsletter Q1 / 2014

Let's Talk About Enzymes...

THE SUCCESS OF HOSTAZYM® X

Good for fattening pigs as well?

NSP (NSP=Non Starch Polysaccharide) enzymes are widely used in wheat based poultry diets around the world. Acceptance in corn based diets is much lower, but more and more interest is raised for using NSP enzymes in these type of feeds as well.

The use of NSP enzymes in swine feeds is gaining popularity. At first, NSP enzymes were mostly considered for use in feeds for young piglets. Nowadays, due to the increasing prices of raw materials like corn, wheat and barley, combined with the lower costs per inclusion of NSP enzymes, it is interesting to use NSP enzymes, in particular Hostazym® X, in fattening pig feeds.

HOSTAZYM® X IN CORN BASED DIETS

For a long time it was considered that NSP enzymes were only important for reducing viscosity of the chime in the digestive tract. The problem of viscosity appears only in wheat based diets, not in corn based diets, so NSP enzymes were not considered to be usefull in corn based diets. Huvepharma research has shown that Hostazym® X significantly improves the energy absorption from corn by the animal. Also a deeper look into the mode of action of Hostazym® X, reveals that the xylanase-activity of Hostazym® X has the ability to break down non-soluble NSP which capture nutrients when they remain intact in the gut. **Big integrations in Brazil and the USA have recognized this effect from Hostazym® X** by testing it themselves on their own research farms. This made them decide to use Hostazym® X in their operations, proving the value of Hostazym® X (which is the combination of cost-price and returns from improved animal performance) is favourable. The sales of Hostazym® X have shifted from wheat based countries to corn based countries, resulting in 2/3 of the total Hostazym® X sales to be now achieved in corn based countries.

HOSTAZYM® X IN SWINE FEEDS

Success Story

Huvepharma has performed several trials with Hostazym® X in fattening pigs, showing a better FCR and improved gain. By using Hostazym® X the cost of production, either due to the improved technical results or lower formulation costs of the diets, is reduced. These trials have been noticed by several pig integrators and feed mills, so they are now using Hostazym® X. **The biggest pig producer in the world has also decided to use Hostazym® X.** After extensive testing within their own company, they have chosen to use Hostazym® X in their operations in the USA. This is a big achievement and it will give a tremendous boost for our Hostazym® X sales. It shows that our enzymes are really valuated by customers on their true merits. Together with the efforts of our sales team and distributors in different countries, this is what makes the Huvepharma enzyme business successful.

KEY FACTS:

- ***Big integrations in Brazil and the USA have recognized the effect of Hostazym® X.***
- ***The biggest pig producer in the world has also decided to use Hostazym® X in its operations in the USA.***
- ***Hostazym® X is also good for corn feeds & fattening pigs.***

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Are all xylanases the same? PART I

In animal nutrition the use of Non-Starch Polysaccharide hydrolyzing enzymes, namely xylanase, became a common practice. There is a significant number of xylanase based products available on the market either as single or multi –enzyme formulations.

Are all these xylanases the same?

To answer this question we need to clarify the basics of fibre degrading enzymes and the presence of NSPs in feed and feed raw materials.

From now on, our newsletter will guide you into the amazing world of enzymes. To make it interesting, we'll take the tour in parts.

PART I. NON STARCH POLYSACCHARIDES IN FEED

Nutritionists all over the world are using different raw materials from different origins to formulate animal diets every day. Although the main dietary contribution from each raw material will be its energy and/or amino acid content, each raw material will also contribute a specific fibre fraction to the feed. As a result, a complete feed will have a complex fibre composition. The fibre fraction of the feed consists of non-starch polysaccharides (NSP) and lignin.
The NSP fractions of most feed raw materials are well characterized but can vary significantly with crop variety and growth conditions.
Figure 1 on next page shows the typical fibre fractions content of different raw materials (based on Knudson, 1997)

Some complementary notes:

- Mixed-link beta-(1,3)-(1,4)-glucans are only present in cereals;
- Arabinoxylans are generally present in all raw materials (mainly as insoluble arabinoxylan). Soluble arabinoxylans, responsible for gastrointestinal increased viscosity, are present in significant amounts in white cereals;
- Cellulose is more abundant in vegetable materials than in cereals;
- Complex polysaccharides like polygalacturonan, rhamnogalacturonam, arabinan and galactan (pectic substances) are only present in vegetable feed raw materials.

All NSP fractions referred to above are part of the plant cell wall structure and are called structural NSP's.

The structural NSP is the target of the commercial exogenous NSP enzymes. The first shot to avoid viscosity problems, by breaking down soluble structural NSP (despite the small amount present), and the second shot to partially degrade the insoluble NSP, resulting in the release of nutrients trapped in the cell wall fibre network.

Additionally, plants can store several types of polysaccharides as energy sources, called storage NSP's... but we'll leave this for the PART II!

Hostazym® X has three enzyme activities for the degradation of structural NSP:

beta-glucanase, xylanase (label declared) and cellulase (Table 1). All activities are produced in single surface fermentation from a selected microbial strain of *Trichoderma longibrachiatum*, with a high production yield of the declared activity. The surface fermentation uses wheat bran as substrate, this assures that the enzymatic complex that is produced will be a perfect fit for degrading NSP in feed and release valuable nutrients for the animals. Moreover, the fermentation product that is used as a raw material for Hostazym® X, is controlled to assure that the declared activity is consistently present from batch to batch.

Hope you're looking forward to PART II.

KEY FACTS:

- *Hostazym® X has three enzyme activities for the degradation of structural NSP: beta-glucanase, xylanase and cellulase.*
- *Single surface fermentation with a high production yield of the declared activity & excellent in vivo performance.*
- *NSP Enzymes - help avoid viscosity problems & partially degrades insoluble NSP*

Below different microbial origins of xylanase.

Figure 1. Average NSP fractions content in different raw materials