

Xylanase Feed Additives

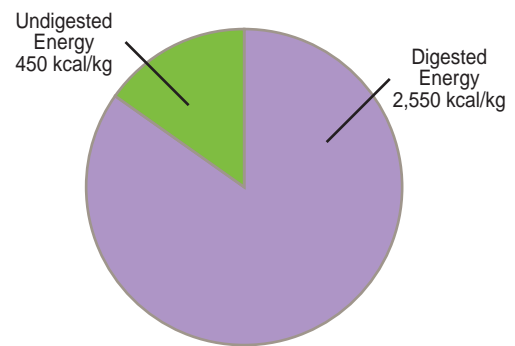
Frequently Asked Questions

Why does my feed need xylanase?

The use of a high-quality xylanase additive in animal diets saves feed cost and improves gut health. The primary function of xylanase enzymes is to break down xylans, a type of non-starch polysaccharide (NSP) found in the cell walls of corn and other grains, so that they are more easily digested by poultry and swine. In a typical 3,000 kcal/kg diet, up to 450 kcal/kg of energy is wasted because it is not readily accessible to the animal's digestive system. Xylanase helps reduce this waste by 50 – 150 kcal/kg (depending on diet, dose, type of xylanase and other factors). Nutrients in the diet that go undigested become food for pathogenic bacteria, so maximizing nutrient digestion leads to an improvement in animal gut health.

Negative Impact of Xylans in Animal Feed

Digestibility of a 3,000 kcal/kg diet

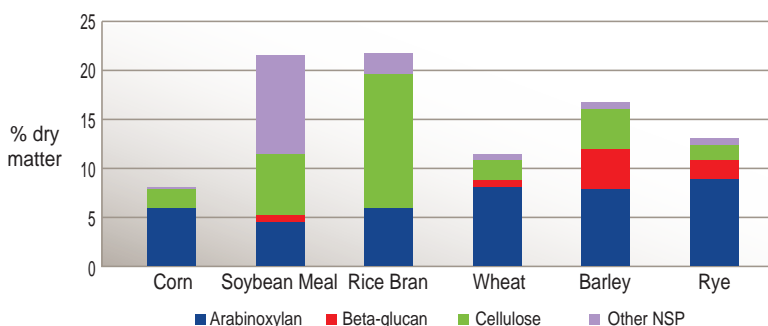


Collins and Moran, 1998
Watt et al, 2009
Cowieson, 2010
Roberts et al, 2015

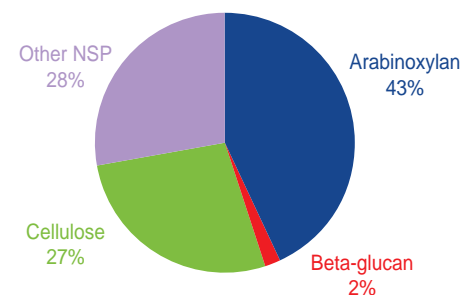
Does my feed need a blend of NSPases or just xylanase?

The choice of a single or blended xylanase depends on the formulation of the feed. In most corn-soybean meal diets, a highly efficient single xylanase is sufficient to release trapped nutrients. Since xylan is the major NSP present in this type of diet (>40% of NSPs), it is the most practical target for NSP-degrading enzymes.

Percentage of NSPs in Feed Grains¹



NSP Breakdown in a Typical Corn-SBM Broiler Diet



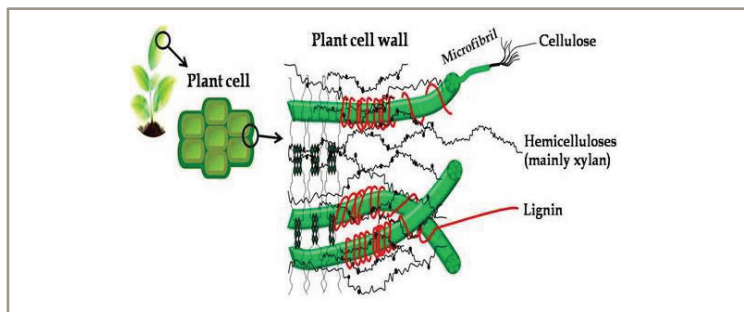
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Primary plant cell walls contain cellulose fibers (thick structural components), hemicelluloses such as xylan (net-type structure that forms the major covering) and other NSPs like lignin (surrounds the cellulose fibers). A high-quality xylanase is able to effectively break the xylan chain and release the encapsulated nutrients, without the need for additional enzymes.

From a commercial point of view, the selection of an NSPase product or a single xylanase product should be based on Return-On-Investment (ROI) which includes nutrient matrix values and other benefits. For example, BRI's Xylamax provides a higher energy matrix value compared to most commercially available NSPase blends.

Xylanases Have Direct Access to Xylans in the Plant Cell Wall



Source: <http://ibimapublishing.com/articles/IJREB/2014/506376/>

What benefit can I expect using a xylanase?

Xylanase performance varies depending on the feed formulation, dose and type of xylanase being used. For example, a modified GH11 xylanase such as Xylamax can provide up to 130 kcal/kg in a corn-based diet. This can translate to savings ranging from USD \$4 - \$16 per MT of feed. The following ROI calculation is an example of feed savings during a poultry trial using BRI's Xylamax.

Average Feed Cost

	per MT	per kg Weight Gain
Control Diet	\$390.21	\$0.678
Control -75 kcal +Xylamax (60g/MT)	\$385.27	\$0.662
Savings	\$4.94	\$0.016

How can I use xylanase with phytase?

When using xylanase with phytase, the energy matrix value for the xylanase should be adjusted. BRI recommends that when considering an energy matrix value for phytase, formulators should reduce the expected matrix of xylanase by 20%. For example, if the Xylamax energy matrix value considered is 130 kcal/kg and the phytase energy matrix value considered is 40 kcal/kg, the combined energy matrix value would be 130 minus 20% + 40 = 104 + 40 = 144 kcal/kg.

100g/MT Xylamax with phytase

Energy Value	kcal/kg of feed
Xylamax	+130
phytase	+40
20% reduction Xylamax	-26
Total Adjusted Energy Value	+144

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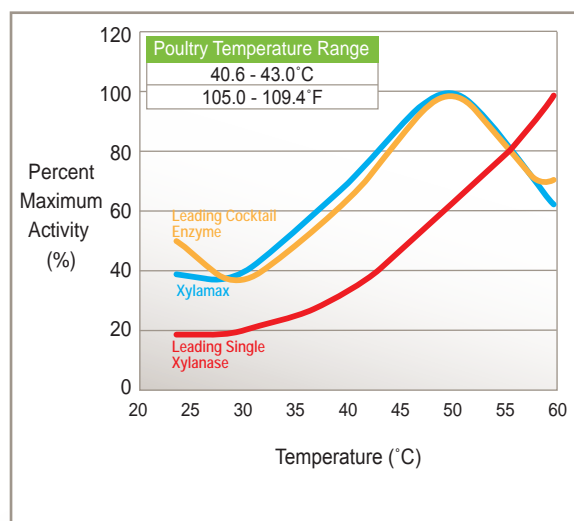
How do I select a xylanase?

When selecting a xylanase, it is important that the product comes from a scientifically-reputable source, provides good return-on-investment (ROI) and works well in your production environment and conditions. The following chart provides a guideline of seven factors to consider when choosing a xylanase feed additive.

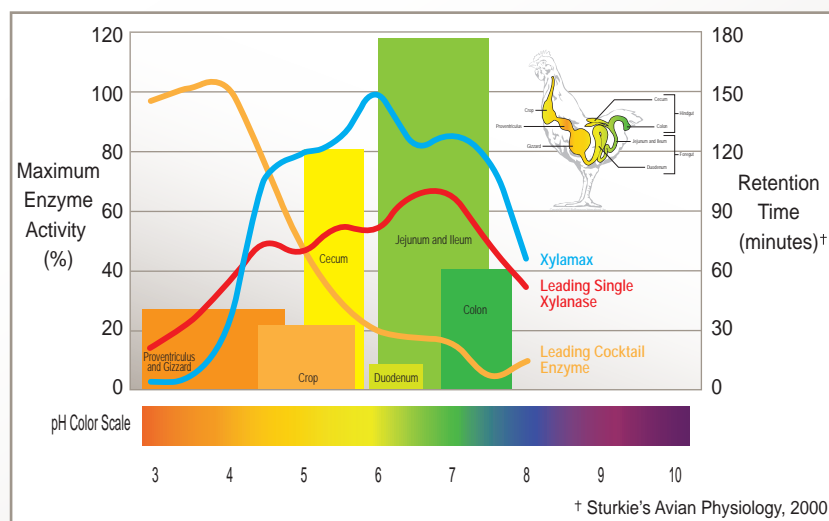
1. Return-on-Investment	Reformulation or On-Top Application
2. Diet Type	Wheat, Corn, Soybean Meal, Rice Bran
3. Thermostability	Sustained activity during pelleting
4. pH activity	Broad & optimum enzyme activity in digestion pH
5. Quality Manufacturing	Reputable manufacturing using GMP, FAMI-QS standards
6. Compatibility	Additive effect when used with other enzymes
7. Side Activities	Presence and value of other enzymes in the product

Reviewing in vitro animal trial research data is a critical step in the successful identification of a xylanase product best suited for your situation. For example, BRI's Xylamax is a modified GH11 xylanase that works better in corn-based diets than standard GH10 and GH11 xylanases. The pH and temperature activity and intrinsic thermostability of Xylamax are ideally suited for optimum activity in poultry and swine digestion.

Xylanase Activity x Temperature Profile



Optimum Activity Where Majority of Digestion Takes Place



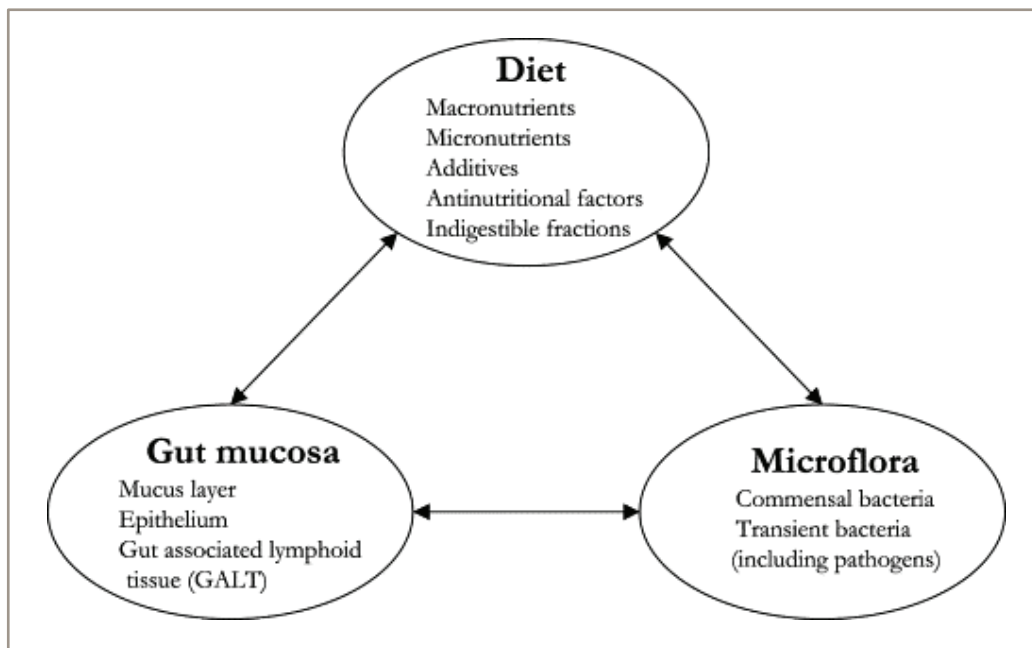
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Why is everyone talking about gut health?

An excellent answer is provided in an article published in the British Poultry Science (2009 50:9-15. doi: 10.1080/00071660802538632)

“gut health” covers the macro- and micro-structural integrity of the gut, the balance of the microflora, and the status of the immune system. This is because not only is the gut the largest immune organ in the body, it also harbours the majority of the microorganisms in the body, contains more than 20 different hormones, digests and absorbs just about all the nutrients, and accounts for 20% of body energy expenditure. Thus, there is a lot to be gained if gut health is fine-tuned. Enhancing immunity means better disease resistance; improving gut integrity means better nutrient utilisation; modulating the gut microbiota can open up all sorts of new possibilities in the future.”



Source: <http://www.poultryhub.org/importance-managing-gut-health-poultry/>

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How can a xylanase provide gut health benefits?

Xylanase has been found to improve on gut health by improving mucosal morphology, reducing cecal pathogen load, reducing severity of necrotic lesions, reducing oxidative stress and inflammation, reducing mucin secretion, and by providing a prebiotic effect through production of xylo-oligosaccharides.

