

Bex

OCTAZYME

Its Time
To Use
OCTAZYME



KEY TO
RESCUE
FEED
ECONOMICS

INTRODUCTION:

The major objective of poultry nutrition is to provide balanced and nutritious feed for efficient and sustainable production however ban on antibiotic growth promoters pose a major challenge to achieve this goal. To overcome this challenge “**eubiotic nutrition**” is the latest trend it basically “**combines modern nutritional principles with the use of non-antibiotic feed additives to create a status of Eubiosis in the Gastro-Intestinal tract and to achieve optimal performance and maximum profitability**”, so enzymes are now being widely used in poultry feed as a part of eubiotic nutrition in an attempt to improve nutrient utilization, the health and welfare of the bird, products quality and to reduce environmental pollution. The use of enzymes in poultry feeds has mainly centered on hydrolysis of Non-Starch polysaccharides (NSPs) present in cereal grains and vegetable protein sources. The NSPs cannot be digested by bird's own enzymes which offer a particular challenge for the microflora of the **GIT** and some pathogenic microorganisms like *Clostridium perfringens* may grow exponentially on poorly digested nutrients.

ANTI-NUTRITIONAL PROPERTIES OF NSPs:

- The Cage Effect (See Fig.1)
- Increased Gut Viscosity by soluble fibers e.g. arabinoxylan and beta-glucan.
- The galacto-oligosaccharides present in leguminous seeds provoke flatulence and compromise protein and amino acid digestion and absorption.
- Decreased retention time due to bulkiness effect by insoluble fiber leading to reduced digestion.
- Pectins have high charge density and interact ionically with dietary cations such as Mn, Fe, Zn and Cu leading to poor absorption of these minerals.
- Beta-mannans present in soybean meal, rapeseed meal and guar meal can be recognized by innate immune system and consequently they provoke intestinal immune response also known as “**feed induced immune response (FIIR)**” which is energy consuming and wasteful.

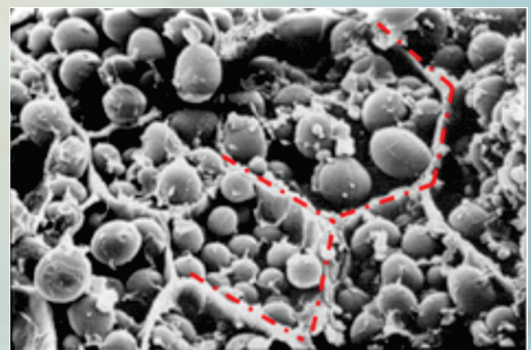
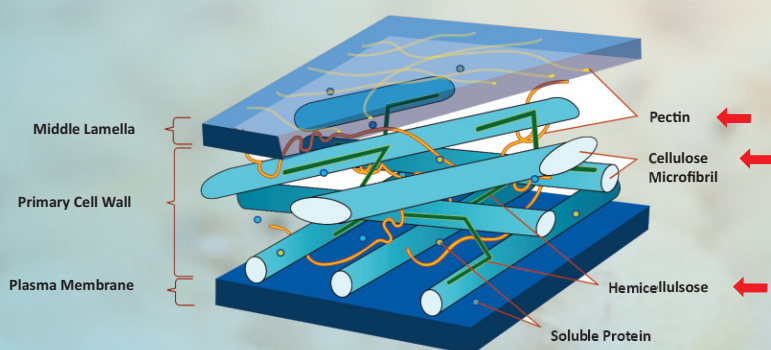


FIGURE 1: Molecular structure of the primary cell wall in plants Cage effect of cell wall

WHAT IS CAGE EFFECT?

Insoluble fibers, which are primarily the NSP constituents of the cell wall, shield the substances inside the cell from the effect of the digestive enzymes, this is known as the “**cage effect**,” and it lowers the digestibility of protein and amino acids particularly.

Figure 2: Classification Of Plant Carbohydrates

Adapted from NRC 2012

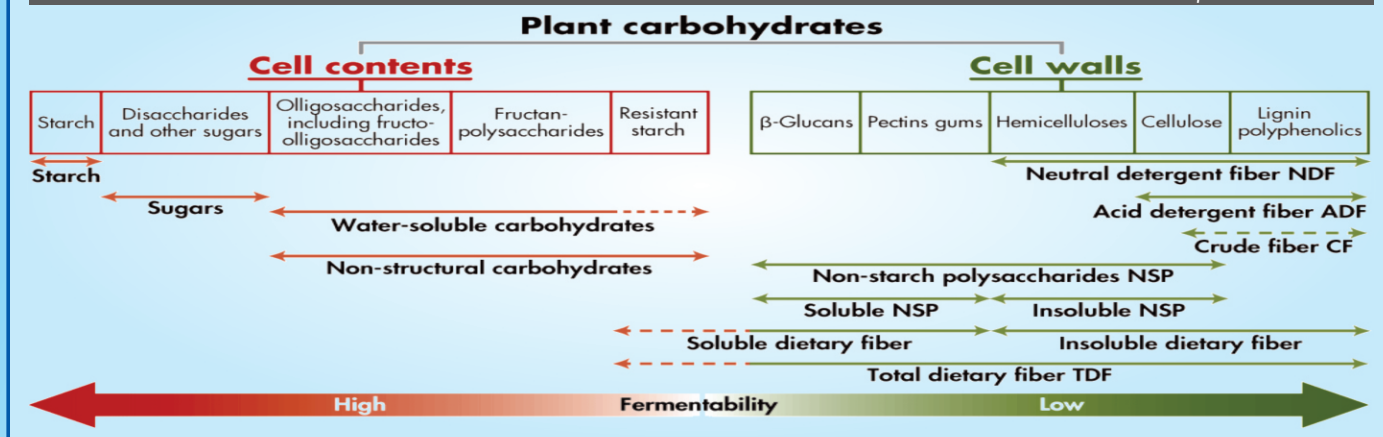


Table 1: NSP Content (%) Of Various Cereals And Vegetable Protein Sources

Ingredient	Soluble NSP	Insoluble NSP	Total NSP
Corn	0.9	8.80	9.70
Wheat	2.5	9.40	11.9
Wheat Bran	2.9	34.5	37.4
CG 30	3.4	31.7	35.1
CG 60	0.6	1.90	2.50
Soybean Meal	6.3	15.4	21.7
Canola Meal	1.5	21.3	17.9
Rapeseed Meal	5.5	17.5	23.0
Sunflower Meal	6.0	29.0	35.0

{According to Bach Knudsen, 1997, Bell, 1993 and C. Lannuzel et al., 2022}

Figure 3: Mechanism Of Action Of NSPs

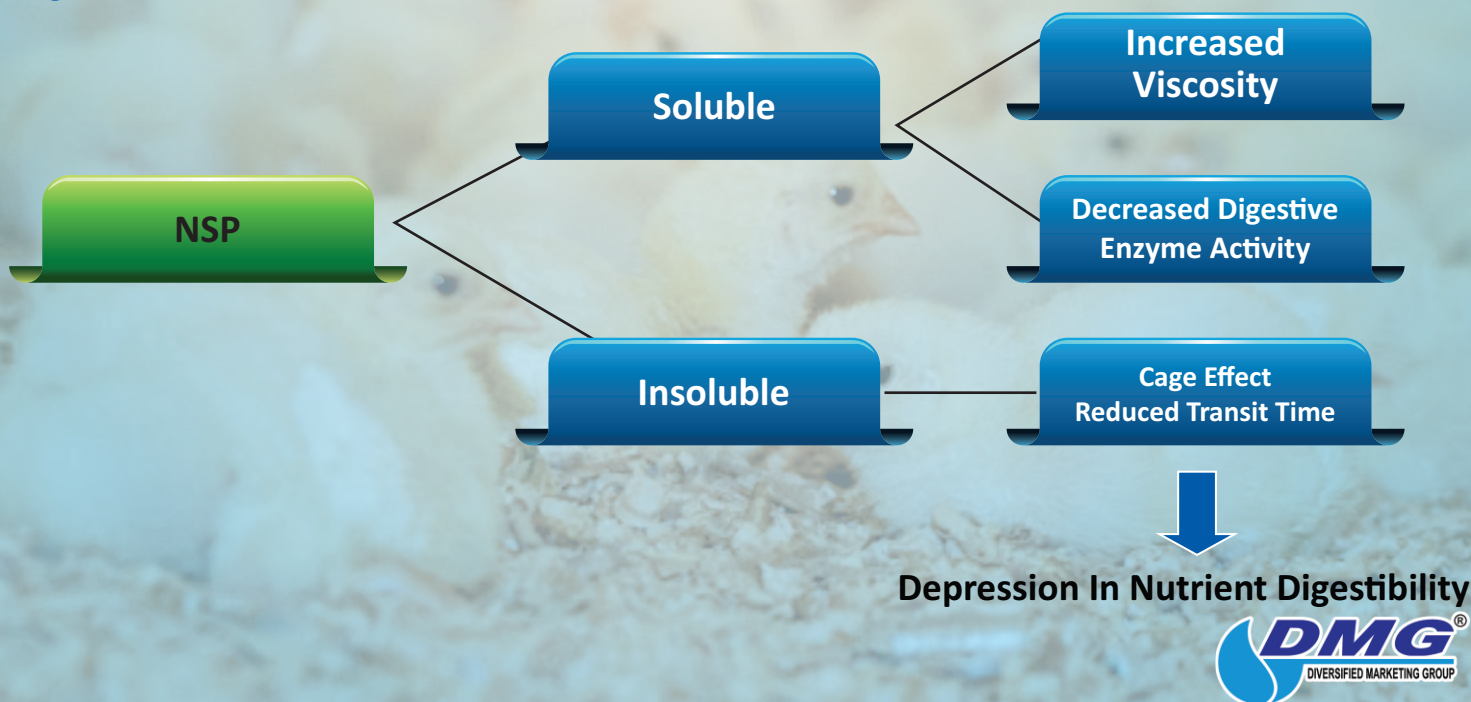


Table 2: Effect Of Different Enzymes On Poultry Performance

Sr. No	Enzyme	Status in Birds	Benefits/Return on Investment	References
1	Cellulase	Absent	- Combination of cellulase, hemicellulase and pectinase is effective in improving organic matter and crude protein metabolisabilities and carcass yield of broilers on a maize–soybean meal diet. - The use of enzyme combinations having cellulase improved the performance of broilers fed diets with reduced nutrient and energy levels.	Saleh et.al., 2005 Nunes et.al., 2015
2	Pectinase	Absent	Pectinase improved the digestibility of a corn-soybean meal broiler diet by 5%.	Tahir et.al.,2006
3	Mannanase	Absent	- Addition of β-mannanase to the diet improved the growth performance of chickens without any effects on carcass characteristics. - Feed-induced immune response within the jejunum had been eliminated by the addition of β-mannanase.	Mohsen et.al., 2021 Arsenault et.al., 2017
4	Galactosidase	Absent	- Alpha-Galactosidase supplementation improves intestinal histology, morphology and economic value of diet. - Improved nutrient and ileal amino acid digestibility. - Supplementation of α-galactosidase improved egg production, egg quality and feed digestibility. - Supplementation of carbohydrase formulation containing alpha-galactosidase improved broiler growth performance.	Amer et.al., 2020 Jasek et.al., 2018 Harnkaew et. al., 2018 Moya et. al., 2019

5	Xylanase B-Glucanase	Absent	Appropriate combination of different enzymes (Xylanase, B-Glucanase) improve poultry performance.	Zargi, 2018
6	Alpha-Amylase and Neutral Protease	Deficient In Young Chicks	Supplementation with amylase combined with protease showed a beneficial effect on starch digestibility and intestinal microbiota diversity, and increased growth of broilers fed with newly harvested corn.	Yin et.al., 2018

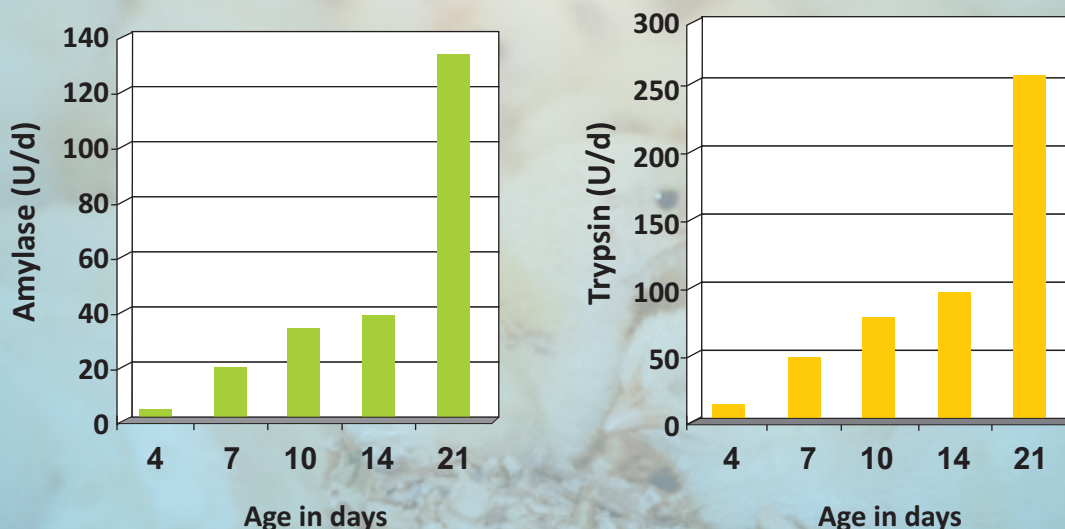
THE SOLUTION

The variation in the overall content and bioavailability of carbohydrates, fats, proteins and amino acids in feeds, has led to the development of various enzymes designed to liberate unavailable nutrients. To gain full benefit from diets with high levels of anti-nutritional factors (ANFs) and fibers, a multi enzyme system that contains both NSP-enzymes as well as α -galactosidase, β -mannanase and pectinase, alpha amylase and protease, may be of great interest. Keeping in view this Bextral has developed BEX Octazyme containing **eight declared enzyme activities** (See Fig. 5).

The salient features of BEX Octazyme are given below:

1. A unique combination of NSP enzymes to explore benefits of diverse range of feed ingredients.
2. The application of normal digestive tract enzymes (i.e., protease, amylase) has also been proposed because early secretions of these enzymes are lower in young birds (See Fig.4), keeping in view that alpha amylase and neutral protease are also part of this product.
3. A combination of fungal and bacterial enzymes to ensure activity in a wider pH range (See Fig.6).
4. Having synergistic actions of multiple enzymes.

Figure 4: Early Secretion Of Enzymes In Chick

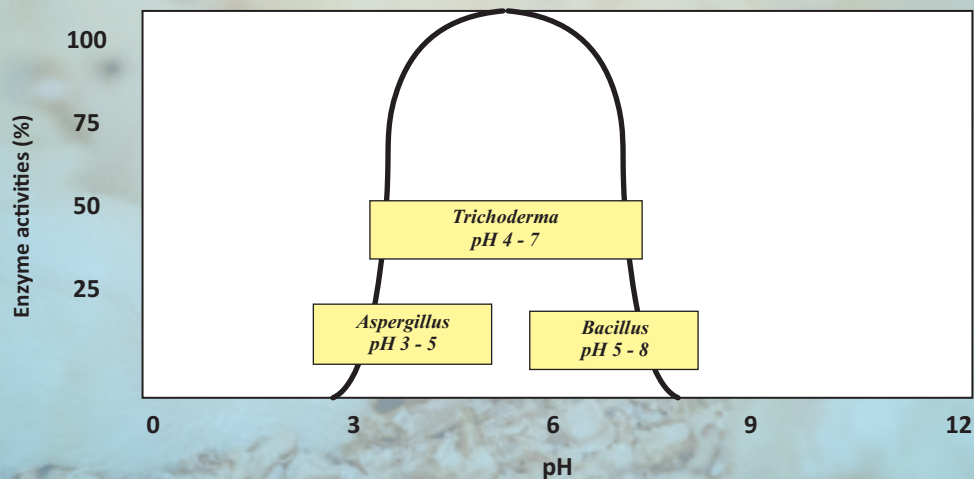


From Noy and Sklan. Poult. Sci. 1995, 74:366-373



Figure 6: The pH-range of BEX[®] Octazyme

The pH-range with BEX Octazyme, containing eight declared enzyme activities derived from different micro-organism



HOW OCTAZYME IS DIFFERENT FROM OTHER NSP ENZYMES?

Current poultry diets in Pakitsan have Arabinoxylans, Cellulose and Beta-Glucan from Cereals and Pectins, Mannans and Galactosyl Oligosaccharides from protein rich ingredients (SBM, Canola meal) as **predominant NSPs. Thanks to the BEX Octazyme, being a complete enzyme system with eight “declared enzyme activities”. This enzyme system has the ability to** breakdown the indigestible dietary fraction from cereals and vegetable protein sources, consequently releasing more nutrients which other NSPase products in the market are unable to do.

BEX Octazyme, a real multi enzyme system derived from different fermentation products works on the feed as a whole substrate, thus improving the digestibility of all the nutrients, including fat, starch and proteins. This way, the effect of BEX Octazyme is not limited to a specific or single nutrient, but it performs multi-dimensional role to reduce the indigestible dietary fraction of the feed. This whole set of functions is performed by the synergistic actions of enzymes and complex but beautiful interactions of enzymes, substrate and gut.

Table 3: Pectins, Mannans And Galactosyl Oligosaccharides (%) Present In Soybean And Canola Meal

Ingredients	Pectins	Mannans	Galactosyl Oligosaccharides	Reference
Soybean Meal	17 ^c	1.61 ^b	13 ^a	According to Bach Knudsen (1997) ^a According to Hsiao et. al. (2006) ^b According to Choct et. al. (2010) ^c
Canola Meal	7.1 ^b	0.49 ^c	10.2 ^a	According to Bell (1993) ^a According to N.E. Ward (2014) ^b According to Chegeni et al., (2011) ^c

Product Characteristics

- * Available as BEX Octazyme dry and Concentrated dry
- * Active in a Wide pH Range
- * Heat Stable upto 90°C
- * Produced in GMP+ Certified Facilities
- * Available in 25kg Bag

Recommended Usage

- * Advised dosage is 250 gram BEX Octazyme dry per ton of feed.



1.What will be the fate of BEX Octazyme if vegetable protein sources other than Soybean meal will be used in diet formulation?

Ans: BEX Octazyme can perform well in different type of formulations containing vegetable protein sources other than soybean meal as when we move towards other sources like canola meal and guar meal etc. the overall NSP content of diet increases leading to more substrate availability and ultimately better enzyme performance. BEX Octazyme has especially been designed for total vegetable diets containing all the necessary NSP enzymes, including pectinase, to cope up all type of vegetable ingredients and more particularly vegetable proteins, including soybean meal, canola and sunflower meal which contain not only high levels of cellulose but also pectin. More particularly, BEX Octazyme contains the enzymes alpha-galactosidase and beta-mannanase to break down the indigestible oligosaccharides, the galactosides and mannans which are present in the leguminous seeds such as soybean.

2.What should be the minimum percentage of cereals and vegetable protein sources for BEX Octazyme to perform well?

Ans: BEX Octazyme can be used in any diet having a minimum of 35% cereals like corn and a minimum of 20% vegetable protein sources like soybean and canola meal etc. However, BEX Octazyme is not designed for specific European or Australian diets that contain a lot of wheat (max 40%), rye (max 15%), triticale (max 25%) or barley (max 30%). In this case BEX Octazyme needs to be supplemented with some extra xylanase and beta-glucanase enzymes.

3.Does BEX Octazyme have both energy sparing and amino acid sparing effects?

Ans: Yes, trial results have demonstrated that there is a positive effect on FCR, growth and final weight as more energy and more amino acids become available from the feed with the inclusion of BEX Octazyme. These are termed as the Energy Sparing Effect (ESE) and the Amino acid Sparing Effects (ASE) which can be attributed to the enzyme product.

4.Why to use the amino acid matrix of BEX Octazyme?

Ans: BEX octazyme contains pectinase, mannanase, alpha-galactosidase and neutral protease which are not produced by the bird except protease and also mostly not present in conventional NSP enzyme products present in the market. The presence of these enzymes leads to maximum digestion of undigested portions of protein sources leading to an increased growth rate when added “on top” or to an amino acid sparing effect if used in reformulation.

5.Why to use BEX Octazyme in laying rations?

Ans: Fibre nutrition is very important concept in case of laying hens and pullets (must be min 5-6%) as feed intake development is one of the key factor for developing a pullet ready to lay. The feed intake capacity is related to gut size, the addition of fiber in diet expands the size of gut and improves feed intake capacity. Using BEX Octazyme, alternative ingredients like by-products from agro industry like wheat bran and rice polish can be used to meet the high fiber demands of laying hens without any detrimental effect of NSP present in these feed raw materials. Fibre will be broken down partially, resulting in smaller and fermentable oligosaccharides that will move readily to the hindgut and be fermented by the friendly bacteria, *lactobacilli* and *bifidobacteria*, producing more VFAs (volatile fatty acids) that will lower the pH in the hindgut and prevent pathogens to invade the small intestine. Moreover, these VFAs are an extra source of energy that is gained from the indigestible fibre fraction.