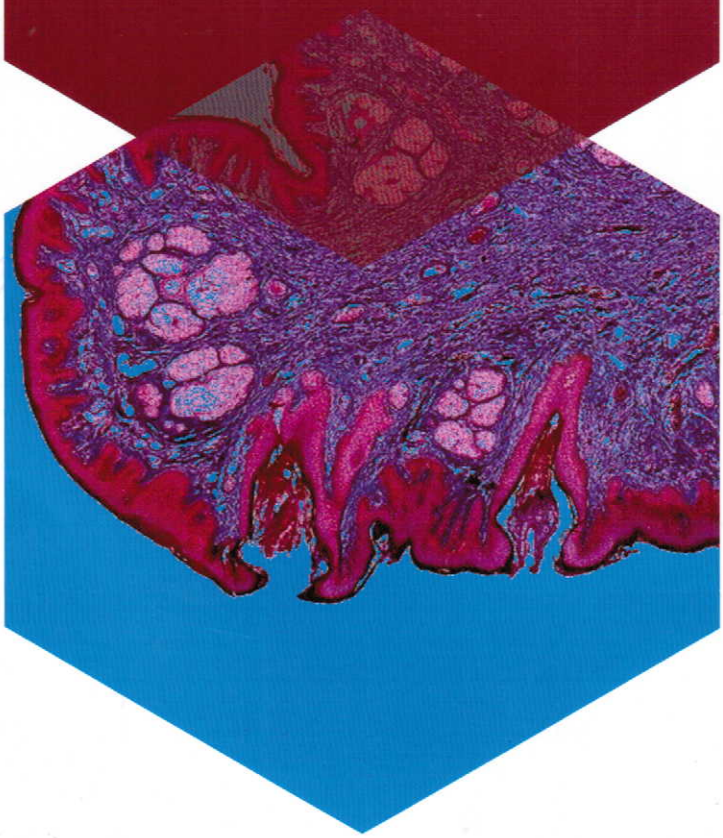
溢多利®

VTR

EnyPro B

Lipase for Livestock and Poultry



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Lipase for Livestock and Poultry

Product Introduction

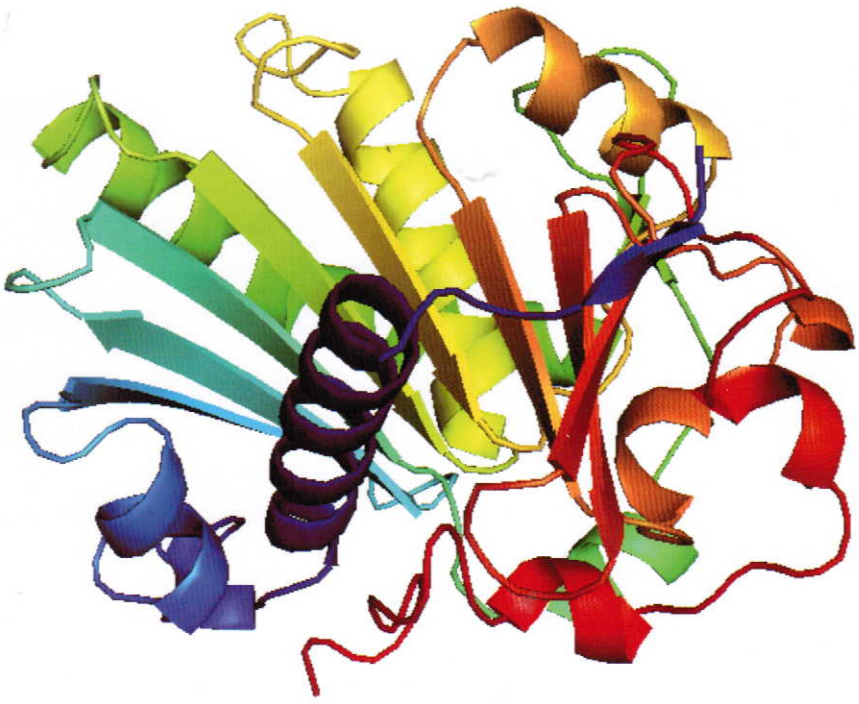
Enypro B, an effective lipase product specific to livestock and poultry, was developed by Guangdong VTR Bio-Tech Co., Ltd. with modern biological engineering technology and chosen microorganism via advanced techniques of microorganism fermentation, enzyme preparation post-treatment and in vitro modeling, on the basis of digestive physiological characteristics and features of oil in common feed.

■ Introduction to Lipase

Lipase, also known as triacylglycerol acylhydrolase, is an enzyme decomposing and composing fat. It catalyzes not only the hydrolysis reaction but also the synthesis and conversion reaction of ester. Lipase belongs to a digestive enzyme. With the acting of lipase, exogenous fat is broken down into free fatty acid, glycerol, and monoglyceride, and finally utilized by animals. Lipase plays an essential physiological role in organisms. Exogenous fat cannot pass through cell wall without the digestion and decomposition by lipase, while fat storage and consumption, and intracellular fat metabolism also request the participation of lipase.

■ Mechanism of Action of Lipase

Amino acid, the basic component unit of lipase, usually formed with one polypeptide chain, depends its catalysis only on its protein structure. Lipase is built on an alpha/beta hydrolase fold, with a Gly-X1-Ser-X2-Gly pentapeptide model as active center. The catalysis active center is catalytic triad (serine- histidine- aspartic acid or glutamic acid), three amino acids of which have a similar spatial structure covered by an amphiphilic peptide-cycle "cover". When lipase reaches oil-water interface, the structure of peptide-cycle "cover" changes with catalysis site exposed, allowing substrate to contact and action with catalytic center. On the oil-water interface, lipase catalyzes the ester bond of triacylglycerol and releases monoglyceride, diglyceride, glycerol, and fatty acid, which are not only energy source to organisms but also precursor of fats with important physiological function like composing phospholipid and sphingolipid.



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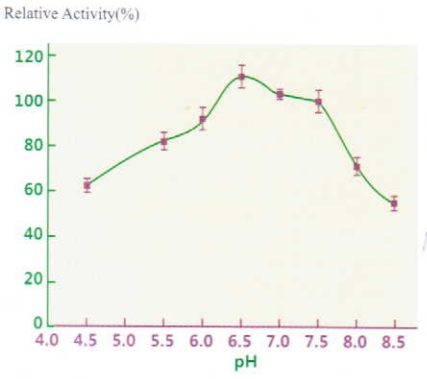
Lipase for Livestock and Poultry

Necessity of Lipase Application in Feed

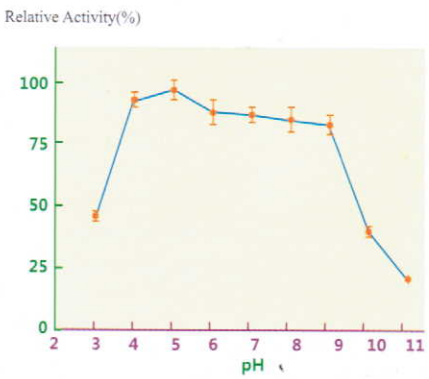
- Energy is the basis of the metabolic process, and the total chemical energy required by animal growth, breeding, and production. Energy owns the highest nutrition level in feed ingredients and the basis of all nutrients.
- Fat, with 2.25 times energy of carbohydrate, is the most important nutrient in animal nutrition, and it is generally added in high-energy feed to meet animal's demand of energy supply.
- Due to the insufficient lipase secreted in digestive tracts, young livestock and poultry were not able to utilize fat efficiently and improve fat digestion without the supplement of lipase.
- When fed with diets of high level of fat, livestock and poultry finishers do not have sufficient lipase, and extra lipase is requested to improve fat digestion.
- Excess fat in diets would lead to diarrhea and slow growth.
- As the cost of fat is expensive, the application of lipase will effectively cut feed cost.
- The synergistic use of lipase and emulsifier will more effectively improve fat utilization.

EnyPro B- Enzymatic Properties of Lipase for Livestock and Poultry

Optimum pH Value of lipase and pH stability

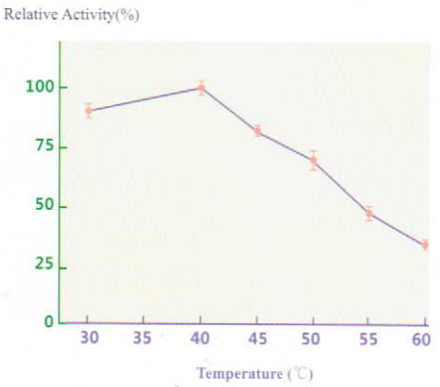


pH Value	4.5	5.5	6.5	7.5	8.5
Relative Activity	59.3%	81.4%	111%	100%	52.2%



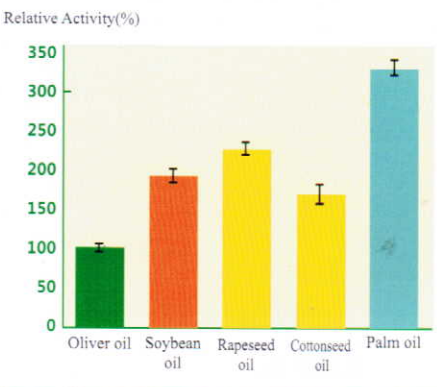
pH Value	3	4	5	6	7	8	9	10	11
Activity Retention	40%	93%	97%	87%	87%	84%	84%	18%	6%

Optimum Temperature



Temperature (℃)	30	40	45	50	55	60
Relative Activity	90%	100%	80%	65%	40%	35%

Hydrolysis Ability against Different Kinds of Fat



Fat	Oliver oil	Soybean oil	Rapeseed oil	Cottonseed oil	Palm oil
Relative Activity	100%	192%	227%	169%	331%

And EnyPro B also has excellent hydrolysis ability against other animal fats (blend oil, lard, fish oil, chicken fat, butter, etc.).

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Lipase for Livestock and Poultry

■ Functions of EnyPro B

- Increase utilization of fat and oil, especially mixing animal fat, and improve feed quality.
- Reduce feed cost by replacing 40-70Kcal/kg of energy material in feed.
- Supplement the lack of endogenous enzyme in young livestock and poultry and improve growth performance.
- Lower weanling stress and diarrhea risks.
- Reduce digestive disease and increase survival rate.
- Replace small amount of antibiotics and cut medicine cost.

■ Application of EnyPro B

- Apply EnyPro B directly in feed and improve feed quality without changing feed formulation (improve utilization of high-energy materials).
- For high-energy-level feed supplemented with fat, such as fast-growing broiler feed, meat duck feed, and piglet feed, apply EnyPro B at 300g/t in feed to replace 50Kcal/kg ME/DE and save feed cost.
- For low-energy-level feed without supplementation of fat, such as growing-finisher pig feed, layer duck feed, free-range chicken feed, beef cattle feed, and dairy cow feed, apply EnyPro B t 200g/t in feed to replace 40Kcal/kg ME/DE, and adjust the content of corn, soybean, bran, AA, etc. to reach a balance in nutrition.
- Concomitant use with other compound enzyme products will get even better synergistic effect.

■ Application Effects of EnyPro B on Different Livestock and Poultry

Application trial on broiler chicken

Effects on growth performance of broiler chicken by reducing energy level and apply EnyPro B in diet:

	Initial Aver. Weight (g)	Final Aver. Weight (g)	Aver. Daily Weight Gain (g)	FCR	Survival Rate (%)
Control Group	35	2678	62.93	1.68	97.2
Trial Group	35	2683	63.05	1.65	97.7

Trial animal: AA broiler chicken (0 ~ 42-day-old)
Trial diet is applied with, on the basis of control diet, EnyPro B at 300g/t with 50kcal/kg ME reduced. Insignificant difference was shown among indicators of different items of both groups (P>0.05).

Application trial on meat duck

Effects on growth performance of meat duck by reducing energy level and apply EnyPro B in diet:

	Initial Aver. Weight (g)	Final Aver. Weight (g)	Aver. Daily Weight Gain (g)	FCR	Survival Rate (%)
Control Group	48	3255	76.4	1.84	98.4
Trial Group	47	3248	76.2	1.85	98.6

Trial animal: Cherry Valley meat duck (0 ~ 42-day-old)
Trial diet is applied with, on the basis of control diet, EnyPro B at 300g/t with 50kcal/kg ME reduced. Insignificant difference was shown among indicators of different items of both groups (P>0.05).

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Lipase for Livestock and Poultry

Application trial on piglet

Effects on growth performance of piglet by reducing energy level and apply EnyPro B in diet:

	Initial Aver. Weight (kg)	Final Aver. Weight (kg)	Aver. Daily Weight Gain (g)	FCR	Survival Rate (%)
Control Group	7.2	24.3	534	1.73	97.9
Trial Group	7.1	24.6	547	1.70	97.9

Trial animal: Duroc×Landrace×Large White three-way cross piglet (28 ~ 60-day-old)
Trial diet is applied with, on the basis of control diet, EnyPro B at 300g/t with 50kcal/kg ME reduced.
Insignificant difference was shown among indicators of different items of both groups (P>0.05).

Application trial on layer chicken

Effects on growth performance of layber chicken by reducing energy level and apply EnyPro B in diet:

	Feed-Egg Ratio	Aver. Egg Weight (g)	Egg Laying Rate (%)	Broken Egg Rate (%)
Control Group	2.31	63.2	94.9	2.95
Trial Group	2.28	63.5	95.1	2.88

Trial animal: Roman layer chicken (30 ~ 38-week-old)
Trial diet is applied with, on the basis of control diet, EnyPro B at 200g/t with 40kcal/kg ME reduced.
Insignificant difference was shown among indicators of different items of both groups (P>0.05).

Product Line & Usage

- **The product is divided into four preparations: powder, mini-granular, granular, and liquid.**
- **Dosage: 200-300g/ton feed.**
- **Liquid preparation shall be applied by post pelleting liquid application system.**

Storage & Shelf Life

- Powder, mini-granular, and granular product shall be kept in room temperature. Shelf Life: 12 months.
- Liquid product shall be kept under the temperature of 4℃-10℃ at the shelf life of 12 months. When kept in room temperature (below 25℃), shelf life is 6 months. Avoid storage under temperature over 25℃.

Precautions

- As the dose rate of the product is small, please premix before addition into complete feed and ensure mixing uniformity.
- Seal the package tightly after use and avoid moisture.

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