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## THE USE OF BROMELIN ENZYME IN FISH FEED

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### Abstract

Enzymes have a very important role for the life of all living things, because enzymes are biological catalysts in chemical reactions that are needed in life. The purpose of this article is to find out about the meaning of the bromelain enzyme, to know the function of the bromelain enzyme, to know the bromelain enzyme in fish feed, and to know the role of the bromelain enzyme in fish feed. Based on the material presented, it can be concluded that the bromelain enzyme is a group of protease enzymes. Protease enzymes are enzymes that have the function of breaking down proteins by hydrolyzing peptide bonds in amino acids. The bromelain enzyme is able to hydrolyze protein and to break down protein in the feed into simpler ones so as to facilitate digestion and absorption of protein in the fish body. Bromelain enzymes play a role in increasing fish growth by increasing digestive ability, namely breaking down crude protein into amino acids that can be utilized optimally by fish for growth. The bromelain enzyme added to the feed will produce more protein which is hydrolyzed into amino acids, thereby increasing growth in fish.

Keywords: Pineapple Extract, crude protein, hydrolysis, protein.

### INTRODUCTION

One of the constituents of life in living things is protein and one of them in the form of protein is enzymes. Enzymes have a very important role for the life of all living things, because enzymes are biological catalysts in chemical reactions that are needed in life. Enzymes are proteins, which are synthesized in cells and removed from the cells that form them through the process of exocytosis which functions as catalysts (compounds that speed up the reaction process without being used up) in chemical reactions and also Almost all biological processes of cells require enzymes to take place quickly enough. .

Enzymes play a very important role in the field of fisheries, both in the fields of pre production, production, and processing. One of the production activities in the fishery sector is the manufacture of quality feed. To improve the quality of fish feed can be done with the addition of the enzyme bromelain. This article aims to determine the role of the bromelain enzyme in improving the quality of fish feed.

### **Use of Enzymes in Fish Feed**

Enzymes are biomolecules that function as catalysts (compounds that speed up the reaction process without being used up) in a chemical reaction. If this substance is not present then these processes will occur slowly or not take place at all. Almost all enzymes are proteins. Enzymes are bio catalysts, which means they can speed up biological reactions without changing their chemical structure. In reactions catalyzed by enzymes, the starting molecule of the reaction is called the substrate, and the enzyme converts that molecule into different molecules, called products. Almost all biological processes of cells require enzymes to take place rapidly.

According to Kuhne (1878), enzyme comes from the word in + zyme which means something in yeast. Based on the research, it can be concluded that the enzyme is a protein in the form of large molecules. In the enzyme there is a protein part that is not heat-resistant, called the apoenzyme, while the non-protein part is the active part and is named a prosthetic group, usually a metal such as iron, copper, zinc or an organic compound containing metal.

The apoenzyme and the prosthetic group are a unit called a holoenzyme, but there are also parts of the enzyme where the apoenzyme and the prosthetic group are not fused. The part of the prosthetic group that is released is called a coenzyme, which is active just like the prosthetic group. Examples of coenzymes are vitamins or parts of vitamins (eg vitamins B1, B2, B6, niacin and biotin).

### **Quality Fish**

Feed Feed is an important factor that affects the growth of catfish. According to Huisman *et al.* in Ali Djunaedi *et al.* (2016) stated that one of the factors that affect growth is feed and good quality feed can support fish growth. The protein content in feed is the main energy as well as a structural component of cells and body tissues for the growth of catfish. In the digestive process, enzymes are needed to hydrolyze peptide bonds into amino acids. This process can be improved by using the bromelain enzyme in the feed of catfish fry.

Bromelain enzyme is one of the natural ingredients that contain proteolytic enzymes. Bromelain enzymes are able to hydrolyze proteins into simpler compounds and break peptide bonds from substrate bonds. The bromelain enzyme acts as a catalyst in cells, thereby increasing protein digestibility (Mohan *et al.* 2016).

Pineapple extract has many benefits, for example it can dissolve very thick mucus in the digestive system, break intestinal fat and increase the body's defense system and can degrade meat collagen so that it can tenderize meat. Bromelain cleaves peptide bonds at the carbonyl ends of lysine, alanine, tyrosine and glycine. Bromelain is recognized by the United States federal agency commonly known as GRAS to improve meat tenderness (Nadzirah *et al.* 2016). The unit molecular weight of the pineapple fruit protease enzyme (*Ananas comocus*) is 30,654

kDa (Rachmania *et al.* 2017) and the bromelain enzyme activity of pineapple is 0.15 U/ml (Omotoyinbo and Sanni, 2017).

### **Bromelain Enzyme in Fish Feed**

According to Hardiany (2013), the bromelain enzyme is a group of protease enzymes. Protease enzymes are enzymes that have the function of breaking down proteins by hydrolyzing peptide bonds in amino acids. The bromelain enzyme is able to hydrolyze protein and to break down protein in the feed into simpler ones so as to facilitate digestion and absorption of protein in the fish body.

Bromelain enzyme is a type of protease enzyme that is able to hydrolyze peptide bonds in proteins into smaller molecules, namely amino acids so that they are easily digested by the body. Inaolaji (2011) reported that tilapia (*Oreochromis niloticus*) fed with pineapple extract as much as 75%/kg of feed had the best relative growth rate.

Masniar *et al.* (2016) reported that betok fish (*Anabas testudineus*) had the best growth after being fed with the addition of pineapple extract at 5%/kg of feed. Subandiyono *et al.* (2018) stated that the java barb (*Puntius javanicus*) has a feed utilization efficiency of 67.29%, a protein efficiency ratio of 1.10%, and a relative growth rate of 1.94%/day after being fed with an optimum dose of pineapple extract 1,85- 2.13%. Yuansoi *et al.* (2018) explained that the growth and efficiency of optimum feed utilization of tilapia (*Oreochromis niloticus*) was obtained after being fed with the addition of pineapple extract at 1%/kg of feed. Rachmawati and Samidjan (2018) revealed that 0.2 ml/kg of pineapple extract made white shrimp (*Litopenaeus vannamei*) the best feed utilization and growth efficiency. The addition of bromelain enzyme from pineapple extract in artificial feed can also increase protein digestibility, feed utilization efficiency and tiger shrimp growth. From the description above, it can be concluded that the need for pineapple extract in each fish species is different.

The provision of bromelain enzymes in commercial feed has no effect on the conversion value of feed, it is suspected that the feed given is partially not consumed properly by the fish, seen in the uneaten feed at the time of the study. Seeing the behavior of the fish, feeding becomes more wasted.

### **Research and Research Results**

The experimental design used in Safrudin's research (2020) was a completely randomized design (CRD) using 4 treatments, each of which was replicated 3 times, referring to the

modification of the protein content of the bromelain enzyme from the crude extract of pineapple weevil for growth rate. catfish can be seen in the arrangement of treatments:

Treatment A: Feed without bromelain enzyme.

Treatment B: Bromelain enzyme was added to the feed at a dose of 0.75 ml/kg.

Treatment C: Bromelain enzyme was added to the feed at a dose of 1.5 ml/kg.

Treatment D: Bromelain enzyme was added to the feed at a dose of 2.25 ml/kg.

The following table shows the levels of enzyme content in fish:

**Table 1.** Absolute Growth Data

Treatment	Deuteronomy (Grams)			Average (Grams)
	1	2	3	
A (0/Kg)	0.9	1.1	1.2	1
B (0.75 ml/ Kg)	1.5	1.7	1.7	1.6
C (1.5 ml/ Kg)	1.8	1,8	2.1	1.9
D (2.25 ml/ Kg)	2.4	2.3	2.6	2.4

From the table above, it can be seen that the growth of catfish seed weight ranged from 0.9 grams – 2.6 gram where the highest growth was found in treatment D 2.4 grams with a dose of 3%/Kg, followed by treatment C 1.9 grams, treatment B 1.6 grams and the lowest growth value in treatment A at a dose of 0%/Kg (Control). The provision of bromelain enzyme in feed with different dose concentrations had a significant effect ( $P < 0.05$ ) on the growth of catfish fry and after further testing showed that each treatment was significantly different from other treatments.

According to Nurhidayah *et al.* (2013), that if more enzymes are added to the feed, more protein will be hydrolyzed into amino acids, so that it will increase the growth and digestibility of fish to feed.

### **Bromelain Enzyme Benefits**

The bromelain enzyme obtained from pineapple extract is one of the proteolytic enzymes capable of hydrolyzing proteins into simpler compounds and breaking peptide bonds from substrate bonds which act as a catalyst in cells so as to increase the digestibility of feed protein (Mohan *et al.* 2016).



**Figure 1.** Pineapple used in research.

Bromelain enzymes play a role in increasing fish growth by increasing digestive ability, namely breaking down crude protein into amino acids that can be utilized optimally by fish for growth. Nurhidayah *et al.* (2013) stated that bromelain enzymes added to feed will produce more protein which is hydrolyzed into amino acids, thereby increasing growth in fish.

According to Putri (2012), the bromelain enzyme contained in pineapple acts as an exogenous enzyme. The addition of this enzyme helps produce more amino acids so that the feed consumed can be utilized more efficiently.

\*\*\*\*\*CONCLUSION

### **Conclusion**

Based on the material described above, it can be concluded that the bromelain enzyme is a group of protease enzymes. Protease enzymes are enzymes that have the function of breaking down proteins by hydrolyzing peptide bonds in amino acids. The bromelain enzyme is able to hydrolyze protein and to break down protein in the feed into simpler ones so as to facilitate digestion and absorption of protein in the fish body. Bromelain enzymes play a role in increasing fish growth by increasing digestive ability, namely breaking down crude protein into amino acids that can be utilized optimally by fish for growth. The bromelain enzyme added to the feed will produce more protein which is hydrolyzed into amino acids, thereby increasing growth in fish.

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