

BENEFITS OF PAPAIN ENZYME IN FISH FEED

By

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Abstract

Feed is the biggest cost in fish farming. To increase the efficient use of feed, enzymes are added to the feed. The purpose of this article is to know about the understanding of papain enzymes, know the function of papain enzymes, know how to produce papain enzymes, and to find out the role of papain enzymes in fish feed. Based on literature studies obtained information that papain enzymes include protease enzymes extracted from papaya fruit. Proteolytic enzyme papain besifat. The addition of papain enzymes in feed plays a role in blackwashing proteins in the feed into simpler elements, namely peptides to amino acids so that the absorption of feed proteins by fish is increasing. Papain enzyme is obtained by drying papaya sap in the oven with a temperature between 50-60 °C.

Keywords : Efission, Oven, Papaya Sap, proteolytic, protein.

INTRODUCTION

Fish feed is the intake of nutritional needs which is one of the factors that can help growth and development in fish. The quality of a feed is seen from the content of proteins, fats, carbohydrates, vitamins and minerals that can increase nutrients in the fish. Fish feed usually comes from a mixture of various raw foodstuffs both vegetable and animal that are processed so that they can be digested by fish. Fish feed consists of two types, namely natural fish feed and artificial fish feed. Natural fish feed is naturally fish food without any direct hand food mixture. While artificial fish feed is fish food made a mixture of processed ingredients that are

processed and formed in a certain form so that it can be consumed by fish. Fish feed is also one of the sources of energy and can also be a store that will be stored in the form of meat for its growth period. Various forms of fish feed include pellets, chicken feathers, shredded fish, fermentation of tofu pulp.

Pellets are a form of artificial food made from several kinds of ingredients that we ramu and we make dough, then we print so that it is a bar or circle of small. Its size ranges from 1-2 cm. (Setyono, 2012). Pellets are a mixture of fish meal, soy flour, cornmeal, wheat flour and protein mixture. Pellets are known as mass forms of feed material that are compacted in such a way by pressing through mold holes mechanically (Hartadi et al., 2005). So it is no longer in the form of flour. Feed content there is Protein 30%, Fat 4 %, Fiber 5%, Ash 12%, Moisture Content 12%. But sometimes the nutrients contained in the pellets are not sufficient protein intake in fish so that the need for intake of other nutrients such as the provision of probiotics and enzymes in the feed so as to increase nutrients in fish feed.

Papain enzyme is one of the enzymes used for the addition of nutrients to fish feed. Papain enzyme is a protease enzyme found in papaya sap. The enzyme is used as a break-up or break down of peptide bonds inside proteins so that proteins break down into simpler peptide bonds. In the field of fisheries the enzyme papain is widely used to catalyze in hydrolysis reactions in the manufacture of fish protein hydrolysate (Shadihiet al., 1995; Ariyaniet al., 2003). The purpose of this article is to know about the understanding of papain enzymes, know the function of papain enzymes, know how to produce papain enzymes, and to find out the role of papain enzymes in fish feed.

Understanding Papain Enzymes in Fish Feed

Papain is a protease enzyme that is able to hydrolyze proteins into simpler elements so that they can be digested and absorbed optimally by the fish body (Suhartono 1991). Papain is an enzyme from papaya fruit extract that is proteolytic and able to hydrolyze proteins into simpler elements, namely peptides to amino acids. The addition of papain as an exogenous enzyme into the feed is able to increase the hydrolysis of feed proteins. This will result in an increased absorption rate of feed protein. The enzyme papain works more actively in vegetable proteins and is relatively resistant to temperature, when compared to other proteolytic enzymes such as bromelin and lysine. Papain enzyme is more resistant to high temperatures compared to bromelin enzymes (Winarno 1995). In the process of utilizing these proteins and carbohydrates, digestive enzymes are needed, namely amylase enzymes, lipases, and proteases to accelerate the growth process of fish. Known sources of protein enzymes are animals,

bacteria and plants (Hutabarat et al. 2016). The type and composition of feed should correspond to the availability of endoenzymes in the digestive tract of fish, so that the feed will be put to good use and the energy available for growth will be greater. To increase the efficiency of feed utilization, in formulating feed, it is necessary to consider the nutritional needs of the fish species to be maintained, including energy needs, proteins, carbohydrates, fats, vitamins and minerals. Psixbahan papain enzyme in the feed is done to be able to utilize protein to the maximum and more optimal in cultivars. able to increase the hydrolysis of feed proteins. This will result in an increased absorption rate of feed protein.

Function of Papain Enzymes

Psixbahan papain enzyme in the feed is done to be able to utilize protein to the maximum and more optimal in cultivars. The enzyme is used for the breakdown or decomposition of peptide bonds in proteins so that proteins break down into simpler peptide bonds because papain is able to catalyze hydrolysis reactions of a substrate (Muchtadi et al. 1992). Able to increase the hydrolysis of feed proteins. This will result in an increased absorption rate of feed protein. The more papain enzymes, the more proteins are hydrolyzed into amino acids that are available to be absorbed and used by the fish body for the maintenance of body tissues, fish body activities, and also growth (Rachmawati et al. 2016). The addition of the enzyme papain has a significant influence on the increase in the growth rate of cultivated cultivars, including *Cyprinus carpio* goldfish (Singh et al. 2011), *Oreochromis niloticus* tilapia (Munguti et al. 2014), starfish *Trachinatus bloochi* (Mo et al. 2016), grouper *Epinephelus fuscoguttatus* (Fadli et al. 2013) and rohu *Labeo rohita* fish (Khati et al. 2015).

Here is a table of enzyme levels in fish:

| No. | Jenis Ikan | Kadaar Kandungan Enzim Papain |
|-----|-----------------|-------------------------------|
| 1. | Carp | 2,53% |
| 2. | Tilapia Fish | 2,25% |
| 3. | Grouper Fish | 4,75% |
| 4. | Star Bawal Fish | 4% |
| 5. | Rohu Fish | 3,75% |

How to Produce Papain Enzymes

Papaya sap is obtained from tapping papaya fruit at the age of 2-3 months. The fruit is tapped at the base to the end of the fruit as many as five nicks (scratches) with a distance of 1–2 cm. A good wiretap is in an interval of 4 days and is done in the morning at 06.00–08.00 WIB. Papaya sap is then collected into a plastic container, and let it dry. After the papaya sap is dry, it is then milled until it becomes smooth to get a sap that resembles a fine powder (papain enzyme)(Sukoyo 2018).

According to Warisno in Aniqoh (2017) coarse papain can be obtained by drying papaya sap in the sun for 1-3 days or until all the water from the sap evaporates. Coarse papain is also obtained by drying papaya sap in the oven with a temperature between 50-60 °C. To get coarse papain from papaya sap can be done by drying papaya sap in the oven with the optimum temperature at 55°C.

The feed used is commercial feed in the form of pellets, with the composition:

1. Protein 30 %
2. Fat 4%
3. Fiber 5 %
4. Abu 12%
5. Up to 12 %.

Here's how to make a feed containing the enzyme papain:

1. Pellets Are Given warm water little by little so that the pellets become soft
2. then enter the enzyme that was previously weighed first
3. After the pellets and enzymes are evenly mixed add the progol with a dose of 2-3 gr / kg which serves as an adhesive
4. print using a tea filter and dried by drying in the sun or using an oven (Sukoyo 2018)

Role of Papain Enzyme in Fish Feed

Papain is a protease enzyme from papaya sap that is able to increase the digestibility and absorption of protein by fish over the feed consumed, so it has a very important role to increase the utilization of feed by the fish body. Feed is a source of protein used for fish growth. Papain is a protease enzyme that is able to hydrolyze proteins into simpler elements, namely peptides to amino acids. Feed that corresponds to the level of nutritional needs and has a high digestibility value can support the optimum growth of fish. (Rosa et al. 2013).

The addition of papain in the feed is also able to increase the deposition of feed proteins into the body for fish growth. Research on increasing the role of protein in artificial feed using papain has been done before for gurame fish. Hasan (2000) stated that the addition of papain in artificial feed can play a role in increasing protein retention, feed efficiency, and daily growth rate of gurame fish. Papain is expected to be able to increase the utilization of feed protein for growth.

Papain enzyme as an exogenous enzyme into the feed is able to increase the hydrolysis of feed proteins and greatly affect the growth of fish. This will result in an increased level of digestibility of the feed. High levels of digestibility can increase the rate of absorption of amino acids into the body for growth. This can be estimated based on the value of feed utilization efficiency, protein efficiency ratio, relative growth rate, and survival.

CONCLUSION

Based on the literature study above obtained information that papain enzymes include protease enzymes extracted from papaya fruit. Proteolytic enzyme papain besifat. The addition of papain enzymes in feed plays a role in blackwashing proteins in the feed into simpler elements, namely peptides to amino acids so that the absorption of feed proteins by fish is increasing. Papain enzyme is obtained by drying papaya sap in the oven with a temperature between 50-60 °C.

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