Review Article

Hydrolysis Enzyme of Alternative Ingredients For Fish Feed: A Review

ABSTRACT

Raw alternative ingredients have high potential as good source of protein forage support growth. Raw alternative ingredients have advantages like cost cheap, plentiful availability and sometimes in the form of waste from agriculture nor food. Use in formulation feed ingredient alternative is often limited by the presence of anti - nutrients and ingredients fiber rough high so that required processing more carry on for increase quality ingredient feed from ingredient alternative. Destination from literature review study this is for knowing the superiority ingredient feed alternative for fish that has hydrolyzed by enzymes. Studies evaluation enhancement quality ingredient feed through hydrolysis enzyme give varying results. Hydrolysis enzyme could give good influence to enhancement quality ingredient special fish feed enhancement quality ingredient alternative. Various ingredient feed alternative hydrolyzed by protease, amylase, lipase, cellulase, and phytase enzymes capable of increasing quality ingredient feed like lower fiber rough will influence digestibility feed until increase protein content in ingredients feed that. Hydrolysis enzymes in ingredients feed alternative can also influence growth in fish caused by existence enhancement power digestibility in fish. Hydrolysis enzyme proven no cause negative impact to a few type of fish so hydrolysis enzyme could be applied to increase quality ingredient feed alternative in fish feed formulation.

Keywords : Alternative ingredients, fish feed, hydrolysis, enzymes, growth .

1. INTRODUCTION

Growing activity cultivation fishery make Request feed too increase. However, the price ingredient feed conventional source of protein is still high [1]. High price the caused because supply limitations resources , sources of protein that are not stable [2] [3]. For resolve things the need raw ingredient alternative that has quality good nutrition with affordable price [4] . Ingredient alternative for fish feed must be worth nutrition tall includes high protein , sufficient amino acids , taste, and digestibility , as well as fiber and heavy metal must low carb no dissolve , because will affect the growth process , costs feed , conversion ratio feed , and must be in accordance with economy production feed [5]. Study about the use of raw alternative ingredients in total or some who have researched and provided influence to fish growth. Among them is use flour cake soya bean [6] [7] , *Leucaena leucocephala* [8][9] , waste vegetable [10][11] , as well as dregs know [12][13] . However, the use of raw local ingredients is still often constrained by the height content fiber rough that can disturb fish digestion [14] crude protein content low, there are anti-nutritional substances, and the presence of balance low in amino acids. This thing results in need conducted processing of raw ingredient feed before used as ingredient feed [15] .

Hydrolysis is the process of solving polymer become monomers for compounds could unraveled like glucose [12]. Factors affecting the hydrolysis process is time reaction, temperature reaction, concentration acid (catalyst), level of suspension starch, and mixing reactor [16]. Destination

hydrolysis is for damage structure crystal cellulose and for increase porosity something ingredient [17] . This review focus on excellence ingredient feed alternative for fish that has hydrolyzed by enzymes through search journal as reference main. It is very important for fish to provide good quality feed so that growth can be achieved optimally.

2. POTENCY ENZYME FOR FISH FEED

Enzyme is a protein that has activity catalyst for lower energy Activation something reaction so that conversion substrate Becomes product could in progress more fast [18] . Lots of enzymes used that are protease, lipase, and amylase enzymes which are enzyme breaking down hydraulics compound macromolecule carbohydrates, fats, and proteins. A research that has been conducted with the title “Activity Test Enzyme Amylase, Lipase, and Protease from *Hermetia* Larvae Intestine Extract *illucens*" at for knowing *Hermetia* larvae potential *illucens* which produces proteases, amylase and lipase enzymes. The result is that Protease is able to break down protein into amino acids, lipase breaks down fat into fatty acids and glycerol , as well as amylase break up starch to maltose [19]

Enzymes can also increase growth of fish through enhancement score efficiency of fish feed [20] [21] . height amount efficiency feed prove that quality feed the more good because efficiency feed the changed Becomes meaningful meat that cost required to produce meat the more inexpensive [22]. Fish need enzyme good in the form of enzyme endogenous nor enzyme exogenous for speed up protein hydrolysis to amino acids and speed up the digestive process [23] .

Power digest feed influenced by enzymes present in the channel digestion and time long food eaten _ react with enzyme digestion [20] because power good digestion will add body weight in fish [24] . A number of study mention that gift enzymes in tilapia feed add heavy of 1.26 g [25] , giving papain and protease enzymes increase growth heavy absolute catfish *Pangasius djambal* of 4.87 g-6.63 g [26] , giving protease, lipase, and amylase enzymes in *Bagrus nemurus* fish feed succeed increase growth heavy absolute of 11.06 g [27]. Increase growth heavy caused existence enzymes that speed up gut work protein hydrolysis in feed so that protein hydrolysis to more amino acids fast and more many absorbed by the fish body [20] .

3. QUALITY INGREDIENT ALTERNATIVE AFTER HYDROLYSIS ENZYME

Hydrolysis enzyme could repair function and structure nutrition protein ingredients in short time and method this no need sterile and anaerobic conditions as fermentation bacteria [28] Hydrolysis use certain ingredient could degrade fiber rough content on raw material feed [29] Moment this, application hydrolysis enzymes in ingredients feed already many done. This thing proven with a number of study that hydrolysis by activity enzyme amylase , cellulase , protease, and lipase on cake coconut could lower fiber Rough by 67.8% [30], in water goiter fiber Rough decrease by 19.72% [31] , on the dregs know capable lower fiber Rough by 22.03% [32], on flour leaf moringa capable lower fiber Rough until by 4.33% [29]. Besides lower fiber coarse, hydrolysis can also increase Crude protein content in flour cake soya bean [33].

4. INFLUENCE HYDROLYSIS ENZYME INGREDIENT FEED ALTERNATIVE AS FISH FEED

Feed is the main factor that can influence fish growth. Besides nutrients contained in feed, consumption feed and ratio conversion feed also has an effect to fish growth [34]. The more tall consumption feed will increase the possibility a lot amount consumed by fish. Ratio conversion feed shows the amount of feed needed to produce fish weight [35].

A number of researchers has test influence hydrolysis enzyme ingredient alternative for fish feed on growth no give negative impact to a number of fish [29] , [36] , [33] , [37] , [38] . However , in research with utilise water hyacinth goiter no take effect to tilapia growth.That thing suspected

microbes present in the material that has been hydrolyzed not yet grow optimally , so that enzymes produced for hydrolyze ingredient no walk with good [31].

Table 1. Influence Hydrolysis Enzyme Ingredient Feed Alternative As Fish Feed

Fish species	Enzyme Type	Alternative Ingredients	Daily Growth rate (%)	References
Clarias sp.	Proteases, lipases and amylase	Moringa Leaves	2.81	[29]
Oreochromis niloticus	Protease	Feather Meal	4.31	[36]
Ictalurus punctatus	Protease, phytase	Soybean	2.73	[33]
Chanos chanos Forsskal	Protease, amylase , lipase, and cellulase	Rice bran	Increase 11.34 (g) growth	[37]
Sparus aurata	Protease	Feather Meal	2.34	[38]
Osphronemus gouramy	Cellulase	Indigofera zollingeriana	3.10	[39]

5. CONCLUSION

Height fiber rough on alternative material Becomes constraint in utilization for fish feed so need existence enhancement ingredient feed one through hydrolysis enzymes. Protease, lipase, amylase, cellulase, and phytase enzymes could increase quality ingredient alternative for fish feed . Application hydrolysis enzymes in flour leaf *Moringa* , flour fur, cake soybeans, and bran fine proven capable of increasing growth of tilapia, catfish, milkfish, and snapper.

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