THE USE OF FERMENTED FEED ON THE GROWTH OF tilapia (OREOCHROMIS NILOTICUS) : A REVIEW

Abstract

Feed is the most important factor that must be considered for fish growth. Feed is also an important factor and affects the survival and growth of fish. The growth of tilapia is very dependent on physical and chemical influences and their interactions. Tilapia fish are included in omnivorous fish or all-eating. These fish can breed with a variety of foods, both animals and plants. Tilapia when it is still in the form of seeds, its food is plankton and moss, while when it is an adult, it can be given additional food in the form of artificial feed. The purpose of this study was to find out how the use of fermented feed on the growth of tilapia and the addition of fermented doses of 2% to 6%. The method used is a descriptive exploratory method from various previous research literature, both from national journals and international journals: Research Gate, Directory of Open Access Journals and Google Scholar. Fermentation is microbial activity in food to produce the desired product. Microbes that are generally involved in fermentation are bacteria, yeast and mold. Fermentation will simplify the particles in the feed ingredients so that it will increase the nutritional value of the feed. The results of the addition of fermentation to feed greatly affect the growth of tilapia with research giving doses of 2 to 6% fermented products with the highest growth, FCR and survival.

Keywords : Feed, Tilapia, Fermentation,Growth, Survival and FCR

Introduction

Fish feed really supports the success of fish farming. The main activity of fish farming at the enlargement stage requires feed costs of around 60% of the total production costs. Various attempts have been made to maximize feed utilization, namely through fasting and increasing feed digestibility by fermenting the feed. According to Walter et al. (2013), efforts to overcome the problem of feed costs through regular feeding and support maximum fish growth. The results of Eslamloo et al. (2012), regular feeding Periodically showed higher growth compared to fish fed daily. Research by Radona et al. (2016), feeding tilapia is effective in increasing growth and

increasing feed efficiency. Research on feeding tilapia with the method of fasting 1 day then

feeding 1 day is effective in increasing growth, feed efficiency and increasing survival. In addition to the fasting method, another effort that can increase growth is enrichment of feed by fermenting feed. This study succeeded in adding fermented feed given a dose of 2% to 6% on the growth of tilapia. Research by Anis and Hariani (2019), shows that feeding fermented feed using

EM4 can increase the growth of catfish. Various ways to increase feed utilization have been described previously, then a study was conducted on the effect of feed fasting and fermentation on growth rate and feed conversion ratio in tilapia.

Fermentation is the activity of microbes in food to produce the desired product. Microbes that are commonly involved in fermentation are bacteria, yeasts and molds. According to (Winarno et.al, 2012) fermentation is all kinds of metabolic processes with the help of enzymes from microbes (microorganisms) to carry out oxidation, reduction, hydrolysis and other chemical reactions. This process causes chemical changes to occur in an organic substrate by producing certain products that cause changes in the properties of the material. The fermentation process of feed ingredients by microorganisms causes beneficial changes such as improving the quality of feed ingredients from both nutritional and digestibility aspects and increasing their shelf life.

Tilapia Fish Habitat

The ability of Tilapia, which has a high tolerance for its environment, so that it can be kept in the lowlands of brackish water to the highlands of fresh water. The living habitat of tilapia is quite diverse, from rivers, reservoirs, lakes, swamps, rice fields, ponds, to ponds (Khairuman. 2003). Tilapia can grow normally at a temperature range of 14O – 38O C and can spawn naturally at a temperature of 22O -37O C. For growth and reproduction, the optimum temperature for tilapia is 25O -30O C. Tilapia will die at a temperature of 6OC or 42O C (Khairuman. 2003).

Tilapia Fish Eating Habits

The eating habits of tilapia are omnivorous. Tilapia eat plankton, detritus, basic organisms (benthos) such as worms, aquatic insect larvae, mussels, snails, and others. Tilapia is very responsive to artificial feed (pellets), both floating and sinking. (Cholik et.al. 2005).

Tilapia Growth

Tilapia can reach maturity at the age of 4-5 months and will reach maximum growth to give birth until the age of 1.5-2 years. At the age of more than 1 year, it weighs about 800gr and can now release 1200-1500 larvae each time it spawns, and can last for 6-7 times a year. Before spawning male tilapia always make a nest at the bottom of the waters and the area will be guarded and is its own territorial area. The growth of tilapia is very dependent on the influence of physics and chemistry as well as their interactions. At times of high rainfall, for example, the growth of various aquatic plants will be reduced so that it interferes with the growth of water and indirectly interferes with the growth of tilapia. Tilapia will also grow faster if kept in shallow ponds, because in shallow ponds the growth of plants and algae is faster than in deep ponds. There are

others, namely ponds which at the time of manufacture use organic fertilizer or manure will also make the growth of aquatic plants better and tilapia will also grow more rapidly (Khairuman, 2003).

Tilapia Fish Feed

Tilapia fish are included in the omnivorous or omnivorous fish. These fish can breed with a variety of foods, both animal and plant. Tilapia when it is still a seed, it feeds on plankton and moss while when it is an adult it can be given additional food such as pellets and various other foods, namely taro leaves.

Function of Fermented Feed in Fish Feed

Fermentation is a microbial activity in food so that the desired product is produced. Microbes that are commonly involved in fermentation are bacteria, yeasts and molds. According to (Winarno et.al, 2012) fermentation is all kinds of metabolic processes with the help of enzymes from microbes (microorganisms) to carry out oxidation, reduction, hydrolysis and other chemical reactions. This process causes chemical changes to occur in an organic substrate by producing certain products that cause changes in the properties of the material. The process of fermentation of feed ingredients by microorganisms causes beneficial changes such as improving the quality of feed ingredients from both nutritional and digestibility aspects and increasing their shelf life. Fermentation products usually have a higher nutritional value than the original material due to the presence of enzymes produced from the microbes themselves (Winarno and Fardiaz 2012). The addition of materials containing certain nutrients into the fermentation media can support and stimulate the growth of microorganisms. One of the materials that can be used as a nitrogen source in the fermentation process is urea. Urea added to the fermentation medium will be broken down by the enzyme urease into ammonia and carbon dioxide, then ammonia is used for the formation of amino acids (Fardiaz, 2012). The difference in water content in the fermentation process has a significant effect. The water content of the media can affect the growth of microorganisms produced, because water is a medium for substrate transport as well as a reagent in the metabolic processes of these microorganisms. The water content of the media that is too low will prolong the lag phase of microorganisms so that growth becomes slower. Although depending on the type of microorganism and the substrate used, the fermentation process is generally carried out on media containing 30-85% water.

Fermentation Feed Growth Rate in Tilapia

Growth rate is the addition of the total weight or length of fish in a certain period of time. There are several results from research on the growth rate of fermented feed on tilapia. According to Rambo's research (2018) it produces 97% SR, FCR 1.35, 3.51% daily growth rate and 4% dose. Suardi Laheng (2020) produced 98% SR, FCR 1, 1.33% daily growth rate and 5% dose.

Ambarwati (2020) produces 96% SR, FCR 1.12, 1.23% daily growth rate and 6% dose and Eka Royani (2022) produces 77-88% SR, 1.13 FCR, 1.03% daily growth rate and 2% dose. From the four studies there were differences in the growth rate of fermented feed on tilapia. Growth is related to external and internal factors of the fish body. In addition to the aquatic environment, one of the external factors that greatly influences growth is food. The related element is protein. Protein in addition to playing a role in the growth process as well as the main energy source. Protein also plays a role in tissue formation or maintenance of the body and replaces damaged tissue and helps metabolic processes (Halver 1989). The experimental results showed that the optimal specific growth rate was produced in tilapia by feeding with 2% coconut husk oil extract compared to other treatments. These results indicate that the addition of coconut husk oil extract as much as 2% in the feed is the right dose because it can be tolerated by fish and is able to produce good quality feed so that the nutrients contained in the feed can be digested and utilized properly by fish. This is in accordance with the statement of Dawood et al. (2021) that the increased nutritional value of digestibility allows good utilization and intake of feed nutrients and results in high growth performance. Previous research stated that the use of distillate medium chain fatty acids from coconut oil was able to increase the amount of food intake in fish, thereby increasing fish weight (Mirabet et al. 2017). In addition, according to research by Dawood et al. (2021) the addition of coconut oil to feed can increase lipase enzyme activity in tilapia which has a relationship with increasing feed utilization and protein utilization.

Satisfaction and Fermentation Feeding on Tilapia

The results of Rambo's research (2012) are in line with the research of Eslamloo et al. (2012), feeding and refeeding showed higher growth than fish fed daily. Fish in the condition of fasting, blood plasma levels of fat and triglycerides tend to increase and insulin levels tend to decrease. On the other hand, post-fasting feeding shows that insulin levels increase and fat and triglyceride levels decrease. This shows that fish that are fasting will use fat stores in the body as metabolic energy, while when fed back after fasting they tend to use carbohydrates. The same is the case with the research of Azodi et al. (2014), fasting and refeeding showed triglyceride and blood glucose levels increased compared to fish fed daily. The utilization of energy from fat in the condition of fasting and the utilization of carbohydrate energy in the condition of re-feeding allows the utilization of protein energy to be used as a building material for the body, repairing damaged body tissues so as to increase growth to the maximum. NRC (2011) states that protein stored in the body is the raw material for forming body tissues so that it supports body weight gain. Abolfathi et al. (2012), stated that under fasting conditions the activity of the amylase enzyme tends to decrease and increase again when feeding post-fasting. Other studies Lee et al. (2016), showed that the fasting treatment of Sepia phaonis fish showed a decrease in the activity of digestive enzymes (amylase, lipase, pepsin, trypsin). When re-feeding after fasting, the activity of amylase and lipase enzymes increased and there was no difference with fish fed daily. In contrast, the pepsin and trypsin enzymes decreased post-fasting activity. The increase in amylase enzyme after fasting is thought to be used as energy for the restoration of damaged

tissues during fasting. This is supported by the research of Yarmohammadi et al. (2012), when fish are fed back after fasting they tend to use carbohydrates.

Fish Survival Rate

The survival rate is the opposite of the mortality rate. According to Effendi (1997), survival is the percentage of the number of fish that are still alive during the maintenance period divided by the number of fish stocked. If the fish is in a state of stress, it means experiencing high mortality, which is mainly caused by unfavorable environmental conditions so that the fish will be easily infected with disease and lack of food.

CONCLUSION

By looking at the discussion of the various studies that have been conducted, it can be concluded that the results of the addition of fermentation to feed are very good and affect the growth of tilapia with research that provides a dose of 2 to 6% of the fermented product. The survival rate is also the percentage of the number of fish that are still alive during the rearing period divided by the number stocked.

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Yogo Tri Saloko1, Rachimi2, Eka Indah Raharjo3, Hendri Yanto4. GIVING EFFECT DIFFERENT FERMENTED YELLOW CORN IN FEED GROWTH RATE AND FISH SURVIVAL RATE JELAWAT (*Leptobarbus hoevenii Blkr*).