The Effect of Duck Manure Fermentation Subtitution for Juvenile Catfish Feed (*Clarias* sp.)

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Abstract
Pellet is replaceable with fermented duck manure in the catfish. The effect of substitution pellet feed juvenile catfish with fermented duck manure was investigated. It can be done by fermentation process of duck manure by yeast from traditional food starter called *Tape*. It contains yeast of genus *Aspergilius, Saccharomyces, Candida, Hansenulla*, dan *Acetobacter* bacteria. Catfish diets supplemented with 5% pellet/fish/day (W/W/day). Four treatments diets were 45% (A), 30% (B), 15% (C) and 0% (D) levels of duck manure from total weight and it fed to catfish juvenile (weight 2,75±0,05 g) for 30 days controlled aquaria. The results of this studies found that the recommended diet was diet C and D formulations beacuse it can provide catfish juvenile growth response. Duck manure can replace feed juvenile catfish by fermentation for maximmum 15% from catfish diets.
Keywords: fermented duck manure, substitute pellet, catfish juvenile growth

Introduction

Based on the Fisheries and Marine Ministry of Indonesia data, freshwater fish production was increased significantly for hybrid catfish (Clarias sp.) commodity. The increase of freshwater production was proposed to reach nation goal in Indonesia's government policy. Production for catfish in 2016 and 2017 was 764.797 tones and 1,77 milons tones. Production catfish in Indonesia increases 114 % from 2016 until 2017.(KKP, 2018)

National goal could be reached by increasing catfish culture. High cost on feed waste problem that emerging during catfish culture (Kusuma et. al., 2015). Substitution feed in the catfish diet with other source could be solved this problem. Duck manure with high protein source is available abundantly and it is cheap cost which can replace feed of catfish diet. Another problem by using duck manure as substitution on catfish feed is low in digestibility so it needed to be fixed.

Fermentation could increase digestibility of duck manure. The increasing of duck manure digestibility is best reason to be used as catfish feed substitution. Duck manure were formed to mold for fermentation process. Fermentation can degrade complex compound to be simple compound (Susanto *et. al*., 2017). Simple compound have higher digestibility than complex compound (Watanabe, 1998). Tape yeast which used on tape production as tape fermentation starter in Indonesia was formed in mold. Tape yeast contains of genus *Aspergilius, Saccharomyces*, *Candida, Hansenulla*, dan bakteri *Acetobacter* (Jhonprimen et. al., 2012). The used of tape yeast as tape fermentation starter in Indonesia can increase digestibility of feed livestock (Rohmawati *et. al*., 2015). The aim of this study was to investigate the effect of fermented duck manure by tape yeast for substitute of catfish pellet feed on the catfish juvenile growth.

Materials And Methods

Juvenile catfish are recruited from local farmers in Magelang City. The catfish species is Clarias sp. with a weight of 2.74

± 0.067 g. Duck manure collected from local duck farmers in Magelang district. Yeast tape collested from traditional tape food vendors around the city of Magelang. Research were conducted in the laboratorium of Agriculture Faculty, Tidar University on July 2018. Duck manure was fermented with yeast tape for 7 days and used to replace juvenile catfish feed pellets. The concentration of tape yeast for fermentation was 1 g for 1 kg of duck manure. 16 juvenile catfish were kept in 12 aquariums for 30 days maintenance. Feeding as much as 5% of the total weight of the fish in the aquarium with 30% pellet protein. Four substitution treatments for pellet feed substitution each with 3 replications. Substituting pellets by fermented duck manure are divided in to 4 groups 45% (A), 30% (B), 15% (C) and without substitution 0% for control (D). Temperature and pH data were measured every week as supporting data. Survival Rate (SR) and Growth Rate (GR) were analyzed after 30 days of maintenance to determine the best treatment.

Statistical Analysis

The results of duck manure fermentation and without fermentation were analyzed by descriptive method. Data of body weight as growth and survival rate of juvenile catfish were analyzed using One-way ANOVA and Tukey's analysis was performed to determine the differences between all treatments.

Results

The first observation was shown between fermented duck manure yeast tape and factory feed for catfish. The comparison nutrition between fermented duck manure yeast tape and factory feed for catfish shown in the Table 1:

Sampel	Water content (%)	Dry matter (%)	Ash (%)	Crude protein (%)	Fat (%)	Fiber (%)	Carbohydrate (%)
Fermented Duck manure	46,20	53,80	59,17	5,86	0,26	32,54	33,64
Commercial feed	Max 12	Max 88	Max 13	31-33	Min 4	Max 5	-

The observations of the data Survival Rate (SR) and Growth Rate (GR) and after 30 days of maintenance are shown in the following data Table 2:

Treatment	Survival Rate (%)	Growth Rate (gr)	Specific Growth Rate (gr/day)	Feed Convertion Ratio
A (45%)	97.92[a]	3.53[a]	0.0276[a]	1.60[b]
B (30%)	95.83[a]	3.61[a]	0.0280[ab]	1.57[b]
C %)	100.00[a]	3.97[b]	0.0298[b]	1.37[a]
D (0%)	97.92[a]	3.96[b]	0.0298[b]	1.38[a]

[a,b]mean in the same column with different superscript are significantly different P<0,05

The observations of the supporting data temperature and pH during 30 days of maintenance are shown in the following data Table 3:

Week	Temperature (^{0}C)	pH
1	18±4	7
2	16±5	7
3	20±4	7
4	20±5	7

Discussion

Nutrients compound of duck manure after fermentation (Table 1) have shown that the ash reached 59% taken from

traditional duck farmers in Magelang Regency were mixed with sand during collection. The sand content results in high ash content. The ash content that is too high can cause inhibition of absorption of nutrients in fish feed. Ash content affects the digestibility and growth of fish (Setyono, 2012). Large ash content can inhibit nutrient absorption and fish growth.

Carbohydrate after fermentation increased due to the ability of the yeast which contains microorganism of cellulolytic and amylolytic groups to degrade cellulose into simpler compounds. Narsun *et al.* (2015) reported that bacteria in yeast tape is a type of *Saccharomyces* sp. which can degrade cellulose into sugar and alcohol, this is what causes an increase in carbohydrates after duck dung fermentation. In feed fish, carbohydrate is source of energi.

Protein is an essential source needed for fish. The main function of protein in the body is to build new cells, treat damaged cells and for reproduction. Protein deficiency in fish feed can cause fish growth to be inhibited, susceptible to disease and inhibit reproduction. In catfish, it requires high protein, which is above 30%. Commercial catfish feed usually has a protein content above 30%. The more substitution of ad feed with fermented manure ducks will reduce protein, increase ash content and increase fiber which can inhibit fish growth.

Survival rate (Table 2) have shown that there were no significant difference between the treatments. It means that the treatment did not affect the death of catfish. Pellet feed substituted with duck manur is not harmful to fish life. Ducks eat water molluscs, rice bran, and other natural ingredients which is maintain traditionally so that duck manure is not harmful to catfish.

Growth rate (Table 2) showed that the more level manure duck given the more growth of fish low. This caused by low protein 5,86% from duck manure after fermentation. Crude protein contents on juvenile catfish diets should be above 28% (Hasting, 1976). Based on this study, duck manure could subtituted catfish feed no more than 15%. The treatment of 30% and 45% duck manure subtitution showed the low growth of catfish. The growth of catfish fed with 15% duck manure were not different with control caused by a variety of protein sources and high carbohydrate after fermentation. The diversity of protein sources is good for fish growth because it meets the nutritional needs of fish (Halver, 1989).

The daily specific growth rate showed good results in turnover treatment with duck manure as 15%. This is due to the diversity of feed given. Daily specific growth results are the same as those given full / treatment D. Daily specific growth rate is inversely proportional to FCR where the pellet replacement treatment with duck manure is 15% and full pellet results in the lowest FCR this is because nutrient feed is absorbed a lot for catfish growth.

The data of pH were 7 during 4 weeks of rearing. pH 7 is a good range for maintenance of catfish (Boyd, 1982). The temperature showed extreme temperatures for catfish maintenance for it reaches temperatures below 20^0C with a standard deviation of 4^0C. Boyd (1982) reported that normal temperature for catfish maintenance is 25^0C above with standard deviation of 3^0C. This extreme temperature

due to the change of climate in Indonesia which caused drastic fluctuations even though the research was conducted in the laboratory. Low temperatures will caused stunted fish growth (Boyd, 1990). Average survival rate for all treatment was 97% and lower compared to Obasa *et al*. (2009) founding

Conclusion

The result of studies pellet containing 30% protein for catfish feed can be replaced with 15% fermented duck manure.

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