The Quality of Compost Using Skipjack Gill with Anaerob Method

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A B S T R A C T

Anaerobic composting is a composting process that requires oxygen availability. Oxygen is needed by microorganisms to remodel organic material during the composting process. Anaerobic composting is a composting process that does not require the availability of oxygen, but only requires the heat from outside. Skipjack fish (*Katsuwonus pelamis*) is a medium-sized fish from the family Skombride (tuna), the only species of the genus *Katsuwonus*. Body length of the largest Skipjack could reach 1 meter and the weight more than 18 kg. The back part is purplish to dark blue and lower abdomen is silver belly and equipped with 4 to 6 black stripes extending to the side of the body. Scales can only be found on the body scars or coreset and lateral line. Inner and outer part of fish waste from processing were potential to be processed into fertilizer/compost. Generally, fish waste contains many nutrients, namely N (Nitrogen), P (Posforus), and K (Potassium). The purpose of this study was to determine the quality of compost, composting time and number of composts with the addition of skipjack gills. This was an experimental research. In the process of composting the amount of vegetable waste used as much as 40 kg, and skipjack gill about 2 kg. The results of this study showed that the compost produced by the addition skipjack gills for 24 days was 2.7 Kg. While, control group, composting for 24 days produced compost about 2.4 kg. Physically, the color of compost-based skipjack gills was blackish brown, smells of fish gills and has a fine texture like soil. A bit different with compost from control group, the color was light brown, smelling of soil and has a fine texture like soil. It is recommended for further researchers to conduct research by utilizing Skipjack Fish Gills with different composting methods.

Keyword: Anaerob; compost; skipjack's gill

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1. INTRODUCTION

Waste has resulted from industry and household. About 70% of waste in Indonesia is organic waste (Dewilda, Aziz, & Hasnureta, 2018). The data from The Cleanliness and Environment Department showed that only 57% or approximately 226 m3 per day of the waste has resulted from the activities of Ternate City population transported to the sanitary landfill (Purwiningsih, 2017). Health problem could come with inappropriate waste treatment, waste could pollute environment (water, soil and air). The previous years an epidemic happened because pathogens contaminated the water (Kiyasudeen S, Ibrahim, Quaik, & Ahmed Ismail, 2016). Organic waste is a favorable media for pathogens to grow (Shukor, Omar, Kasim, Jamaludin, & Naim, 2018).

The government must implement another alternative to reduce the volume of waste. Composting and incineration were other ways to treat solid waste. Composting is a better alternative to decrease organic waste (Kulkarni, 2017), it is not only reducing waste volume but also as fertilizer for plant. Organic compost is as good as commercial fertilizer to provide nutrients for the soil (Segatelli, Pimenta, Peixoto, Silva, & Bosco, 2019).

Local microorganism could be used to produce compost faster (Purwiningsih, 2017). Compost skipjack gill-based contains 8% of Nitrogen, 9% of Phosphor and 9% of Kalium (Potassium). The study group (compost enriched with skipjack gill) contains more NPK than control group (Purwiningsih & Arba, 2020). A study suggested that anaerobic composting technique produced compost contains enormous mineral N (Shah et al., 2017). High level presentation of N in compost is because of the microorganism existence that could transform ammoniac to be nitrate. Microorganism in the soil uses Nitrogen as the energy source in decomposing organic matter. The more nitrogen, the faster green waste decomposed (Bachtiar & Ahmad, 2019). Using skipjack gills as compost material could generate bad odor. Anaerobic composting is a better alternative to solve the issue. Therefore, this study conducted to measure compost quality that treated with anaerobic method.

2. MATERIALS AND METHOD

2.1. Research design

The study was carried out to know the quality of compost using skipjack gill on anaerobic composting process. Post-test only controlled design was applied to this study. Quality and quantity of compost were measured after 24 days since the experiment has been started.

2.3. Population and sample research

Study sample was organic waste and skipjack gill. Organic waste and skipjack gill originated from local market. The wastes were collected and weighed based on need.

2.4. Materials and research tools

Materials used in anaerobic composting were organic wastes and skipjack gill. The tools which utilized in this study were: (1) scale to weigh waste; (2) plastic bag as an anaerobic composting media.

2.5. Collection / research stages

Quantity of compost was measured using scale. Quality of compost was observed and then recorded into an observational checklist.

2.6. Data analysis

Quantity and quality of compost resulted from the study then compared to the standard of quantity and quality of compost.

3. RESULTS AND DISCUSSION

Recently, composting process with organic method was developed. Composting method consist of two types based on oxygen availability, they were aerobic and anaerobic method (Supardi & Sulistyorini, 2020).

Table 5.1 showed that composting duration either the study group (using skipjack gill) or control group was 24 days. It implied that both groups were not effective because the effective composting time was below than 20 days. A study also found that composting process with anaerobic method need more than 20 days to produce compost (23 days). Anaerobic composting need composter, composting duration would be longer without composter (Rosalin & Saleh, 2016). Compost which mature in 28 days had a better impact on leave's development than those in 14 days (Anshah, Prajati, & Suryawan, 2019).

Table 5.2 suggested that compost resulted from study group (using skipjack gill) was more than control group, it was 2.7 kilograms for study group and 2.4 kilograms for control group. Proportion of compost with local microorganism was more than the one without it (Purwiningsih, 2017).

Color is one of the compost indicators, old brown indicate that the compost matured (Dini, Zumroturida, Nurhalisa, & Saputra, 2020). Table 5.3 showed that physically, the color of compost-based skipjack gills was blackish brown, smells of fish

gills and has a fine texture like soil. A bit different with compost from control group, the color was light brown, smelling of soil and has a fine texture like soil. Similar to a study which result with the compost appearance blackish, smell like soil and the texture was fine (Suwatanti & Widyaningrum, 2017). The old brown and smelling like soil compost also produced by using additional microbes (tomato waste). Degradation of organic material by microorganism along with the color and smell change, soil smelled and old brown compost was a good quality compost (Amalia & Widyaningrum, 2016).

4. CONCLUSION

Compost resulted from study group (using skipjack gill) was more than control group. The compost-based skipjack gills appearance was blackish brown, smells of fish gills and has a fine texture like soil. A bit different with compost from control group, the color was light brown, smelling of soil and has a fine texture like soil. It is recommended for further researchers to conduct research by utilizing Skipjack Fish Gills with different composting methods.

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Tables and Graphs

Table 1. Compost Duration

Compost Material	Compost Duration	Result
Skipjack gill	24 days	Not Effective
Control Group	24 days	Not Effective

Table 2. Compost Quantity

Compost Material	Original Weigh	Result
Skipjack gill	20 kilograms	2.7 kilograms
Control Group	20 kilograms	2.4 kilograms

Table 3. Compost Appearance Quality

Compost Material	Color	Smell	Texture
Skipjack gill	Blackish brown	Smells of fish gills	Fine texture like soil
Control Group	Light brown	Smelling of soil	Fine texture like soil