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# REVIEW ARTICLES; UTILIZATION OF FISH OFFAL FOR ORGANIC LIQUID FERTILIZER

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## ABSTRACT

This article aims to examine the use of fish offal into liquid fertilizer in terms of the manufacturing process and the quality of the liquid fertilizer obtained. Based on the results of the literature study, information was obtained that the method of making liquid organic fertilizer for fish offal waste can be done using the Bakasang method, the method of adding the banana kepok peel component, the method of adding the MOL component of banana hump and the method of adding the EM-4 component. The quality of the liquid fertilizer obtained has a positive impact on plant growth.

Key words : Nutrients, BEKASANG method, plants, WASTE, FISHERY INDUSTRY

## PRELIMINARY

Fish offal waste is one of the ingredients to make liquid organic fertilizer. Fish offal or fish waste has the potential to be processed into organic fertilizer. This is because fish offal waste contains nutrients needed for plants. Plant growth requires three important nutrients, there are N (nitrogen), P (phosphorus) and K (potassium) (Suprihatin 2011 in Suartini et al 2018). So that fish offal waste can be used to increase nutrients for plant growth and be processed into liquid organic fertilizer.

In the fishery processing industry, fish offal waste is obtained from the fillet industry, surimi, fish balls, fish sausages, and many more. However, on average, all fishery products, whether diversified or not, certainly produce fish offal waste. Because Fish Offal cannot be consumed by humans.

Three-quarters of the total weight is waste (Koli et al 2012 in Atma 2016). One of the wastes in question is fish offal, so this is a big problem in the fish processing industry. Fish waste both in solid and liquid form can pollute the environment. Even though fish waste still contains high enough protein. Offal produced from fishing industry waste has a high content of protein and unsaturated fat (Bhaskar et al 2008 in Nurhayati et al 2014). This is evident from the protein content of sturgeon fish (Acipenser persicus) 15.48%, catla fish (Catla catla) 8.52% and mackerel 16.72% (Bhaskar et al. 2008; Ovissipour et al. 2009; Nurhayati et al. al. 2013).

**Product Manufacturing Process**

Based on several journals, the method in making liquid fertilizer based on fish offal waste is by fermentation. In some journals, the manufacture of liquid organic fertilizer still needs to add other components. Liquid organic fertilizer from catfish innards has not optimal nutrient content, so other components are needed to meet the standards for liquid organic fertilizer (Ilham 2012 in Fryathama 2016). In several journals there are methods of making liquid organic fertilizer from fish offal waste with the addition of other components such as kepok banana peel, banana hump MOL, EM-4 and bakasang. Here's how to make it:

A. Bakasang Method

In the manufacture of organic fertilizer from fish offal is divided into 4 stages. The first stage is the manufacture of liquid organic fertilizer, analysis of nitrogen content, phosphorus content and potassium content. The following is a flow chart of the process of making organic fertilizer from fish offal. This process begins with cleaning the fish offal from blood and dirty that is still attached. Then the fish innards are cut into pieces and crushed until smooth. After being mashed, weigh 200 grams of fish offal and then put it in a 1500 ml bottle, tightly closed, then dried in the sun for 5-10 days and then analyzed for nitrogen, phosphorus and potassium levels.

B. Method of Adding Kepok Banana Peel Components

This procedure is in accordance was done by (Ilham 2012) which is to make preparations of fish offal first. Fish offal weighed 4 kg then finely chopped. After that, make a solution preparation by mixing 50 ml of EM-4, 1 liter of old coconut water and 7 liters of clean water into a plastic container and stir until homogeneous. To make the preparation of banana peels, first washed and then chopped and weighed as much as 100g, 200g, 300g and then blended. Next, the crushed fish offal is put into a jar and mix the solution media and banana peel then stir homogeneously and tightly closed. The mixture was fermented anaerobically for 13 days . After 13 days the solution was taken and filtered and then put into a bottle. The last step is to analyze the value of pJ, total nitrogen, total phosphorus, and total potassium.

C. Method of Adding MOL Components of Banana Hump

This procedure uses the method of Waryanti et al 2013. A total of 200 grams of mujair fish offal waste was put into four closed containers. Add 100 ml of molasses and 1 liter of distilled water. Each container was added with MOL banana hump with different volumes in each container, namely 0 ml, 50 ml, 100 ml and 150 ml. The container is tightly closed and make sure no air can enter then fermented for 14 days.

D. EM-4 . Component Addition Method

Puree the tilapia offal in a blender and put it in a closed bucket. Then add rice washing waste, water, molasses, and EM-4 into a bucket filled with tilapia waste. All the ingredients that have been mixed are stirred until homogeneous. When it is homogeneous, close the bucket tightly and place it in a safe place and avoid direct sunlight. Leave the bucket containing the fish waste mixture and other solutions for 2 weeks. After 2 weeks, this mixture is covered by using a sieve to separate the dregs and liquid fertilizer. The dregs of liquid fertilizer can be used as compost.

**Quality of Liquid Organic Fertilizer for Fish Offal Waste from Various Researches**

Based on research conducted by Suartini et al 2018 resulted that liquid organic fertilizer from skipjack viscera waste with the bakasang method contains nitrogen and phosphorus which has fulfil the minimum requirements for liquid organic fertilizer (3-6%) but the potassium content has not met so other components are needed. which contains a lot of potassium to meet the potassium content. In addition, research conducted by Baon 2017 showed that the concentration of liquid organic organic fertilizer from tilapia fish waste had a significant effect on the growth of long bean plants, namely the growth of stem height, number of leaves, and number of flowers. The fertilizer concentration of 3% is the most effective fertilizer concentration on the growth and production of long bean plants.

The same thing was also produced in Zahroh et al's 2018 research showing that the comparison of the concentration of organic fertilizer in fish waste had a significant effect on the growth of the number of leaves and stem height of red chili plants. Concentration of 4.5% is the best concentration in the application of fish waste organic fertilizer to the growth of red chili. The addition of the kepok banana peel component in the manufacture of liquid organic fertilizer of fish offal waste results in an increase in potassium content when the greater the proportion of banana peels in the composition of liquid organic fertilizer from catfish innards, so that high potassium can be used as a substitute for fertilizer (Fryathama 2016). The results of the analysis of the NPK nutrient content in liquid organic fertilizer of tilapia fish waste with variations in the volume of banana weevil MOL in the research of Lepongbulan et al 2017 produced nitrogen (N) levels of 0.311% with the addition of 100 mL MOL banana hump, phosphorus 0.167% in the addition of 150 mL MOL banana hump, and 0.037% potassium at the addition of 150 mL MOL banana hump. So that the application of organic fertilizer to find tilapia fish waste with variations in the volume of MOL banana hump on plants will be useful to stimulate overall plant growth.

**Market Segment of Liquid Organic Fertilizer from Fish Offal Waste in Indonesia**

The sale of liquid organic fertilizer from fish offal waste in Indonesia is still very rare, even at the e-commerce level, no one has sold it yet. However, the manufacture of liquid organic fertilizer from fish waste has been widely carried out, this is evident from the many research results

from various university or researchers. For the production of fish innards waste, it is rarely sold, in e-commerce what is sold is liquid organic fertilizer from whole fish waste in which there are fish innards. The name of the product is Fish Fertilizer Calcium Amino Acid Organic Fertilizer, sold at a price of IDR 12,000 for 260 grams.


**Figure 1.** Fish Waste Fertilizer Products in Indonesian e-commerce (Source: Tokopedia)

## 2.4 Product Usage

Liquid organic fertilizer products based on fish offal waste are used as an alternative to inorganic fertilizers which have several negative impacts. No organic fertilizerwill damage the environment so it is safe to use. This fertilizer can also improve soil fertility as well as provide nutrients needed by plants, namely sodium, phosphorus, and potassium so as to increase the productivity of agricultural commodities. This product is commonly used for horticultural crops, namely plants cultivated by humans. Some research results state that the use of liquid organic fertilizer from fish offal waste affects the growth of stems, leaves and flowers of various plants.

## Conclusion

Based on the results of the literature study, information was obtained that the method of making liquid organic fertilizer for fish offal waste can be done using the Bakasang method, the method of adding the banana skin component to the kepok, the method of adding the MOL component of banana hump and the method of adding the EM-4 component. The quality of the liquid fertilizer obtained has a positive impact on plant growth. .

## REFERENCES

Atma Yoni. 2016. Utilization of Fish Waste as an Alternative Source of Gelatin and Bioactive Peptide Production: A Review. Journal of the University of Muhammadiyah Jakarta.

Baon Joseph Karolus Pati. 2017. The Effect of Liquid Organic Fertilizer for Tilapia Fish Waste on the Growth and Production of Long Bean Plants. Essay. Faculty of Teacher Training and Education, Sanata Dhama University. Yogyakarta

Bhaskar N, Mahendrakar NS. 2008. Protein hydrolisate from visceral waste protein of catla (Catla catla): optimization of hydrolysis condition for a commercial neutral protease. Journal of Bioresource Technology 99:4105-4111.

Fryatham Ilham. 2016. Utilization of Patin Fish Offal (Pangasius Hypoptalmus) With The Addition Of Kepok Banana Peel (Musa Acuminata Balbisiana) In Making Liquid Organic Fertilizer. Fishery Products Technology Riau University.

Hapsari, N. & Welasi, T. (2013). Utilization of fish waste into organic fertilizer. Journal of Environmental Engineering, 2(1), 1-6.

Ilham, D. 2012. Preparation of Liquid Organic Fertilizer from the Stomach of Jambal Siam Fish by Using EM-4 as a Starter. [Essay]. Faculty of Fisheries and Marine Science. Riau University

Indriani, F., Sutrisno, E. & Sumiyati, S. (2013). Study of Adding Fish Waste to Process

Ismayanda, MH & Mulana, F. (2014). Study of Making Potassium Sulfate Fertilizer From Rice Husk Ash And Natural Gypsum Using Stirred Tank Reactor. Journal of Chemical and Environmental Engineering, 2(10), 77-83.

Koli JM, Basua S, Nayaka BB, Patageb SB, Pagarkarb AU, and Gudipatia V. 2012. Functional characteristics of gelatin extracted from skin and bone of Tigertoothed croaker (Otolithes ruber) and Pink perch (Nemipterus japonicas). Food Bioprod Process 90:555-62.

Kusumaningrum, SI 2019. Utilization of the Agricultural Sector to Support Indonesia's Economic Growth. Transaction Journal, 11(1).

Lepongbulan, W., Vanny, MAT, Anang, WMD 2017. Nutrient Analysis of Liquid Organic Fertilizer from Mujair Fish Waste (Oreochromis Mosambicus) Lake Lindu With Volume Variations of Local Microorganisms (Moles) Banana Weevil. Academic Journal of Chemistry, 6(2) : 92-97.

Nurhayati Tati, Ella, S., Cholifah, Roni, N. 2014. Optimization of the Process for Making White Snapper Offal Hydrolyzate. Journal of Aquatic Products Technology, 17(1).

Making Liquid Fertilizer From Cow Urine Against Macro Nutrient Content (CNPK). Journal

Suartini Komang, Paulus, HA, Minarni, RJ 2018. Production of Liquid Organic Fertilizer from the Offal Waste of Skipjack Fish (Katsuwonus pelamis). Journal of Academic Chemistry 7(2) : 70-74 Environmental Engineering, 2(1), 1-6.

Be concerned. (2011). The Process of Making Liquid Fertilizer From Banana Tree Trunks. Journal of Chemical Engineering, 5(2), 429-433.

Environmental Engineering, 2(2), 1-6.

Waryanti, A., Sudarno & Sutrisno, E. (2013). Study of the effect of adding coconut husk on the manufacture of liquid fertilizer from fish washing waste on the quality of macro nutrients (CNPK). Journal of Environmental Engineering, 2(2), 1-7.

Zahroh, F., Kusrinah, Siti, MS 2018.Comparison of Variations in Concentration of Liquid Organic Fertilizer from Fish Waste on the Growth of Red Chili (Capsicum annum L.) Plants.Journal of Biology and Applied Biology, 1(1) : 50-57.