

# Influence Utilization Leaf Cassava (*Manihot utilissima*) Fermented to Rate Growth Weight, Water Quality and Efficiency Freshwater Pomfret Fish Feed (*Colossoma macropomum*)

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**Abstract:** Feed plays an important role in cultivation activities Freshwater Pomfret, so a needed feed alternative that has substance nutrition high and price is affordable. one possible alternative utilized as fish feed is flour leaf cassava fermented. This research aims to know the influence of gift flour leaf cassava fermented to rate growth weight, water quality, and efficiency of Freshwater Pomfret feed. Study this using design Random Complete (CRD) with 8 treatments and 3 replications. The data obtained were analyzed using the Analysis of Variance Test (ANOVA) and further tested in the form of real difference Honest / BNJ and Real Difference Smallest / BNT. The results showed that gift flour leaf fermented cassava effect ( $p < 0.05$ ) on rate growth Freshwater Pomfret Fish Weight. Growth p value heavy The highest was obtained in treatment P 4 (3 0% flour leaf fermented cassava) with score Fcount 13.70 > FT Table 2.66 and also the value of efficiency feed highest obtained in treatment P 4 with score Fcount 15.00 > FTable 2.66. Measurement value water quality which includes temperature and pH of water in normal range with a score for measurement temperature 6-9 and pH 28-32 °C. Conclusion from the study this is gift flour leaf fermented cassava as feed take effect to rate growth weight, water quality, and efficiency of Freshwater Pomfret.

**Keywords:** Feed; Freshwater Pomfret; pH; Temperature

## Introduction

Growth is increasing size, length, or heavy over some time. Growth occurs because of the existence increased network from the division cell in mitosis that occurs because of the existence of excess input of energy and protein originating from feed (Kardana et al., 2012).

Freshwater Pomfret (*Colossoma macropomum*) is one of the valuable freshwater fish commodities economically tall, good for fish consumption, and ornamental fish. Privileges that make many fish farmers cultivate it so that Becomes an opportunity profitable business (Santoso & Agusmansyah, 2011). Feed is the cost variable biggest in the production process which is about 60–70% of the cost of production. However, the problems that are often encountered by fish farmers are height price of feed from factories, because ingredient

raw main fish feed also experienced an enhancement price. because of that, must develop formulation feed that has efficiency high feed with cost production of the lowest feed possible (Murtidjo, 2001).

According to Arief et al. (2014), efficiency feed is a score comparison Among increase heavy with declared feed consumed in percent. The tall score efficiency feed, the fish response to feeding the more good show with the fast growth of fish. For push cost production one way that can be conducted is with the use of ingredient standards that scored core nutrition high and the price is relatively cheap. one ingredient raw material that can be used as fish feed that hascoredre high nutrition \_ is leaf cassava (*Manihot utilissima*) (Verina, 2020). However, the use of leaf cassava as an ingredient in fish feed has a weakness in that it contains high fiber so that hard digested by fish. because that way to get over it through

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fermentation. Fermentation using EM4 is suspected capable of lower content fiber rough and enhancing palatability feed. Fermentation using EM4 on leaves of cassava (*Manihot utilissima*) can take affect the performance of Freshwater Pomfret Growth (*Colossoma macropomum*) (Listiowati and Pramono, 2014).

Pawhestri et al. (2020) state that water quality provides influences the process of growth and the addition of fish weight because water is the natural habitat of fish. The impact of poor water quality good is on the improvement level of fish stress which causes fish death. Because that checking Water quality is a very important notice in the maintenance of Freshwater Pomfret. So far this gift flour leaf fermented cassava as fish feed has already been done by giving feed on tilapia red (*Oreochromis niloticus*), carp (*Cyprinus carpio*), and gourami (*Osphronemus gouramy*), however, gift flour leaf fermented cassava as Freshwater Pomfret feed not yet known, because that then need conducted study for see influence use flour leaf cassava on feed to growth weight, water quality, and efficiency feed Freshwater Pomfret.

## Method

### *Research Location and Time*

Study this carried out in the laboratory Faculty of Fish Hatchery and Breeding Marine and Fisheries, Syiah Kuala University. Study this held in the month July until August 2021.

### *Tools and Materials Study*

Tools used in the study These include a mortar and pestle, a sieve of flour, a container, a grinder, an electric oven, black bucket plastic, a thermometer, pH meter, scales, compass shove, camera, fishing line, tool write, and label. Materials used in the study included flour leaf cassava, fish meal, flour soybeans, bran smooth, starch, flour corn, premix (vitamin), mineral mix, fish oil, and EM4 for fisheries and aquaculture. Considering that fish food in the form of pellet feed costs is greater than alternative feed, fermentation of ingredients that are easy to find and relatively affordable prices such as cassava leaves can be used as an alternative feed for the growth of Pomfret fish.

### *Approach and Type Study*

The approach used in the study is approached quantitatively. Type study is a study experiment.

### *Experimental design*

Study this use method experimental with a non-factorial Completely Randomized Design (CRD) pattern consisting of 8 treatments and 3 replications. The treatment given is as follows:

- P0 = Pellet 100% commercial (control)
- P1 = Flour leaf cassava 0% fermentation + flour soybean 60%
- P2 = Flour leaf cassava 10% fermentation + flour soybean 50%
- P3 = Flour leaf cassava 20% fermentation + flour soybean 40%
- P4 = Flour leaf cassava 30% fermentation + flour soybean 30%
- P5 = Flour leaf cassava 40% fermentation + flour soybean 20%
- P6 = Flour leaf cassava 50% fermentation + flour soy 10%
- P7 = Flour leaf cassava 60% fermentation + flour soy 0%

### *Procedure Making Flour Leaf cassava*

Making feed from leaf cassava started with a collection of leaf cassava taken in the Lam Ujong area, Sub-District Krueng Barona Jaya, Aceh Besar. The plucked part of the leaf is leaf cassava that has been old. After the leaf cassava was picked, then separated from the stalk, then entered into in receptacle placed the holder, and washed clean. Next up, the leaves of the cassava cut become small parts with sizes 2-3 cm. Then leaf cassava dried under ray sun. After that, leaf cassava is pounded with the use of mortar wood until crushed and smooth like flour. Next flour was filtered to get results more flour smoothly. Flour leaf cassava that has been so then weighed in accordance with dose treatment that is, P.0 = 0% using 100% pellets commercial, P.1= 0%, P.2 = 10%, P.3 = 20%, P.4 = 30%, P.5 = 40%, P.6 = 50%, and P.7 = 60 %. Then mixed with materials other for making feed flour leaf cassava.

### *Procedure Fermentation Flour Leaf cassava*

What's more formerly flour leaf cassava was weighed, then mixed equally with EM4 as much as 10% of heavy flour leaf cassava, then entered in pocket plastic, covered, and fermented for 7 days. Fermentation using EM4 used in research is fermentation anaerobic. Flour leaf cassava that has been fermented is removed and dried back below the rayed sun (Listiowati and Pramono, 2014).

### *Procedure Making Pellet*

Manufacturing process pellets started with mixing ingredient feed with flour leaf fermented cassava \_ from the smallest amount to the biggest in accordance with a comparison of each treatment that has been determined. In the process of making pellets, added starch as much as 2% of the total weight Materials used that work as adhesive. Next up, the ingredients for making pellets the stirred until mixed evenly, after the ingredients are already mixed evenly, then add warm water as much as 30% of the total material. Adding water is done while

ingredients are stirred until even and smooth, so that can be made lumps for printed. Becomes pellets with use milled and dried until the feed water content is constant and dry.

*Procedure Acclimatization*

The container for acclimatization process conducted with method put pocket plastic containing the test fish inside receptacle research that has been filled with water for 30 minutes. Next, the test fish were transferred to in styrofoam temporary before the test fish are transferred direct to in receptacle research. After the acclimatization process finished, the test fish are fasted for 1x24 hours with destination for remove influence remainder feed previously from fish body. When the test fish is finished be fasted, every test fish samples measured weight body beginning with use scales, then be measured long her body from part end mouth until base tail and width her body be measured from part middle dorsal fin to part ventral middle of the fish body with use period push.

*Procedure Maintenance Test Animals*

Maintenance test animals were carried out in container. Container used is a plastic bucket with a volume of 26 liters as many as 24 pieces. Before used, the bucket washed more formerly with Use clean and dry water. Then Each bucket is filled with water as high as 15 cm with a volume of 6 liters of water. Water used in maintenance of this test fish is the well water from before already deposited more first inside receptacle water reservoir. Next up, Freshwater Pomfret stocked as many as 3 tails in each research bucket.

Freshwater Pomfret given treatment for 30 days and given feed artificial in accordance with treatment that has been determined. Frequency gift feed during the research period 3 times a day, in the morning day 8:00 a.m., noon day 12.00 and in the afternoon at 17.00 hrs. Feed given as much as 5% of weight Freshwater Pomfret Fish Body. Then every one week very Freshwater Pomfret Fish sample return weighed for see weight, length and width body of fish, as well as see compared to straight or whether or not efficiency feed given to fish growth.

Besides measure fish growth, water quality was also measured. Parameters used for measure Water quality is the pH and temperature of the water. During the maintenance process is also carried out siphoning. Siphoning is something action for suck and throw fish droppings and remainder feed nor other impurities in the fish pond. Siphoning this conducted by conditional with destination for guard water quality inside receptacle study during maintenance take place, then also be done water refill in accordance with the amount

of water that has been wasted because of the siphoning process.

*Observed Parameters*

Rate growth Fish weight Fish Freshwater Bawal. Measurement of maintenance water quality parameters Freshwater Pomfret including pH and water temperature. Measurement of pH and water temperature is carried out every day. Efficiency suitable feed to rate freshwater pomfret growth.

*Data Analysis*

For see influence gift flour leaf fermented cassava to rate growth the weight of Freshwater Pomfret, then the data obtained analyzed with equality as following (Dedi and Helmizuryani, 2014):

$$Y_{ij} = \mu + \tau_i + \varepsilon_{ij} \tag{1}$$

Description:

$Y_{ij}$  : Observation on treatment i-th and repeat to-j

$\mu$  : Influence average score

$\tau_i$  : Influence treatment i-th

$\varepsilon_{ij}$  : Influence side on replay observation the -j that gets treatment i-th .

For see efficiency suitable feed \_ to the growth of Freshwater Pomfret, then conducted analysis with use formula efficiency feed. Efficiency feed (EP) calculated with use formula Zulpikar et al. (2018):

$$\text{Efficiency feed} = \frac{(W_t + D) - W_o}{F} \times 100\% \tag{2}$$

Description:

$W_t$  : Final fish weight research (g)

$W_o$  : Initial fish weight research (g)

$D$  : Weight of dead fish (g)

$F$  : Feed consumed (g)

**Result and Discussion**

*Result*

*Growth Freshwater Pomfret Weight*

Based on the research that has been done from day 0 until day 30, it can be seen that Freshwater Pomfret Growth have average value increment heavy body that doesn't homogeneous (varied) from every treatment given. N rate average value growth Freshwater Pomfret Fish Weight \_ highest found in P4 (30% flour leaf cassava fermented and 30% flour soybeans).

The results of the AN A VA test showed that the administration of flour leaf fermented cassava have a real impact to rate growth Freshwater Pomfret Fish Weight with Fcount 13.70 > Ftable 2.66. Average value of growth rate heavy Freshwater Pomfret Fish body could see in Figure 1 and data analysis variant to Freshwater Pomfret can be seen in the Table 1.

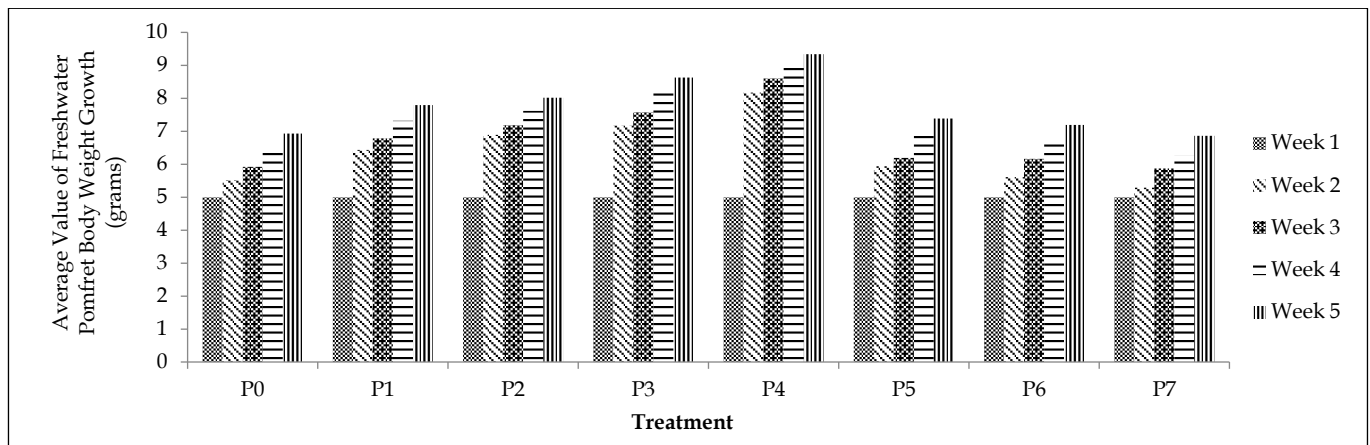


Figure 1. Average Gain Heavy Freshwater Pomfret Fish Body

Table 1. Analysis of Variance on Growth Freshwater Pomfret Weight

Source Diversity (SK)	Degrees Free (db)	Amount Square (JK)	Square (KT)	F Count	F Table (0.05)
Treatment	7	1.37	1.37	13.70*	2.66
Error	16	1.10	0.10		
Total	23	2.47			

Description: \* Different real

Efficiency Freshwater Pomfret Fish Feed

Based on the research that has been done from day 0 until the 30th day, it can be seen that the Freshwater Pomfret have average value of efficiency feed that is not homogeneous (varied) from every treatment that has been given. The average value of efficiency Freshwater Pomfret feed highest found in P4 (30% flour leaf cassava

fermented and 30% flour soybeans). The results of the ANOVA test showed that the administration of flour leaf fermented cassava have a real impact to score efficiency Freshwater Pomfret feed with  $F_{count} 15.00 > F_{table} 2.66$ . Average efficiency Freshwater Pomfret feed could see in Figure 2 and data analysis variant to Freshwater Pomfret can be seen in Table 2.

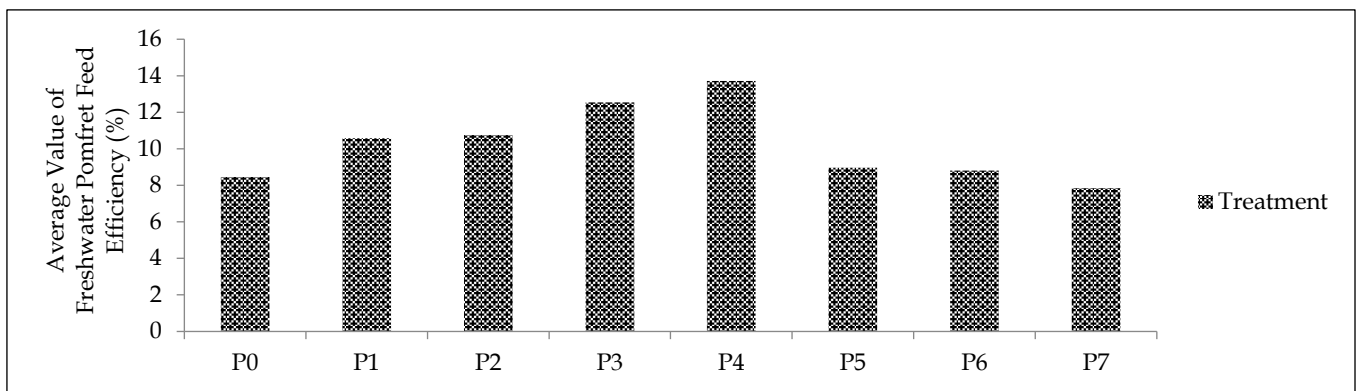


Figure 2. Average Efficiency Value Freshwater Pomfret Fish Feed

Table 2. Analysis of Variance on Efficiency Freshwater Pomfret Fish Feed

Source Diversity (SK)	Degrees Free (db)	Amount Square (JK)	Square (KT)	F Count	F Table (0.05)
Treatment	7	91.34	13.05	15.00*	2.66
Error	16	13.84	0.87		
Total	23	105.18			

Description: \* Different real

Freshwater Pomfret Rearing Water Quality

Measured water quality parameters in study this including pH and water temperature. Based on

measurement water quality that has been done, obtained results that in research this water quality in the container study in optimal range for growth and survival

Freshwater Pomfret live. The range value water quality during the study is presented in Table 3.

**Table 3.** Measurement Results in Water Quality of Freshwater Pomfret Fish Maintenance Media During Study

Parameter	Measurement	Treatment							Optimal Range (Arifin, 2016)	
		P0	P1	P2	P3	P4	P5	P6		P7
pH	Beginning	7.9	7.7	7.8	7.7	7.7	7.8	7.7	7.8	6-9
	End	7.8	7.8	7.9	7.8	7.8	7.8	7.9	7.9	
Temperature (°C)	Beginning	29	29	29	29	29	29	29	29	28-32 °C
	End	29	29	29	29	29	29	29	29	

*Discussion*

*Rate Growth Freshwater Pomfret Weight*

Growth is a process of increasing long and heavy something organisms that can see from change size long and heavy in unit time. Fish growth is influenced by quality and quantity feed, age and water quality (Mulqan et al., 2017). According to Hidayat et al. (2013), growth is also influenced by several factors factor that is factor from in and factor from outside, as for factor from in cover nature heredity, resilience to disease and ability in utilise food, while factor from outside cover nature physics, chemistry and biology waters.

Based on results the research obtained, can is known that gift leaf fermented cassava as fish feed show existence influence to growth heavy Freshwater Pomfret Fish Body. Highest average growth rate found at P4 with concentration gift flour leaf cassava as much as 30% and flour soya bean as much as 30% as the main protein in feed artificial for support Freshwater Pomfret Growth with good . Composition available feed in P4 is also suspected to be appropriate for support needs nutrition and speed Freshwater Pomfret Growth. Meanwhile, low score rate growth in P0, P1, and P2 treatments was due to because low amount content leaf cassava inside fish feed, so no could Fulfill Nutrients needed by Freshwater Pomfret for support its growth. However, if the more tall amount content leaf cassava inside fish feed will also could cause drop to Freshwater Pomfret Growth as in the P5, P6, and P7 treatments caused by the presence of content fiber rough on the leaves enough cassava high, so that the fish will difficult digest it and the growth process of the fish will decreased (Nurulaisyah et al., 2020).

Based on analysis statistics, value rate growth heavy Freshwater Pomfret 's body in treatment P4 shows results in the form of addition heavy Freshwater Pomfret Fish body highest compared with formulation or combination feed on treatment other. Possibility caused because The mixture contained in P4 feed has rate balance energy and enough protein for Fulfill needs fish energy so that utilization of fat and carbohydrates becomes maximum in synthesis metabolism fish body (Amrullah, 2018).

According to Anggraeni and Nurlita (2013), fish growth is closely relation with availability of protein in feed, because protein is a source energy for fish and protein is nutrients that are needed by fish for growth. High and low protein content in feed influenced by content non-protein energy that comes from from carbohydrates and fats. Low score rate growth in P5 treatment with concentration gift flour Leaf Cassava as much as 40%, P6 with concentration of 50%, and P7 with 60% concentration is suspected because content nutrition feed that is not in accordance with Freshwater Pomfret needs for support rate its growth. In accordance with opinion Revi et al. (2013) stated that fish can grow with good if intake the nutrients sufficient, especially protein requirements. Protein content in feed effect on height low fish growth, because protein functions shape network new for growth and maintenance her body. If protein content in feed too high, then only some will absorbed and used for shape or repair cells broken body, temporarily the rest will changed Becomes energy .

Carbohydrates can also support fish growth, even though fish needs very small carbohydrates. The ability of fish in utilise carbohydrate depending on the type and ability of the fish in produce enzyme amylase for synthesize carbohydrates (Danu et al., 2015). The fat contained in feed can also support fish growth. This thing in accordance with Perdana et al. (2016) which states that, the fat contained in feed could provide energy for maintenance fish body so part large amount of protein consumed could use for growth, energy contained in feed originating from non-protein can influence amount of protein used in growth, if feed originating from nonprotein then part big fat content in feed given only enough for maintenance body and replace damaged cells.

According to Amarwati et al. (2015) stated that leaf cassava havend content fiber rough enough high. one effort for lower content fiber Rough that is with fermentation. Fermentation flour leaf cassava this could increase quality nutrition with lower fiber rough and increase the BETN in fish feed that affects the rate of growth. Fermentation process flour leaf cassava old conducted with help EM4 microbe, Lactobacillus. The bacteria present in EM4 can excrete enzymes capable of

hydrolyze fibers Rough like ordinary cellulase many found in every network plants. Fermentation results from flour leaf cassava old with using 2 ml of EM4 obtained content nutrition fat by 4.39%, protein by 22.01%, and energy 2630.3 kcal /kg (Pawhestri et al., 2020).

#### *Efficiency Freshwater Pomfret Fish Feed*

Well whether or not something quality feed no only seen from score conversion feed, but also can showed from score efficiency feed. Efficiency value feed obtained from results comparison Among increase weight fish body with amount feed consumed by fish during the rearing period. The more big score efficiency feed, meaning the more efficient fish utilize feed consumed for growth (Iskandar and Elrifadah, 2015). Yulisman et al. (2012) stated that protein is macro nutrients that are needed by fish in addition to carbohydrates and fats for support its growth. High and low protein content in feed will influence level growth and efficiency feed consumed by fish. Feed that contains too much protein low or too tall besides could reduce fish growth will also cause feed no efficient so that could increase cost production originating from feed. The more tall feed protein content until limit certain produce growth and efficiency more feed high.

In the P4 treatment the concentration gift flour leaf fermented cassava as much as 30% show score efficiency feed highest compared with treatment other. height score percentage efficiency feed on feed P4 treatment was influenced by the height of protein content in feed that. As already is known previously that protein content in feed could influence level efficiency and effectiveness utilization feed. This thing in accordance with statement Radona et al. (2017) which states that efficiency feed influenced by the protein content present in feed.

Temporary that even though in the treatment P0, P1, P2, P3, P5, P6 and P7 were added flour leaf fermented cassava, however score efficiency the feed more low than P4. This thing caused by the addition of flour leaf fermented cassava below 30% which results in imbalance and lack composition free amino acids in feed that can absorbed so that influence Freshwater Pomfret growt. However, if addition flour leaf fermented cassava above 30% can also cause score efficiency low feed because excess protein. When the protein in feed too much, the fish will experiencing excessive protein syndrome', so that the protein no used for growth of fish, but will throw away in form of ammonia (Haetami, 2012).

#### *Freshwater Pomfret Rearing Water Quality*

Water quality is appropriateness waters for support the life and growth of fish are determined by factors

water physics and chemistry. Water quality must pay attention so that the fish can grow and develop optimally. Water quality is considered important that is temperature, pH, and ammonia (Wijanarko, 2002). Observed and measured environmental parameters in study this cover water temperature and pH. These two parameters chosen because during this considered as enough factor take effect to continuity fish life and growth. Very volatile water temperature and pH with enough range big often easy cause disturbance for fish, even could cause fish mortality, especially in the early days its growth. Besides it's a metabolic process. The body is strongly influenced by the temperature and pH of the water (Budiharjo, 2003).

According to Arianto et al. (2019) range optimal temperature for Freshwater Pomfret between 29-32°C. Freshwater Pomfret Growth will far reduce if water temperature drop below 25°C. Water temperature greatly affects rate growth, rate fish metabolism and appetite eat fish too solubility oxygen in water. Then, can is known that h result measurement temperature obtained from study this could said in optimal and good range for Freshwater Pomfret Growth.

Factor Water quality also matters to Freshwater Pomfret Growth is degrees acidity (pH) of water. Freshwater Pomfret could grow with well in the pH range of 6-8. Fluctuations in the pH of the waters are one of them influenced by the amount dirt in the environment waters, especially those from from remainder feed and yield metabolism pH too low (state acid) can cause lust eating fish decreases. This thing caused because activity and production enzyme digestion decrease, occur clumping mucus on the gills, as well as could cause fish to die weak because difficulty take oxygen in water (Santoso and Agusmansyah, 2011). Based on this the result showed that pH measurement obtained from study this could said in optimal and good range for Freshwater Pomfret Growth with range pH value 7.7-7.9.

## **Conclusion**

Based on the research results obtained, it can be concluded that p flour leaf fermented cassava as fish feed effect to rate growth weight and efficiency feed Freshwater Pomfret, as well as giving flour leaf fermented cassava as much as 30% is the most optimal concentration for rate growth weight and efficiency feed Freshwater Pomfret. For measurement result maintenance water quality Freshwater Pomfret, it can be seen that the quality of the water in optimal range for growth and survival Fresh Water Pomfret with pH range 6-9 and temperature 28-32 0 C.

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