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THE EFFECT OF ADDING *Kaempferia galanga* ON DIFFERENT DOSAGES OF ARTIFICIAL FEED ON THE GROWTH OF MILK FISH SEED (*Chanos chanos*)

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Abstract

This research was carried out from 25th October to 5th December 2021 at the Brackish and Marine Water Laboratory, Faculty of Fisheries, Pekalongan University. The purpose of this study was to determine the effect of adding kencur (*Kaemferiagalanga*) to feed on milkfish growth. The study used laboratory experimental methods with 4 treatments and 3 replications. The treatments used were A (0% or feed without kencur), B (2% kencur powder/100g feed), C (4% kencur powder/100g feed) and D (6% kencur powder/100g feed). The results showed that treatment B gave the highest growth yield of 8.59g, followed by treatment C 4.95g, treatment D 3.78g and the lowest was treatment A, namely 3.78g. After analyzing the variance, the results of the F count are greater than the F table, which means that the addition of kencur to feed has an effect on the growth of milkfish. Survival rate of fish during treatment for all treatments was 100%. The water quality during the study was still within a reasonable range, namely temperature 28 -30 C, salinity 18-20 ppt, pH 7.5-7.9 and DO 4.6 - 5 ppm.

Keyword: *Milkfsih, Kaempferia galanga, Growth*

INTRODUCTION

Milkfish (*Chanos chanos*) is one of the export commodities known as milkfish. This fish has the characteristics of a slender body, branched fins and agile in the water, has scales like glass and white flesh. Milkfish has a unique, toothless mouth and its food is seabed plants. In addition, the length of the milkfish intestine is 9 times the body length (Murtidjo, 2002). This kind of fish are able to adapt to environmental changes such as temperature, pH, and water turbidity, and are resistant to disease (Ghufron and Kordi 1997). Moreover milkfish has a protein content of 20.38% so it is good as a source of fulfill the body's protein needs. The coastal community recognizes milkfish as a source of protein that has a fairly high nutritional value and low cholesterol level.

The problems encountered in milkfish cultivation are the high price of feed, and the use of feed that has not been maximized. The need for efficiency efforts in feed, can be done by adding natural supplements to fish pellets for milkfish cultivation. Adding herbal or natural supplements mixed with artificial feed could trigger fish growth and reduce mortality (Henny *et al.*, 2020). One of the natural ingredients that can be used is kencur (*Kaempferiagalanga*) or KG. This plant contains flavonoids, saponins, polyphenolic compounds and essential oils (Gholib, 2009). These ingredients has a positive effect on the growth and health of fish. Flavonoids has function as anti-oxidants that protect fish from disease or poor water quality. Essential oils are also able to increase fish appetite so that it affects growth. This is in accordance with the opinion of Muhlisah (1999) explaining that drugs containing saponins, flavonoids, and essential oils can be used to increase appetite so that it affects growth.

The purpose of this study was to determine the effect of adding KG to feed on milkfish growth and to determine the best dose to be used in feed. The results of this study are expected to provide information on the use of KG in milkfish cultivation widely.

Materials and methods

Time and place

This research was carried out from 25th October to 5th December 2021 in the brackish and marine water laboratory of the Faculty of Fisheries, Pekalongan University. The method used is the experimental laboratory method with the experimental design is a completely randomized design consisting of 4 treatments and 5 replications. The treatments used are as follows:

Treatment A = control or without the addition of KG to the feed

Treatment B = 2% KG powder in 100 grams of feed

Treatment C = 4% KG powder in 100 grams of feed

Treatment D = 6% KG powder in 100 g of feed.

The treatment dose was based on the results of research by Anggraeni *et al.*, (2018) which stated that 4% KG was the best dose in anesthesia for red tilapia (*Oreochromis niloticus*) which was transported for 120 minutes.

Research Procedures

Containers Preparation

Preparation of research containers by cleaning 12 plastic jars with a diameter of 35 cm jars with a capacity of 10 L. Each jar was cleaned first and then filled with water to 80% or 20-25 cm.

Fish Preparation

The test fish used for the study were milkfish, with a density of 1 fish/L. Milkfish seeds were previously adapted to the feed to be given. And adapted to the environmental conditions of the media for 3 days.

Feeding and Addition of KG Powder

The KG or kencur powder is dissolved first, then sprayed onto the feed with a spray bottle until evenly distributed. The feed is then aerated to dry, then given to milkfish fry. Feeding was carried out 3 times a day during the study.

Test Parameters

Growth

Growth observations were carried out at the end of rearing by observing the difference in total body weight of fish at the end of rearing and early rearing. According to Effendi (1997), absolute biomass growth can be expressed by the formula

$$Wm = Wt - Wo$$

Information:
Wm = absolute biomass growth of milkfish (grams)
Wt = Weight of milkfish at the end of the study (grams)
Wo = Weight of milkfish at the beginning of the study (grams)

Survival rate

Survival rate (SR) was calculated by calculating the total number of fish that lived at the end of the treatment using the Effendi (1997) formula:

$$SR = (Nt/N0) \times 100\%$$

Information:
SR = Survival (%)
Nt = Number of live fish at the end of rearing
N0 = Number of fish at the beginning of maintenance

Glucose Test

Blood glucose was quantified by cutting the caudal of fish to obtain the drop of bresh blood. Then the following step was was touched fresh blood with glucose strip inserted in a standard glucometer.

Data analysis

Hypothesis

H0 : The addition of KG powder with different doses to artificial feed is thought to have no effect on the growth of milkfish fry.

H1 : The addition of KG powder with different doses to artificial feed is thought to affect the growth of milkfish fry.

To answer the hypothesis that has been proposed, data analysis based on analysis of variance (ANOVA) was carried out. If the results show a significant effect on growth. the following test was Tukey Test to determine the differences between treatments. Data of blood glucose levels, survival rate and supporting water quality will be analyzed descriptively

Results and Discussion

Based on the data obtained, it shows that the best growth in treatment B is 8.59 g, which then decreases in treatment C 4.95g and treatment D 3.78g. While the lowest growth is shown in treatment A 3.26. The results of data analysis show f count > f table with 95% confidence range. This shows that the addition of KG to feed has a significant effect on growth. The increase in growth could be due to the addition of KG which is containing active ingredients such as flavonoids, alkaloids, essential oils and saponins. Significant result could be seen in treatments B, C and D which were able to make a positive contribution to the growth of milkfish.

The presence of flavonoids as antioxidants could provide cell protection from pathogen and has important role on the formation of new cells. This is in accordance with Sianturi *et el.,* (2013) stated that antioxidants function to neutralize harmful free radicals and improve the structure of red blood cells. The formation of new cells in the body will support the increase in the value of growth. The role of essential oils is as an anti-stress for fish. Essential oils have a function as a sedative due to the presence of turpentine in it. Ade *et al.,* (2017) mentioned that the sedative effect of essential oils could provide calm to fish. The calm condition of the fish will help the physiological process to remain good so that its help growth increases. Essential oils are also able to optimize feed digestibility by fish. Mia *et al., (*2014) stated that essential oils could improve the balance of nutrients and energy which is important for feed digestibility. Furthermore, the content of saponins helps growth because it can improve the appetite of fish. According to Henni *et al.,* (2008) mentioned that vitamin C, antibacterial and saponins has positif impact to increase appetite so that fish growth is better. Treatment A without the addition of KG showed a lowest value because there were no active ingredients in the form of flavonoids, saponins and essential oils that helped improve the internal condition of the fish..

Table 1. Growth of milkfish

	Treatments			
	A	B	C	D
1	3,38	8,56	5,16	3,53
2	3,27	8,71	4,69	3,92
3	3,15	8,5	5,02	3,89
Total	9,8	25,77	14,87	11,34
Average	**3,26**	**8,59**	**4,95**	**3,78**

The decrease in growth that occurred in treatments C and D when compared to treatment B could be caused by the higher content of flavonoids and saponins along with the increasing dose of KG. The presence of flavonoids and alkaloids as antibacterial could reduce of population of bacteria and protect cells from disease. However, if the level is too high, it will become a dangerous substance because it brings cell damage so that it affects to growth. This is in accordance with the opinion of Mukti *et al.,* (2012) that at certain levels alkaloid and flavonoid compounds would be toxic and cause death of organism. Flavonoids can be stomach poison which cause disruption of the digestive system. Rita *et al.,* (2008) stated that flavonoids under certain conditions have adverse effects due to disruption of taste receptors in the mouth of the larvae so that the larvae die of starvation….

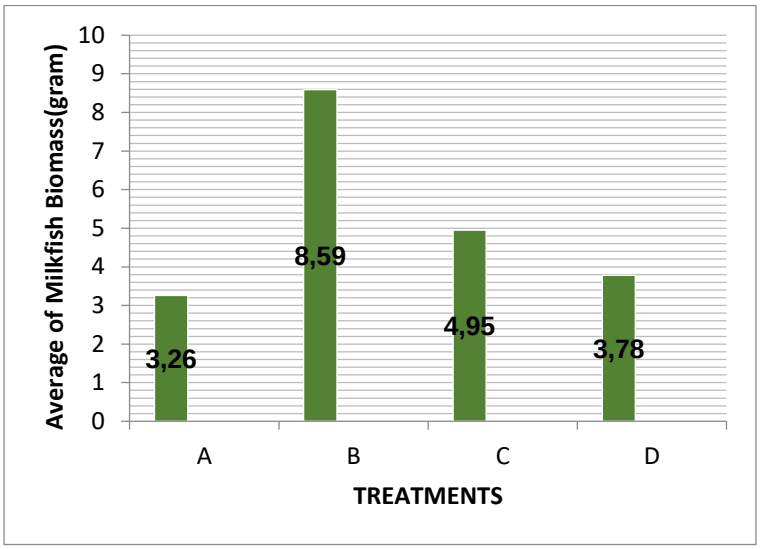

Figure 1. Growth of Milk Fish

Blood Glucose Level

Based on the data obtained, there was an increase in blood glucose levels of milkfish in accordance with the increase in the KG dose according to the treatment. The blood glucose level is still within normal limits but there is a significant increase indicating a physiological change in the fish's body. Blood glucose is a source of energy for cell metabolism in the body, especially the brain. According to Patrice (2009) normal blood glucose for fish ranges from 40-90 mg/dl. In treatment A, blood glucose was 36 mg/dl. Followed by treatment B 47 mg/dl, Treatment C 58 mg/dl and continued to rise to 72 mg/dl. The increase in blood glucose can be caused by increasing the dose of KG in the feed. The active ingredients contained in KG such as flavonoids, saponins can cause a stress response in fish that triggers an increase in glucose. Zahrotun *et al* (2016) stated that when fish are stressed, the body will release ketocholamines hormon which suppress insulin hormone, causing blood sugar levels to increase.

Survival rate

Data of survival rate on fish showed results of 100% or no mortality until the end of the study. This proves that giving KG to the feed does not affect the survival of milkfish. The survival of fish can be influenced by internal and external factors during the maintenance period. Factors from within the fish body can be in the form of fish seed quality while external factors are water and feed quality. During maintenance, the feed provided has met the required quality and quantity so that it affects the fish's body resistance. Water quality during maintenance which is in a good range supports a high survival rate. This is in line with the opinion of Prasetyo *et.al.,(*2018) that the quality and quantity of feed and good environmental conditions greatly affect the survival rate.

Table 2. Data of Survival Rate (SR)

	TREATMENTS			
	A	B	C	D
1	4	4	4	4
2	4	4	4	4
3	4	4	4	4
TOTAL	12	12	12	12
SR	100%	100%	100%	100%

Water Quality

Water quality during maintenance is still in the optimal range for growth. The temperature during the study was obtained 28 – 30ºC which was still feasible for growth. According to Effendi (2003) stated that a temperature of 27 – 30ºC is a good temperature for fish growth. Salinity is a parameter that affects osmoregulation so that it can cause mortality if it is not in accordance with the physiological conditions of fish. During the study, the salinity value was 28-30 ppt which was in accordance with Poernomo (1988) mentioned that good salinity in milkfish ranged from 26-30 ppt. A good pH value for fish cultivation was also obtained during the study, namely 7.5-7.8. The DO value during the maintenance process is still sufficient to meet the oxygen needs of fish, which is 4.5 to 5 ppm. According to SNI 01.6148.1999, the DO value is at least 3 ppm for milkfish cultivation.

Conclusion

The results of the research for 30 days provide the following conclusions:

1. The addition of KG (*Kaempferia galannga*) to artificial feed has an significant effect on the growth of milkfish
2. The best dose of KG addition is 2% / 100 g of artificial feed which achieves a growth of 8.59 g
3. Water quality during the study was in optimal conditions for milkfish rearing.

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