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The Effect Of Adding Natural Ingredients To Artificial Feeding On The Level Of Color Brightness Of Carp (Cyprinus carpio Linn)

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ABSTRACT

The Effect of Adding Natural Ingredients to Artificial Feed on the Color Brightness Level of Goldfish (Cyprinus carpio Linn). This research aims to determine the effect of adding natural ingredients to artificial feed on the level of color brightness of goldfish (Cyprinus carpio Linn), and the growth rate and survival rate of the test fish. The method used in this research is an experimental method using a Completely Randomized Design (CRD) consisting of 4 treatments and 3 replications with a feeding frequency of three times per day with a percentage of 5% of the body weight of the test fish, a natural ingredient used in making artificial feed. These are pumpkin flour (Cucurbita moschata), mangosteen rind flour (Garcinia mangostana L), and carrot flour (Daucus carota L) with the same dose in each treatment, namely 25% of 1 kg of feed. Based on the results of variance analysis, the brightness level of goldfish color has a very real influence. The highest increase in the color of the test fish was obtained in treatment A, pumpkin flour, amounting to (1.37) on the Toca color finder scale (from pale orange to dark orange), followed by the second highest in treatment C, carrot flour, amounting to (1.2), treatment B flour. Mangosteen peel was in third position with an increase in color of (0.94) and the lowest increase in color change occurred in treatment D (control = without the addition of natural ingredients) of 0.7. However, absolute weight and length growth did not have a real influence. The overall graduation rate is 87.49%. The average water quality parameters are temperature 26-29oC, pH 7.5-7.9 and ammonia 0.25 ppm.

Keywords: Color Brightness, Growth, Viability, Yellow Pumpkin, Mangosteen Skin, Carrots.

I. INTRODUCTION

The increasing population in Indonesia causes the level of food consumption needs to increase, one of which is the need for protein. Protein can be obtained from various sources, one of which is fish. Fish cultivation businesses have developed a lot in Indonesia recently, one of which is the goldfish cultivation business.

Carp (Cyprinus carpio Linn) is one type of freshwater cultured fish that is most widely cultivated by farmers, both in hatchery cultivation and grow-out in yard ponds or running water. Goldfish production can reach an average above other consumption fish. Among farmers and the public, goldfish have long been known and liked so marketing them is not that difficult.Goldfish are currently the freshwater fish with the highest production and have been cultivated commercially in all provinces in Indonesia (Pudjirahaju, 2008). This fish has a very high tolerance for the surrounding environment (Silaban et al., 2012).

Interest in consumption goldfish is increasing, therefore there is a need for innovation in an effort to increase the brightness of the color, thereby increasing buyers' interest in consumption goldfish. In general, Batak tribal people use goldfish as food in traditional events. Therefore, the goldfish used must have a bright color (not pale). In terms of administering carotenoids, namely active substances contained in natural ingredients such as carrots, pumpkin and mangosteen peel, they function as color brightening agents, which can be applied to goldfish for consumption. The yellowish red or orange color commonly found in goldfish for consumption is formed due to the pigmentation ability of carotenoid substances. Carotenoids are a group of yellow, orange or red

pigments that are soluble in the form of fat or organic solvents, but not in water (Subamia et al., 2010). Carotene, which is a source of pigment that is absorbed by fish, is then partially stored in the liver as a precursor to vitamin A, the rest is channeled to fat tissue for color needs (chromatophores) found in the dermis (Jannah et al., 2016). From the results of observations in the field, it was found that there is a tendency for consumers to buy goldfish, as household consumers of goldfish have a brighter golden color.

Optimal sources of carotenoids can be found in carrot flour (Pardosi et al., 2014), pumpkin flour (Nazhirah et al., 2017). Yellow pumpkin (Cucurbita moscahata Durch), is a type of fruit vegetable that has high shelf life and is a source of vitamin A because apart from being rich in carotene, pumpkin is also rich in carbohydrates, protein, minerals and vitamins. The carotenoid content found in pumpkin fruit is 180.00 SI (Lestari, 2011). And also mangosteen rind flour (Garcinia mangostana L). It is a carotene-producing ingredient which can beautify the color of goldfish consumed. The skin of the mangosteen fruit is rich in anthocyanins which give it natural colors such as red, purple and blue (Indra, 2009).

Based on the above, the author is interested in conducting research using substitute raw materials for yellow pumpkin flour (Cucurbita moschata Durch), mangosteen rind flour (Garcinia mangostana L), and carrots (Daucus carota L) in artificial feed on brightness levels. goldfish color (Cyprinus carpio Linn), for the sake of sustainability of the goldfish cultivation business, especially to minimize feed prices and utilize local raw materials available around us.

II. LITERATURE REVIEW

1. Classification of Goldfish

Introduction to the biology of goldfish (Cyprinus carpio Linn) is important for the success and sustainability of intensive cultivation efforts. Understanding the systematics and morphology of goldfish, types and habitat, behavior and eating habits and growth of goldfish (Rukmana, 2003).

According to Amri and Khairuman (2002), goldfish can be classified as follows:

Phylum: Chordata
Subphylum: Vertebrates
Superclass: Pisces
Class: Osteichthyes
Subclass: Actinopterygii
Order: Cypriniformes
Suborder: Cyprinoidae
Family: Cyprinidae
Genus: Cyprinus
Species: Cyprinus carpio Linn

2.2 Goldfish Morphology

Goldfish (Cyprinus carpio Linn) historically originate from mainland China and Russia.The body shape of goldfish is slightly elongated and flattened upright (compressed). The mouth can be disassembled (protactile) and is at the end of the middle (terminal). The anterior part of the mouth has two pairs (4) of barbels or whiskers whose function is as a touch tool. Sometimes it also has a pair of antennae (rudimentir). The pharyngeal teeth consist of three rows of molar teeth (Kordi, 2013).

Furthermore, Kordi (2013) also explained that in general, almost the entire body of goldfish is covered by scales. Only a small part of its body is not covered by scales. Carp scales are relatively large in size and are classified as type scales (cycloid). Apart from that, the goldfish's body is also equipped with fins. The dorsal (dorsal) fin is quite long with the back part having hard

rays, and the last fin, namely the third and fourth fins, is serrated. This dorsal fin has 4 hard rays and 16-18 soft rays.

2.3. Fish HabitatSir

Goldfish like living places (habitats) in fresh waters where the water is not too deep and the flow is not too fast, such as on the edge of rivers or lakes. Goldfish can live well in areas with an altitude of 150 - 600 m above sea level (asl) and at a temperature of 25-30 °C. The pH of the water is between 7-8. Even though they are classified as freshwater fish, goldfish are sometimes found in brackish waters or river estuaries with a salinity of 25-30% (Suseno, 1999).

Mout

2.4.Eating Habits of Goldfish

In general, after the age of 5 days, goldfish eat microorganisms in the form of plankton. Goldfish larvae eat vegetable plankton measuring 100-300 microns. At the age of 5 days, the size of the larvae reaches 6 mm–7 mm. At the age of 1 month, the normal size of larvae reaches 25 mm-30 mm and the size of organisms that can be swallowed ranges from 0.5 mm-2.0 mm. Even though goldfish like natural food in the form of plankton, this habit changes gradually in line with their development and growth. Goldfish are known as omnivorous aquatic animals. Adult goldfish are relatively greedy in swallowing all types of natural or artificial food (Santoso, 1993).

2.5. Fish Growth

Growth is defined as an increase in the weight, size or volume of a living animal over a period of time (Effendi, 2002). Growth is an important factor in the life of living creatures on earth. In general, growth is categorized as the identity of an organism that can live for a certain time. This is in line with the statement of Handajani and Widodo (2010) who argue that growth is an increase in volume and weight over a certain time.

There are several indicators that have an influence on growth according to Effendi (1997), namely the amount and size of food, temperature, dissolved oxygen, water quality, age, oxygen size and gonad maturity. Young fish have the potential to grow faster than older fish. Regarding fish growth, there are several influencing factors. Factors that influence fish growth consist of external and internal factors. Some of these factors can be controlled and some cannot. Internal factors are generally factors that are difficult to control, including heredity, sex, age, parasites and disease. The main external factors influencing growth are food and water temperature (Effendie, 1997).

2.6. Life Graduation

Survival is the ability of an organism to survive from the start of stocking until a certain time limit. The life expectancy of goldfish is relatively large. This is due to the biological characteristics of goldfish which have tolerance to water quality and high adaptability. The ability of goldfish when water quality is poor does not immediately experience stress. Goldfish can adapt to changes in water quality.

Success in seed maintenance is high survival. The low survival rate is caused by several factors, namely inappropriate feed at the growth stage, disease attacks and poor water quality. However, if the water quality is not immediately improved to normal, then these fish will be susceptible to bacterial, fungal and protozoan infections. . This disease can cause death to fish, and can spread from one to another quickly. So mass deaths can also occur. The size of the fish itself determines its survival.

Survival rate (SR)Test fish survival rate is comparing the number of test fish that are alive at the end of the study with the number of test fish that are alive at the end of the study
test fish stocked at the start of the study(Zonneveld et al., 1991)

2.7. Water quality

a) Temperature

Goldfish are cold-blooded animals, so their body temperature depends on the temperature of the water in their living environment. Goldfish can live in the temperature range of 30-35oC, but at temperatures that are too extreme (for example 0oC) the fish will stop eating and their immune system will disappear. Meanwhile, the ideal temperature for goldfish is 15-20oC (Hikmat, 2002). Changes in temperature that are too drastic can cause disruption to the respiration rate, heart activity, metabolic activity and other activity disorders and if the temperature is too high the fish will lack oxygen and enzyme systems. not functioning properly which can cause stress (Afrianto and Liviawaty, 1992).

b) Degree of Acidity (pH)

Most fish can adapt well to aquatic environments that have an acidity degree (pH) ranging from 5-9. The ideal pH for goldfish to grow healthily is around 6.5-8.5. At night the biota in the water will respire and produce carbon dioxide (CO2) which can lower the pH, while during the day the algae will carry out photosynthesis which will produce oxygen and neutralize the pH, therefore the pH of the water in the morning tends to be low while in the afternoon The pH of water tends to be slightly stable. (Wisdom, 2001).

c) Dissolved Oxygen (DO)

Oxygen is one of the important limiting factors in fish farming. A good oxygen content for goldfish is around 5-7 ppm, in this condition the goldfish will feel they are getting enough oxygen so that the goldfish can move relaxedly, not be restless and responsive to food. If the oxygen is less than 5 ppm, it will cause the fish to have difficulty breathing, not want to eat and cause the goldfish to become thin and sick (Amri and Khairuman, 2002).

2.8. Yellow Pumpkin (Cucurbita moschata Durch)

According to Santoso (2013) tThe pumpkin plant is in the Cucurbitaceae family which has the following taxonomy:

Kingdom: *Plantae*
Sub kingdoms: *Tracheobionta*
Superdivisio : *Spermatophyta*
Division : *Magnoliophyta*
Class : *Magnoliopsida*
Subclasses: *Dilleniidae*
Order: *Violales*
Family: *Cucurbitacea*
Genus: *Cucurbita*
Species: *Cucurbita Moschata*Durch

The plant (Cucurbita moschata Durch) has a single leaf, the shape of the leaf is round, the edge of the leaf is wavy while the base of the leaf is rounded and hairy. The leaves are 7-35 cm long with a width of 6-30 cm. This plant has pinnate leaf spines and is green in color. Cucurbita moschata Durch flowers are yellow, funnel-shaped while the petals are bell-shaped. The fruit of Cucurbita moschata Durch is round, has light yellow flesh, and the seeds are flat, hard, approximately 1.5 cm long, approximately 0.5 cm wide and milky white in color (Anonymous, 2010).

Research using pumpkin fruit flour in artificial feed for fish has been carried out previously. Based on research conducted by Ibnu et al., (2015), the addition of 10% yellow pumpkin flour to feed has complete nutritional content, so yellow pumpkin flour can produce the best orange color

on the back, head and tail of Kaya goldfish as an alternative. as an additional ingredient in making ornamental fish food.

2.9. Effect of Carotenoids

According to Kusuma (2012), color is an indicator of beauty in ornamental fish, and the brighter the color of the fish, the more attractive it will be and the selling price will be higher. Because the color of fish is caused by the presence of pigment cells or chromatophores found in the dermis of the scales, outside or under the scales.

Amin et al. (2012) explained that aquatic animals cannot synthesize carotenoids in their bodies and therefore must obtain color pigments from food. Feeding containing supplements needs to be done in order to improve and improve color quality. Color changes in fish are caused by environmental stress, such as lack of sunlight, poor water quality and color pigment content in feed (Sholichin, 2012).

By maintaining and improving the quality of fish color, one way is by providing food that contains a source of carotenoids (Gouveia, 2003). Carotenoids in the body cause brightness on the fish's skin on the outside which makes the fish attractive and beautiful (Toyomizu, 2001).

In previous research, research was conducted on the use of sweet potato extract (Ipomoea batatas var Ayumuraki) in artificial feed on body color performance, growth and survival of rainbow fish (Melanotaenia praecox) with the best dose, namely 200 mg/kg, giving a difference in brightness value of 17.93. ± 0.92 (Yaeni, 2017).

III. RESEARCH METHODOLOGY

This research was carried out in November - December2022 at CV. Our Fish House is located at Jl. Rawe 1 Ward 12 Kel. Big Gg. Intact – Martubung.

The method used in conducting this research was an experimental method, namely by conducting direct observations of the effectiveness of the effect of adding natural ingredients to artificial feed on the brightness level of color of goldfish (Cyprinus carpio Linn).

IV. RESULTS AND DISCUSSION

1. Brightness of Goldfish Color (Cyprinus carpio Linn)

From the results obtained during research, the effect of adding natural ingredients to artificial feed on the color brightness level of manfish (Cyprinus carpio Linn) can be seen in table 4.

Table 4. Results of Increasing Fish Color During the Research.

Treatment	Beginning	End	Relative Brightness Results
A	17.5	18.87	1.37
B	17.66	18.6	0.94
C	17.33	18.53	1,2
D	17.66	16.96	0.7

In the table above it can be concluded that the increase in goldfish color during the research resulted in results, treatment A in the form of pumpkin flour gave an increase in the level of brightness which was initially 17.5 to 18.87 so that an additional result of 1.37 was obtained, treatment B in the form of flour Mangosteen rind provides an increase in brightness level which was initially 17.66 to 18.6 so that the addition result was 0.94, treatment C in the form of carrot

flour gave an increase in brightness level which was initially 17.33 to 18.53 so the addition result was obtained amounting to 1.2, treatment D in the form of control gave a decrease in the brightness level from initially 17.66 to 16.96, resulting in a decrease of 0.7.

The table above shows that the highest increase in the color of the test fish was obtained in treatment A with pumpkin flour at (1.37) on the Toca color finder scale (from pale orange to dark orange) followed by the second highest in treatment C with carrot flour at (1.2) treatment B mangosteen rind flour was in third position with an increase in color of (0.94) and the lowest increase in color change occurred in treatment D (control = without the addition of natural ingredients) of 0.7. Presented in the form of a bar diagram of color brightness, it can be seen in Figure 5.

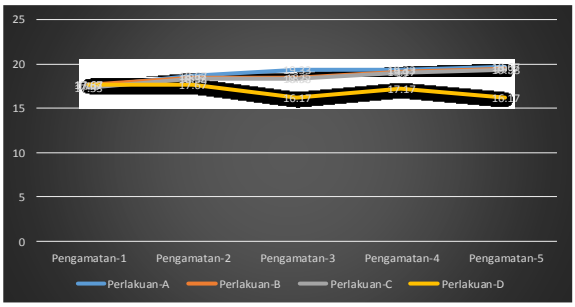

Figure 5. Increase in fish color brightness

The image of the increase in color brightness above shows the increase in the color of the test fish during the research, the research was held for 30 days or 4 weeks and during the research the test fish were measured 5 times, where the first measurement was carried out at the beginning of the research or before the fish entered the research container to obtain initial color of the test fish, the second measurement was carried out 7 days after the first measurement to determine the increase in color in the test fish, the third measurement was carried out 14 days after the first measurement to determine the increase in color of the test fish in the second week, the fourth measurement was carried out 21 days after the first measurement To determine the increase in color in the third week, the fifth measurement is carried out 28 days after the first measurement to determine the increase or decrease in the fourth week.

In measuring the color quality of the test fish, it was measured using the Toca Color Finder (TCF), a color measuring tool to make it more subjective and also to provide 10 people as panelists who were not color blind to avoid bias so that the measurement results could be maximized. In one measurement of the test fish, 2 samples of test fish were taken to measure the color changes in the test fish. The results of the research on the effect of adding natural ingredients to artificial feed on the color brightness level of goldfish can be seen in table 5.

Table 5. Observation Results of Color Brightness of Test Fish

Test	Treatment				Amount
	A	B	C	D	
1	18.6	18.8	18.4	15.9	71.7
2	19.1	18.7	18.8	17.4	74
3	18.9	18.3	18.4	17.6	73.2
Amount	56.6	55.8	55.6	50.9	218.9
Average	18.87	18.6	18.53	16.96	72.95

The results of increasing the brightness of goldfish's body color during research on the addition of natural ingredients to artificial feed on the level of color brightness of goldfish, natural ingredients used in treatment A, yellow pumpkin flour (Cucurbita moschata), treatment B, mangosteen fruit flour (Garcinia mangostanaL), and treatment C Carrot flour (Daucus carota L),

showed that there was an increase in color in goldfish as test fish, the increase occurred in the first week until the end of the study.

From the results of the recapitulation of fish color data during the research using the sampling method, the data was then analyzed using variance analysis. The data analyzed was data resulting from the highest number of goldfish (Cyprinus carpio) color increases. Analysis of variance of the research data was based on a completely randomized design additive linear model (table 5).

From the results of variance analysis, homogeneity tests using the Barlett method, and additive tests, it shows that the most observed data on the increase in color of the test fish can be seen in (table 6).

Table 6. Calculation of Bartlet's Test for Homogeneity and Diversity of Fish Color Observation Data During Research

Treatment (i)	DB (ri-1)	$\frac{1}{(ri-1}$	JK	Si2= JK 1 / db i	Logs Si2	(ri-1) Log Si2
A	2	0.5	0.11	0.055	-1.25964	-2.5192746
B	2	0.5	0.13	0.065	-1.18709	-2.3741733
C	2	0.5	0.14	0.07	-1.1549	-2.3098039
D	2	0.5	1.73	0.865	-0.06298	-0.1259678
Amount	8	2	2.11	1,055	-3.6646	-7.3292196

The variance is homogeneous and additive so that the data meets the assumption requirements for analysis of variance. To test the ANOVA, the JK (sum of squares) values are entered into the variance model table for the random design. After the values, the KT price can be found by dividing JK respectively by db which can be seen in (table 7).

Table 7. Analysis of Variance on Observation Data

Sources of variance	Db	JK	KT	Fh	Ft	
					0.05	0.01
Average	1	3,993.10	3,993.10	-	-	-
Treatment	3	6.69	2.23	8.57**)	4.07	7.59
Error	8	2.1	0.26	-	-	-
Total	12	4,001.89	-			

*Description **)=Highly significant*

From the results of the analysis of variance (ANOVA) that was carried out, the results were: Fh 8.57 > Ft (0.01) 7.59. This means that the addition of natural ingredients to artificial feed has a very real (significant) effect on the level of color brightness of goldfish. (Cyprinus carpio Linn). So H0 is rejected and Hα is accepted

Thus, H0 is rejected and Hα is accepted, so the conclusion is drawn that the addition of natural ingredients to artificial feed has a very significant effect on the level of color brightness of goldfish (Cyprinus carpio Linn).

Based on the results of the analysis, it can be seen that making artificial feed with natural ingredients can have a very real (significant) influence on the color brightness level of goldfish (Cyprinus carpio Linn). In treatment A, pumpkin flour produces a higher level of color brightness due to the very high carotene content in pumpkin fruit, namely 18,000 SI (Lestari 2011). Compared

to other natural ingredients, treatment C carrot flour produces the second highest level of color brightness after pumpkin flour because carrots contain 12,000 SI of β-carotene (Rukmana, 1995). And treatment B, mangosteen rind flour produced the third highest level of color brightness after treatments A and C due to the β-carotene content, 0.00000009 SI mg in mangosteen rind, which was the lowest compared to pumpkin and carrots. Meanwhile, the D = Control treatment experienced a decrease in the color brightness level of the test fish because the process of making artificial feed was not provided with natural ingredients which function to increase the color brightness of goldfish (Cyprinus carpio Linn).

According to Kusuma (2012), color is an indicator of beauty in ornamental fish, and the brighter the color of the fish, the more attractive it will be and the selling price will be higher. Because the color of fish is caused by the presence of pigment cells or chromatophores found in the dermis of the scales, outside or under the scales.

Amin et al, (2012) explained that aquatic animals cannot synthesize carotenoids in their bodies and therefore must obtain color pigments from food. Feeding containing supplements needs to be done in order to improve and improve color quality. Color changes in fish are caused by environmental stress, such as lack of sunlight, poor water quality and color pigment content in feed (Sholichin 2012).

By maintaining and improving the color quality of fish, one way is by providing food that contains a source of carotenoids (Gouveia (2003). Carotenoids in the body cause brightness on the fish's skin on the outside which makes the fish attractive and beautiful (Toyomizu 2001).

In previous research, research was conducted on the use of sweet potato extract (Ipomoea batatas var Ayumuraki) in artificial feed on body color performance, growth and survival of rainbow fish (Melanotaenia praecox) with the best dose, namely 200 mg/kg, giving a difference in brightness value of 17.93. ± 0.92 (Yaeni, 2017).

2. Growth of Goldfish (Cyprinus carpio Linn)

Growth is defined as an increase in the weight, size or volume of a living animal over a period of time (Effendi, 2002). Growth is an important factor in the life of living creatures on earth. In general, growth is categorized as the identity of an organism that can live for a certain time. This is in line with the statement of Handajani and Widodo (2010) who argue that growth is an increase in volume and weight over a certain time.

A. *Absolute Weight*

From the results of observations made on the development of the absolute weight of the test fish during research on the addition of natural ingredients to artificial feed, it shows that the highest absolute weight growth value was found in treatment D, with an average value of 2.76 grams, with a stocking density of 10 test fish. /10 liters of water. Meanwhile, the lowest absolute weight growth value was found in treatment C, namely with an average value of 1.15 grams, with a test fish stocking density of 10 fish/10 liters of water, the results of the absolute weight growth calculation can be seen in (table 8).

Table 8. Calculation Results of Absolute Weight Growth

Test	Implementation				Amount	Average
	A	B	C	D		
1	1.1	1.1	2.5	3.05	7.75	1.93
2	1.7	0.9	1.05	2.05	5.7	1.42
3	2.9	2.65	1.15	3,2	9.9	2.47
Amount	5.7	4.65	4.7	8.3	23.35	5.83
Average	1.9	1.55	1.56	2.76	7.78	1.94

From the results of the analysis of variance (ANOVA) that was carried out, the results were obtained: Fh 1.64 > Ft (0.05) 4.07
This means that the addition of natural ingredients to artificial feed has no real (non-significant) effect on the weight growth rate of goldfish (Cyprinus carpio Linn).

So H0 is accepted, Hα is rejected. Thus, H0 is accepted, Hα is rejected, then the conclusion is drawn that the addition of natural ingredients to artificial feed does not have a significant effect on the weight growth rate of goldfish (Cyprinus carpio Linn).

B. Long

From the results of measurements carried out on the absolute length development of test fish during research on the addition of natural ingredients to artificial feed, it shows that the highest absolute length development value was found in treatment D, namely with an average value of 1.21 cm with a stocking density of 10 fish/10 test fish. liter of water. Meanwhile, the lowest absolute length development value was found in treatment C, namely with an average value of 0.8 cm with a test fish stocking density of 10 fish/10 liters of water. The results of calculating absolute length development can be seen in (table 9).

Table 9. Length Development Calculation Results

Test	Implementation				Amount	Average
	A	B	C	D		
1	0.45	0.95	1.1	1.25	3.75	0.93
2	1.25	0.8	0.8	0.5	3.35	0.83
3	1.7	1.65	0.5	1.9	5.75	1.43
Amount	3,4	3,4	2,4	3.65	12.85	3.21
Average	1.13	1.13	0.8	1.21	4.27	1.06

Remarks *) = significant

From the results of the analysis of variance (ANOVA) that was carried out, the results were: Fh 2.64 > Ft (0.05) 4.07. This means that the addition of natural ingredients to artificial feed has no real (non-significant) effect on the length growth rate of goldfish (Cyprinus carpio Linn).
So H0 is accepted and Hα is rejected

Thus, H0 is accepted and Hα is rejected, so the conclusion is drawn that the addition of natural ingredients to artificial feed has no real effect on the growth rate of goldfish (Cyprinus carpio Linn) in length. The bar chart of length and weight can be seen in (figure 6)

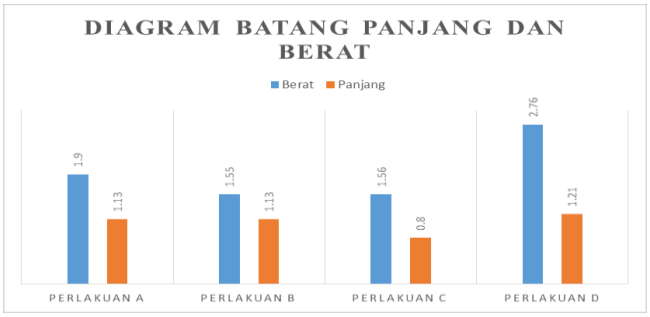

Figure 6. Weight and Length Bar Diagram.

According to Haetami (2007), fish needs for energy are expected to be mostly met by non-protein nutrients such as fat and carbohydrates. If enough energy comes from non-protein nutrients, then most of the protein will be used for the body, but if energy and non-protein nutrients are not met, then protein will be used as an energy source so that the function of protein as a body builder will be reduced. This is also in accordance with the opinion of Frikardo (2009), protein is needed by the body, both for growth and to produce energy, the type and age of fish determines the amount of protein needed. If the protein content in feed is too high, only part will be absorbed

(retained) and used to form or repair damaged body cells, while the rest will be converted into energy (Buwono, 2000).

3. Survival Rate (Survival)

Survival rate (SR)Test fish survival rate is comparing the number of test fish that are alive at the end of the study with the number of test fish that are alive at the end of the study test fish stocked at the start of the study(Zonneveld et al., 1991). The survival rate of test fish during the research can be seen in (table 10).

Table 10. Goldfish survival rate during research

No	Treatment	Life Graduation		Percentage
		Nt	No	
1	A (Pumpkin flour)	30	27	90%
2	B (Mangosteen rind flour)	30	26	86.66%
3	C (Carrot flour)	30	26	86.66%
4	D (Control)	30	26	86.66%
Amount		120	105	87.49

The survival rate (SR) of test fish carried out for 30 days during the research period was 150 from the initial total of 120 with a percentage of 87.49%. The highest survival rate for carp was found in treatment A with a final test fish number of 27 from the initial number of test fish of 30 with a percentage of 90% per treatment, treatments B, C, and D had the lowest survival rate under treatment A with the number At the end of the study there were 26 fish per treatment from the total number at the beginning of the research of 30 with a percentage of 86.66%, treatments B, C, and D had the same survival rate of test fish and also the percentage.

Remarks *) = significant

From the results of the analysis of variance (ANOVA) that was carried out, the results were obtained: Fh -918.667 > Ft (0.05) 4.07. This means that the addition of natural ingredients to artificial feed has no real (non-significant) effect on the goldfish survival rate (Cyprinus carpio Linn).

So H0 is accepted and Hα is rejected

Thus, H0 is accepted and Hα is rejected, so the conclusion is drawn that the addition of natural ingredients to artificial feed has no real effect on the graduation rate (SR) of goldfish (Cyprinus carpio Linn).

4 Water Quality

Measurements of water quality parameters such as temperature and pH are carried out every day, twice a day, namely in the morning and evening, while ammonia measurements are carried out once a week. The results of measuring water quality parameters during the research can be seen in (table 11).

Table 11. Results of Water Quality Parameters.

Treatment	Water Quality Parameter Data		
	Temperature (0C)	pH	Ammonia (ppm)
A	28 – 29	7.6 – 7.8	0 ppm
B	27 - 29	7.7 – 7.8	0.25 ppm
C	28 - 29	7.6 – 7.9	0.25 ppm
D	28 - 29	7.5 – 7.9	0.25 ppm

a) Temperature

Goldfish are cold-blooded animals, so their body temperature depends on the temperature of the water in their living environment. Goldfish can live in the temperature range of 30-35oC, but at temperatures that are too extreme (for example 0oC) the fish will stop eating and their immune system will disappear. Meanwhile, the ideal temperature for goldfish is 15-20oC (Hikmat, 2002). Changes in temperature that are too drastic can cause disruption to the respiration rate, heart activity, metabolic activity and other activity disorders and if the temperature is too high the fish will lack oxygen and enzyme systems. not functioning properly which can cause stress (Afrianto and Liviawaty, 1992).

b) Degree of Acidity (pH)

Most fish can adapt well to aquatic environments that have an acidity degree (pH) ranging from 5-9. The ideal pH for goldfish to grow healthily is around 6.5-8.5. At night the biota in the water will respire and produce carbon dioxide (CO2) which can lower the pH, while during the day the algae will carry out photosynthesis which will produce oxygen and neutralize the pH, therefore the pH of the water in the morning tends to be low while in the afternoon The pH of water tends to be slightly stable. (Wisdom, 2001).

c). Ammonia

The ammonia content produced during the research had the highest ammonia content in treatments B, C and D, namely 0.25 ppm, while the lowest ammonia content was in treatment A, namely 0 ppm. This content is still within the tolerable range for goldfish cultivation. This is in accordance with the opinion of Widiastuti (2009), that the growth of goldfish begins to be disrupted if the water in which they live contains ammonia of 1.2 mg/L. Meanwhile, according to Fazil et al. (2017), the standard value of ammonia permitted in fish farming is 0.5 mg/L. Content

V. CONCLUSION

1. The addition of natural ingredients to artificial feed on the brightness level of goldfish color for 30 days had a very significant effect (highly significant) or had the highest influence on goldfish color in treatment A, namely 1.37.
2. However, from the ANOVA results, the addition of natural ingredients to artificial feed on growth in weight and length showed that it had no real (non-significant) effect.
3. The water quality parameters during the research were temperature 27-29 oC, pH 7.5 – 7.9, with an ammonia content of 0.25 ppm.

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