



## The Effectiveness of the Addition of Red Dragon Fruit Peel Extract on Feed to Enhancement Color Brightness of Clownfish (*Amphiprionpercula*)

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### Abstract

This research aims to obtain the optimum concentration of red dragon fruit peel extract in the artificial feed to improve color enhancement of clownfish (*Amphiprionpercula*). Research preparation of red dragon fruit extraction was carried out on November-December 2019 at Central Laboratory of Universitas Padjadjaran while the main research was carried out for 42 days at the Main Center for Marine Aquaculture, Lampung. The research used Completely Randomized Design (CRD) with five treatments and three replications. The feed used in the treatments were feed with concentration of 0 ppm (treatment A), 200 ppm (treatment B), 300 ppm (treatment C), 400 ppm (treatment D) and 500 ppm (treatment E) of red dragon fruit peel extract. Clownfish (*Amphiprionpercula*) used in this research was  $\pm$  2 months old with length ranging from 2-3 cm while density of fish was kept at 1 fish/1 L (10 fish per aquarium). Brightness level of the fish color was analyzed using non-parametric statistics (Kruskal-Wallis test) while survival rate and water quality was also measured. The results showed that the addition of red dragon fruit peel extract had a significant effect on increasing the brightness of clownfish (*Amphiprionpercula*). The highest level of color brightness was found in the treatment E which was artificial feed enhanced with red dragon fruit peel extract with the concentration of 500 ppm.

Keywords: Red Dragon Fruit Peel Extract, Clownfish, Color Brightness Level

## INTRODUCTION

Clownfish (*Amphiprionpercula*) a member of the Pomacentrida family has the highest percentage in the international ornamental fish trade (IMA 2001). Clownfish (*Amphiprionpercula*) features as interesting appearance which the body is composed of a blend of orange color with black and white stripes. Color itself is an important aspect of the commercial value of most ornamental fish. Sembiring *et al* (2013) states that color is able to be measured as a parameter to determine the value of ornamental fish. Color in fish itself is caused by the presence of pigment or chromatophore cells found in the dermis on the outside and the inside of the scales.

The body color of fish living innatural conditions is normally developed through consumption of natural feed containing carotene. Domesticated fish usually maintain their color by eating artificial feed enhanced with carotene. In general the color of ornamental fish kept in aquariums usually has decreased quality compared to fish in the wild (Novita *et al* 2019). Changes in pigment cell colour is usually caused by stress due to the environment, lack of sunlight, disease, lack of feed and lack of feed components which is able to enhance color (Sholichin 2012). Manipulation to enhance the color brightness of the fish is by giving feed that contains pigment however the effect of / substances or by color supplements may vary due to time of feed, amount, quality and type of substance.

One source of natural coloring pigments is red dragon fruit peel. Red dragon fruit peel contains anthocyanin, which is a group of organic chemical compounds that can dissolve in polar solvents and can give enhancement of the orange, red, purple, blue and black colour. The addition of red dragon fruit peel extract in artificial feed may be a useful effort to increase the color brightness of clownfish (*Amphiprionpercula*). This research aims to obtain the optimum concentration of red dragon fruit peel extract in the artificial feed in order to increase the best color brightness on clownfish (*Amphiprionpercula*).

## METHODS

As much as 150 Clownfish (*Amphiprionpercula*) with the length 2-3 cm were kept in 15 aquariums containing seawater and assigned to its respective treatment. Commercial feed with an addition of the red dragon fruit peel extract was prepared with the addition of the progol binder. The research used Completely Randomized Design (CRD) with five treatments and three replications. The feed used in the treatments were feed with concentration of 0 ppm (treatment A), 200 ppm (treatment B), 300 ppm (treatment C), 400 ppm (treatment D) and 500 ppm (treatment E) of red dragon fruit peel extract. Research preparation of red dragon fruit extraction was carried out on November-December 2019 at Central Laboratory of Universitas Padjadjaran while the main research was carried out for 42 days at the Main Center for Marine Aquaculture, Lampung.

### Color Brightness Level

The observation of clownfish color brightness level was conducted using Modified Toca Color Finder (m-TCF) by 4 panelists who did not have partial or total color blind to avoid bias. Panelist were also hobbyist of ornamental fish. Brightness level of the fish color was measured analyzed using non-parametric statistics with the Kruskal Wallis test (H test):

$$H = \frac{12}{N(N+1)} \sum_{j=1}^k \frac{R_j^2}{N_j} - 3(N+1)$$

Description:

H = Kruskal-Wallis test statistics

$R_j^2$  = Total rank in group j

N = Number of samples

$N_j$  = Number of samples in group j

### Survival Rate

An additional parameter of the clownfish (*Amphiprionpercula*) survival were calculated using the following formula (Effendie 1997):

$$SR = \frac{N_t}{N_0} \times 100\%$$

Description:

SR = Survival of fish during the experiment (%)

$N_t$  = Number of fish at the end of the experiment

$N_0$  = Number of fish at the beginning of the experiment

### Water Quality

Water quality observation parameters conducted in this research include water temperature, dissolved oxygen (DO), pH, salinity, and ammonia (NH<sub>3</sub>).

### Data Analysis

Water quality data were analyzed in a comparative descriptive manner and data on increasing the color brightness of clownfish (*Amphiprionpercula*) were analyzed using the Kruskal-Wallis non-parametric statistical method (H Test) while survival rate was analyzed using of the F tests with a 95% confidence level, and a post-hoc Duncan's multiple range test.

## RESULT AND DISCUSSION

### 1. Color Brightness Level

Based on the results of research that has been carried out for 42 days showed that the treatment of the addition of red dragon fruit peel extract on feed gave an influence on the increase the clownfish (*Amphiprionpercula*) brightness.

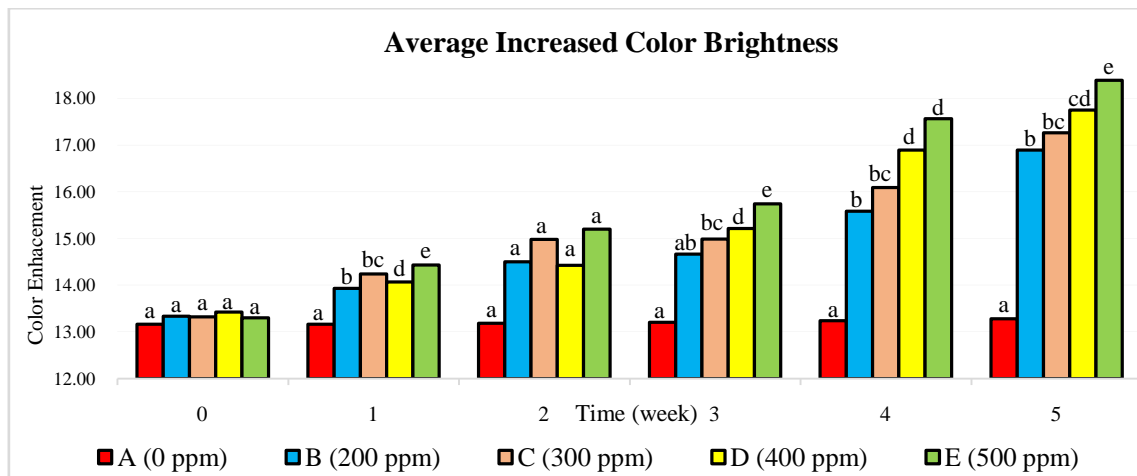


Figure 1. Average Increased Color Brightness of Clownfish (*Amphiprionpercula*)

Based on the Figure 1, the increased color brightness of clownfish was directly proportional to the amount of red dragon fruit peel extract on feed. The higher the dose of red dragon fruit peel extract that was given the higher level brightness of clownfish (*Amphiprionpercula*). The highest level of color brightness found in the treatment E which was adding red dragon fruit peel extract with concentration of 500 ppm or 0,5 mg/g on artificial feed and the lowest was in treatment A (control) without the addition of red dragon fruit peel extract on artificial feed.

The brightness value of clownfish (*Amphiprionpercula*) in the treatment A in the feed increased with a total change of 0.12 although without feed any additives. The addition of 200 ppm red dragon fruit peel extract (treatment B) in the feed had a significant increase of 3.56 while the addition of 300 ppm red dragon fruit peel extract (treatment C) in the feed increased the total change value by 3.94. The addition of 400 ppm red dragon fruit peel extract (treatment D) in the feed increased the value with a total change of 4.33. Increasing the score of the fish's color brightness by the addition of 500 ppm red dragon fruit peel extract (treatment E) in the feed increased with a total change of 5.09. The results showed that the addition of red dragon fruit peel extract on feed had a significant effect on increasing the color brightness of clownfish (*Amphiprionpercula*).

The brightness of the clownfish (*Amphiprionpercula*) is different in each treatment since the fish in every treatment has a different absorption rate of the type of color pigment and the dose given. This is in accordance with the statement of Satyani and Sugito (1997) in Shidqiet al (2019) who stated that the change in color of fish depends on the amount of composition of the color ingredients in the feed and the right dose of the source of color pigment. Both must neither

excessive nor lacking to obtain the best color appearance on fish. Giving color ingredients with the right dose, will clarify the color pattern of the fish body.

The increase in the brightness of clownfish (*Amphiprionpercula*) that occurs in treatment A (control) is caused by internal fish factors, since fish were kept at the juvenile stage while color changes also in accordingly with growth. This is consistent with the statement of Yuliantiet al (2014)who stated that when fish matures, the intensity of the fish's body brightness increases. At a certain age, the color intensity will go back down.

## 2. Growth

Based on the results of analysis of variance, shows that the addition of red dragon fruit peel extract on feed did not have a significant effect on the growth of clownfish (*Amphiprionpercula*). This is in accordance with the statement of Sulawesty (1997) which states that the addition of carotenoids on feed has no effect on growth.

## 3. Survival Rate

Survival rate is a comparison of the number of fish that live at the end and beginning of the research. According to Sari (2014), fish life is influenced by biotic factors such as competitors, parasites, age, predation, population density, adaptability of fish, human handling and abiotic factors such as the physical and chemical properties of an aquatic environment.

Table 1.Average Value of SurvivalRate

Treatment	Survival Rate (%)
A (0 ppm)	90 <sup>a</sup> ± 1,00
B (200 ppm)	97 <sup>a</sup> ± 0,58
C (300 ppm)	97 <sup>a</sup> ± 0,58
D (400 ppm)	97 <sup>a</sup> ± 0,58
E (500 ppm)	97 <sup>a</sup> ± 0,58

Based on data,the addition of red dragon fruit peel extract on feed did not have a significant effect on the survival rate of clownfish (*Amphiprionpercula*) in all treatments. The high survival rate of fish is influenced by environmental conditions, best handling practices, and maintaining the water quality as perfect as possible.

## 4. Water Quality

Water quality parameters measured during the research were temperature, pH, DO, salinity, and ammonia. The measurement analysis of water quality parameters during the researchshowed that parameters are still within the range of tolerance which is shows that the clownfish (*Amphiprionpercula*) is in an environment that is healthy and suitable for growth. Water quality data during the researchis provided in Table 2:

Table 2.Water Quality

Parameter	Treatment					Reference*
	A	B	C	D	E	
Temperature (°C)	28,9	29,0	29,0	29,1	29,2	28-30
pH	8	8	8	8	8	7-8,5
DO (mg/L)	5,19	5,43	5,44	5,32	5,18	>4,0
Salinity (ppt)	32	32	32	32	32	32
Ammonia (NH <sub>3</sub> ) (mg/L)	0,073	0,060	0,074	0,059	0,062	<0,3

\*Reference: Sea Water Quality Standards for Marine Biota Minister of Environment Decree No. 51 of 2004

## CONCLUSION

Based on the results of the research it can be concluded that the addition of red dragon fruit peel extract on feed had a significant effect on increasing the brightness of clownfish

(*Amphiprionpercula*). The highest level of color brightness found was in the treatment E which is adding red dragon fruit peel extract with concentration of 500 ppm on artificial feed.

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