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NONI FRUIT (MORINDA CITRIFOLIA L.) EXTRACT FOR HEMATOLOGICAL HEALTH OF TILAPIA FISH (OREOCHROMIS NILOTICUS)

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ABSTRACT
Tilapia (Oreochromis niloticus) is a type of freshwater fish that has high economic value in Indonesia. Noni fruit (Morinda citriffolia L) is a tropical plant that has long been used as herbal medicine and food. The objective of this study was to observe the haematological response of tilapia fed noni fruit extract (Morinda citrifolia l) with different doses. Tilapia were reared for 30 days by being given treatment A treatment with 100% pellet feed without being mixed with noni extract, treatment B with 100% giving with pellet feed mixed with noni extract at a dose of 10% of the total feed per day and treatment C with giving 100% with feed pellets mixed with noni extract at a dose of 15% of the total feed per day.

KEY WORDS
Tilapia, noni fruit, hematology.

Tilapia (Oreochromis niloticus) is a type of freshwater fish that has high economic value in Indonesia. Tilapia is also an economically important fish as a consumption fish (Lasena & Irdja, 2017). This is because tilapia is a freshwater fish commodity that has received a lot of attention from the government and observers of world fisheries issues, especially in terms of improving the nutrition of people in developing countries. Tilapia fish production must be supported with quality seeds. However, there are still a number of obstacles that have not been met so far, namely the low quality of seeds, the unavailability of seeds at any time on an ongoing basis. According to Lestari, (2015) One of the obstacles in efforts to increase fisheries development is the problem of diseases that often attack fish or fish health which causes a low survival rate of tilapia fry.

According to Adrian et al (2018) in Francissca & Muhsoni, (2021) the average good fish survival rate ranges from 73.5-86.0%. To produce tilapia seeds in large quantities and of high quality, hatchery activities with the application of the basic principles of aquaculture are urgently needed, so that cultivation activities can continue and the improvement of natural stocks of tilapia is always available. Noni fruit (Morinda citriffolia L) is a tropical plant that has long been used as herbal medicine and food. Noni became widely known since the Polynesians migrated to Southeast Asia 2000 years ago. Noni plant (Morinda citriffolia L) is classified into Dycotiledones, Lignosae division, family Rubiaceae, genus Morinda, and species Morinda citrifolia. Noni is known to have many health benefits (Budiarsih, 2020).

Flavonoids function to protect cell structures, increase the effectiveness of vitamin C which functions as an immunostimulant and are able to increase lymphocyte proliferation so that it can increase fish immunity, anti-inflammation, prevent bone loss and act directly as an antibiotic by inhibiting bacterial attacks (Adriyan, 2018). The objective of this study was to observe the haematological response of tilapia fed noni fruit extract (Morinda citrifolia l) with different doses.

MATERIALS AND METHODS OF RESEARCH

This research will be carried out at the Wet Laboratory of the Aquaculture Study Program, Faculty of Agriculture, Achmad Yani University, Banjarmasin, for 30 days. Tilapia fish size 1-3cm were reared in a 60cm x 30cm x 30cm aquarium with a stocking density of 100 individuals and were given the following treatment:

- Treatment A: Treatment by giving 100% pellet feed without being mixed with noni extract;
- Treatment B: Treatment by giving 100% with pellet feed mixed with noni extract at a dose of 10% of the total feed per day;
- Treatment C: Treatment by giving 100% with pellet feed mixed with noni extract at a dose of 15% of the total feed per day.

Hematological measurements were carried out by taking tilapia blood before and after 30 days of being fed noni extract. The haematological parameters measured were hematocrit, erythrocytes and leukocytes. The supporting parameters in this study were the analysis of water quality during the study.

RESULTS AND DISCUSSION

The results of the haematological analysis of tilapia fed noni extract for 30 days are as follows. The average hematocrit levels of tilapia in each treatment can be seen in the following figure:

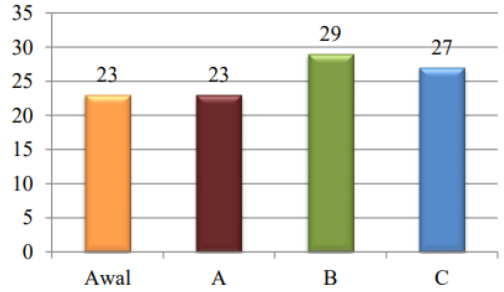

Figure 1 – Average Tilapia Hematocrit Levels

The hematocrit levels obtained during the research were 23% at the beginning of the study and at the end of the study for each treatment were as follows, for treatment A was 23%, treatment B was 29%, treatment C was 27%. The graphic above shows that the highest hematocrit level was in treatment B of 29% while the lowest hematocrit level was in treatment A of 23%. Compared with the observations of Hartika et al., (2014) with the addition of prebiotics in the feed, the highest hematocrit level was obtained at 7.70%, according to Fange (1992) in Sarkiah et al., (2016), in tolerant fish, hematocrit levels are generally relatively constant between 20 – 40%. Normal tilapia hematocrit values range from 27-37% Hrubec and Smith, (2011) in (Sarkiah et al., 2016).

Based on laboratory results, the average number of erythrocytes in each treatment was obtained, as seen in the following figure:

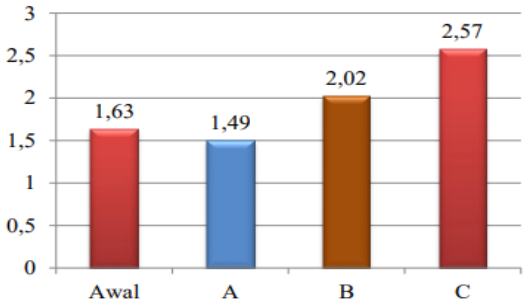

Figure 2 – Average Number of Tilapia Erythrocytes

The number of erythrocytes obtained during the study, namely at the beginning of the study was 1,630,000 x 106 cells/ mm^3 and at the end of the study for each treatment was as follows, for treatment A it was 1,490,000 x 106 cells/mm3, for treatment B it was 2,020,000 x

106 cells/mm^3, C treatment was 2,570,000 x 106 cells/ mm^3. Compared with the observations of Sarkiah et al., (2016) by looking at the health of tilapia in cage businesses ranging from 2,260,000 – 2,920,000. According to Hastuti (2014), the normal number of erythrocytes in freshwater fish is around 2,000,000 – 3,000,000 cells/ mm^3. Based on the results of observations, the average erythrocytes for each treatment were still within the normal range so that the fish could be categorized as healthy.

Based on laboratory results, the average number of leukocytes in each treatment was obtained as follows:

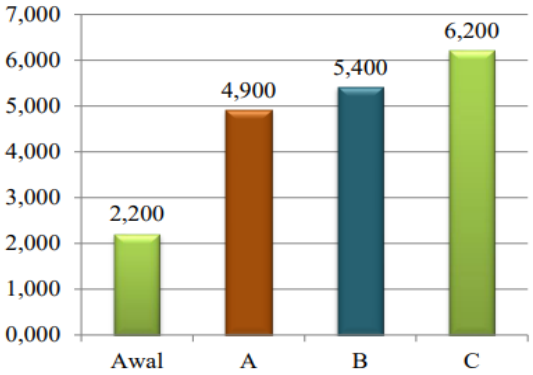

Figure 3 – Average Tilapia Leukocyte Count

The number of leukocytes obtained during the study, namely at the beginning of the study, was 220,000 cells/mm3 and at the end of the study for each treatment, they were as follows, for treatment A, it was 490,000 cells/mm^3, for treatment B, it was 540,000 cells/ mm^3, and for treatment C, it was 620,000 cells/ mm^3. Compared with the observations of Hartika et al., (2014) the highest number of leukocytes was obtained with the addition of prebiotics in the feed, around 80,400 cells/ mm^3. The range of normal leukocyte counts for fish is around 20,000 – 150,000 cells/ mm^3 (Hartika et al., 2014). Judging from the results of the average observation of each treatment the number of leukocytes was lower than the normal range. Judging from the results of the average observation of each treatment the number of leukocytes was higher than the normal range so that the fish can be categorized as healthy. Based on the results of calculating hematocrit levels, the number of erythrocytes and the number of leukocytes, it shows that the health condition of fish can be categorized as healthy.

The range of pH of the morning water in treatment A on the 10th day of observation is in the range of 7.5-7.6, on the 20th day it is in the range of 7.6- 7.7, the 30th day, which is around 7.6-7.7. Treatment B on the 10th day of observation ranged from 7.5-7.6, the 20th day ranged from 7.6-7.7, the 30th day ranged from 7.6-7.7. Treatment C on the 10th day of observation was around 7.5-7.6, the 20th day was around 7.6-7.7, the 30th day was around 7.6-7.7. While the range of pH in the afternoon in treatment A on the 10th day of observation was around 7.5-7.6, the 20th day was around 7.6-7.7, the 30th day was around 7.5-7.6. Treatment B on the 10th day of observation was around 7.5-7.6, the 20th day was around 7.5-7.7, the 30th day was 7.5-7.6. Treatment C on the 10th day of observation was around 7.5-7.6, the 20th day was around 7.5-7.6, the 30th day was around 7.5-7.6. Based on the results of measuring the pH of the water in the morning and evening in each treatment during the rearing period, it is included in the pH category suitable for tilapia habitat, namely 6 - 8.5 (Mokoginta et al, 2022)

The average morning water temperature in treatment A on the 10th day of observation was 26.1, the 20th day was 26.0, the 30th day was 25.5. Treatment B on the 10th day of observation was 26.0, the 20th day was 25.6, the 30th day was 25.7. Treatment C on the 10th day of observation was 25.8, the 20th day was 25.8, the 30th day was 25.9. The average temperature in the morning ranged from 25-26. While the afternoon temperature range showed that the average afternoon water temperature in treatment A on the 10th day

of observation was 27.7, the 20th day was 27.0, the 30th day was 27,0. Treatment B on the 10th day of observation was 27.3, the 20th day was 27.0, the 30th day was 26.9. Treatment C on the 10th day of observation was 27.5, the 20th day was 27.5, the 30th day was 27.1. The average temperature in the morning ranged from 26-27. The results of morning and evening water temperature measurements in each treatment during the maintenance period of the water temperature in each treatment ranged from 26ºC -27ºC, this range is still within a reasonable range, that the conditions for living media fish is in the range of 25˚C – 30˚C with a temperature difference between day and night no more than 5˚C (Anugraheni et al, 2022).

CONCLUSION

Noni fruit extract for hematological health of tilapia, namely the highest hematocrit level in treatment B was 29%, the highest number of erythrocytes was in treatment C of 2.57 x 106 cells/ mm^3, and the highest leukocyte count was in treatment C of 6.200% x 103 cells/ mm^3.

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