Effect of Different Doses of Mangrove Leaf Juice on the Survival of Tilapia Seeds Infected with Parasite *Trichodina* sp.

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Abstract

This study aims to determine the effect of immersion in a mangrove *api-api* (*Avicennia marina*) leaf juice with different doses that affect the survival of tilapia (*Oreochromis niloticus*) seeds infected with the parasite *Trichodina* sp. This research is a quantitative descriptive study with 4 treatments and 3 replications. The fish used were tilapia that had been infected with an initial intensity of 205 *Trichodina* sp. This research was conducted for 7 days. The treatment used was the dosage of mangrove leaf juice and water, where the dosages were A (2.5 gram/liter), B (5 gram/liter), C (7.5 gram/liter) and D (Control). The results showed that giving different doses of *api-api* leaf immersion had an effect on the survival of tilapia where the use of the mangrove leaf juice at a dose of 7.5 mg/liter gave the best survival results with a percentage of 86.66% and also is a solution dose that can reduce the intensity of *Trichodina* sp. The results of the calculation of the intensity of *Trichodina* sp. in treatment A (2.5 gram/liter), namely 30 individuals/head and treatment B (5 gram/liter) 15 individuals/head of treatment C (7.5 gram/liter) the intensity of *Trichodina* sp. 6 individuals/head.

Keywords: Mangrove; *api-api***;** *Avicennia marina*; tilapia; *Trichodina* sp.; survival rate.

I. Introduction

Tilapia is one of the important commodities in the world freshwater fish business. The FAO (Food and Agriculture Organization) Department of Fisheries and Aquaculture places tilapia in third place after shrimp and salmon as a successful example of world aquaculture (Zheila, 2013). Some of the advantages of tilapia aquaculture are easy to breed, relatively fast growth and tolerant of unfavorable aquatic environmental conditions (Rustikawati, 2012). In Indonesia, tilapia has long been cultivated intensively. Diseases in fish can be caused by infectious agents such as parasites, bacteria, and viruses, non-infectious agents such as poor feed quality, and environmental conditions that are not supportive for fish life. The emergence of disease attacks is the result of mismatched interactions between fish, environmental conditions and organisms or disease-causing agents (Afrianto and Liviawati, 1992).

This disease caused by *Trichodina* sp infection is one of the threats to the success of aquaculture (Irianto, 2005). According to Afrianto and Liviawaty, (1992) the predilection of *Trichodina* sp is the body surface, fins and gills. Fish attacked by *Trichodina* sp. are characterized by the presence of grayish white spots and an increase in mucus production (Gusrina. 2008). *Trichodina* sp infects by attaching to the epithelial layer of fish with the help of a hook. This hook rotates so that it can damage the cells around the place where it is attached. Then *Trichodina* sp ate the destroyed epithelial cells and caused serious irritation (Yuasa et al, 2003).

Prevention and treatment of the parasitic disease *Trichodina* sp in fish has been using chemicals and antibiotics such as NaCL, formalin and $CuSO_4$ (Mahasri, G. 2009). The use of antibiotics and chemicals continuously can cause side effects on fish and the environment (Baticados and Paclibare, 1992). Another alternative is needed to overcome this problem by using natural ingredients. The use of natural ingredients is a step in the right direction because in addition to functioning as antioxidants, natural ingredients can also increase fish immunity to environmental changes. One of the natural ingredients that can be used is the *api-api* (*Avicennia marina*) leaves.

The results of research by Oktavianus (2003) that mangrove leaves (*Avicennia marina*) were used as an anti-bacterial because these leaves contain several polar compounds that can control the development of *Trichodina* sp. These polar compounds, namely saponins, flavonoids and tannins, can work as anti-microbes by damaging the cytoplasmic membrane and killing epidermal cells (Rahayu, 2008).

II. Research Methods

This research was conducted at the Fish Quarantine Station, Quality Control and Safety of Class I Fishery Products in Gorontalo.

Slide, aquarium, ruler, jar, analytical scale, hose and aeration stone, microscope, glass object, scalpel, pH meter, hand counter, injection, plastic bag, camera, stationery. The experiment used sixty tilapia fish, 150 grams of mangrove leaves (*Avicennia marina*) and F999 feed.

The design used in this study was a completely randomized design (CRD) with four treatments and three replications each. The treatment given was mangrove leaf juice (*Avicennia marina*) with different doses to the tilapia seeds infected by the parasite *Tricodina* sp.

The treatments in this study were as follows: Treatment A = dose 2.5%; Treatment B = 5% dose; Treatment C = 7.5% dose; Treatment D = control.

To get a dose of 2.5%, the *api-api* leaf is weighed as much as 25 grams, then add 975 ml of water so that the mixture reaches 1000 ml, then to get a dose of 5% and 7.5%, the same thing can be done as determining the 2.5% dose.

The placement of the containers is carried out randomly, randomization is carried out to provide an equal chance for each container to get a place.

Before the research was conducted, the test fish container was prepared, consisting of 12 aquariums with a length of 30 cm, a width of 20 cm and a height of 20 cm. Each aquarium is equipped with a hose and an aeration stone. The containers used are each filled with 5 liters of water and given enough aeration to supply oxygen. The fish are spread as many as 5 fish /container.

The tilapia used in this research is tilapia from the Gorontalo City Fish Seed Center. The tilapia is ± 5 cm in size. Acclimatization was carried out for 2 days during which the fish were fed F-999 with a dose of 5% of the weight of the biomass with a frequency of 2 times a day.

A solution is a mixture of several ingredients and a homogenized solvent. In the manufacture of this solution, water is used as a solvent and the *api-api* leaves as an ingredient. The steps for making mangrove leaf juice (*Avicennia marina*) are as follows: (1) Wash the mangrove leaves (Avicennia marina) to be used and then air dry. (2) Cut into smaller pieces (3) Enter the pieces of mangrove leaves (Avicennia .marina) according to the dosage then add the amount of water needed then blend. (4) The results of the blender are then filtered and poured into the soaking container.

The fish used in this study were fish that had been attacked by *Trichodina* sp.. In the immersion process, 1 liter of the leaf juice is poured into the container used for the immersion process, measuring 20 cm long, 20 cm wide, 20 cm high. Soaking is done by inserting 5 infected tilapia fish into each immersion container, soaking is carried out for 30 minutes.

After immersion, the fish were returned to the culture container, an aquarium container with a length of 30 cm, 20 cm width, 20 cm height which has previously been cleaned. The fish then treated for 5 days of feeding with a dose of 5% of the weight of the biomass during the growing process. For 5 days, tilapia survival was carried out by observing survival of tilapia and examining the intensity of the *Trichodina* sp parasite.

The variable observed was the survival of tilapia seeds infected with the parasite Tricodina sp, which was given the juice of mangrove leaves (*Avicennia marina*) with different immersion doses. The data obtained were analyzed using descriptive analysis. Survival is the percentage of the total biota that is alive at the end of a certain time (Cholik et al, 2005).

III. Results and Discussion

3.1 Intensity of *Trichodina* sp.

The results of the examination on 30 tilapia fish with a size of +5 cm shows the total parasite intensity of *Trichodina* sp. was averagely 205 individuals on each tilapia and the intensity is of very heavy category, this is in accordance with the statement of Afifah, (2014).

The results of the parasite intensity counting at the end of the rearing can be seen in the following graph in Figure 1.

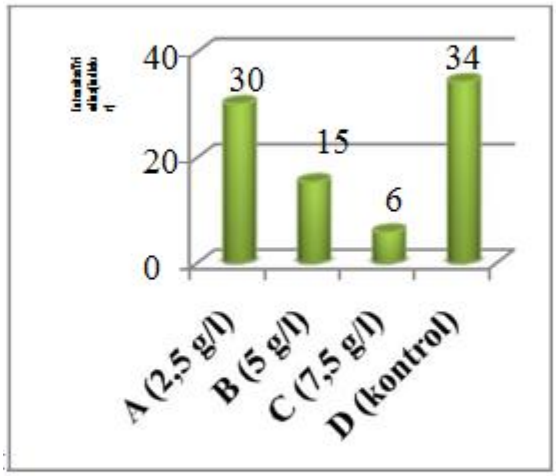

Figure 1. Intensity of *Trichodina* sp.

The graph shows that the intensity of *Trichodina* sp. The highest included in the category of very heavy parasite attack intensity was obtained in treatment D (Control) as many as 34 individuals/head. Treatment A (2.5 grams/liter) was included in heavy category parasite attacks with 30 individuals/head, then treatment B (5 grams/liter) was included in medium category parasite attacks with 15 individuals/head, then in treatment C (7.5 gram/liter) as many as 6 individuals/head and included in the category of normal parasite attack intensity. Treatment C using a solution of 7.5 grams of *api-api* leaves showed the lowest intensity of Trichodina sp.

According to Afifah, et al., (2014) the reduced number of *Trichodina* sp. showed a good response in inhibiting of its development. This is due to the presence of secondary metabolite compounds that are polar in the juice of the mangrove leaves, namely tannins, flavonoids and saponins. Flavonoids are able to damage cell membranes that play a role in cell integrity by denaturing proteins in the cell membrane, so that the permeability of the cell membrane is impaired and causes leakage of cell contents. This can inhibit growth and eventually lead to parasite death. Another content contained in the *Avicennia marina* leaves is tannins. The mechanism of action of tannins is thought to be able to shrink the cell membrane so that it interferes with the permeability of the cell itself. Due to disruption of permeability, cells cannot carry out living activities so that their growth is stunted and dies. Other compounds, namely saponins, with a working mechanism of inhibition by forming complex compounds with cell membranes through hydrogen bonds. So that it can destroy the permeability of the cell membrane and eventually cause cell death.

3.2 Survival rate of tilapia

Survival rate is the percentage of the number of live fish at the end of the rearing period. Some of the things that affect the survival of fish are internal factors such as genes and immunity, while external factors such as food, stocking density and water quality.

The results of calculating survival rate for each treatment can be seen in the following Figure 2.

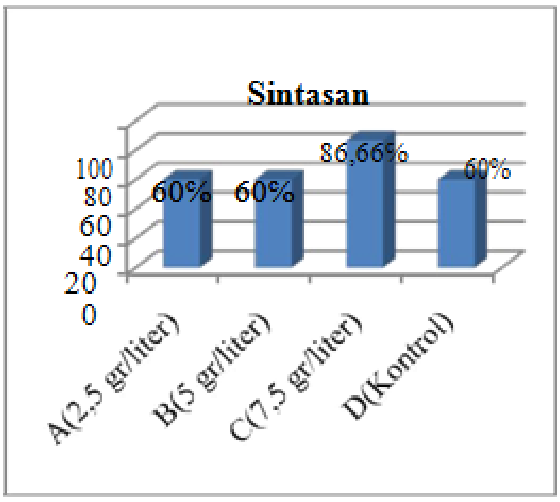

Figure 2. Survival rate of tilapia seeds

According to Ginting, et al., (2013), the predilection of *Trichodina* sp. are the surface of the body, fins and gills. *Trichodina* sp. causes itchy fish disease called Trichodiniasis. Fish attacked by Trichodina sp. characterized by the presence of grayish-white spots and an increase in mucus production. The high intensity of *Trichodina* sp. This is because these parasites reproduce rapidly and the conditions in the pond waters are conducive to the life of these ectoparasites.

Pujiastuti (2015) adds that the high intensity of *Trichodina* sp. causing the fish to stress and the occurrence of death. High intensity of *Trichodina* sp. will cause infection which will then experience high mortality. Attack of *Trichodina* sp. with high intensity can cause hyperplasia and damage to the structure of the gills, thus facilitating secondary disease attacking the skin and gills which in the end the fish will have difficulty in breathing and cause death.

According to Afifah et al. (2014) fish attacked by *Trichodina* sp. characterized by the presence of grayish white spots and an increase in mucus production. *Trichodina* sp. become highly pathogenic to fish and can causing severe damage even causing death to the host. In addition, Nofyan, et al., (2015) added that this parasite attack causes hyperplasia which can cause osmotic and breathing disorders and even death. This condition results in obstruction of the flow of water to the gill filaments so that it can stress the fish and make it difficult to breathe. Fish attacked by this parasite will swim slowly, swim near the surface of the water and have a decline in appetite.

3.3 Water Qualities

The quality of the water that is suitable for the fish's needs will support growth and survival. Water quality is one of the external factors that greatly influences the metabolic process of fish. The results of measurement and average calculation of several water quality parameters observed in this study are as follows in Table 2.

Tabel 2. Kisaran kualitas air selama masa pemeliharaan

Perlakuan	Parameter		
	Suhu	pH	DO (Mg/L)
A	27.18	7.30	4.35
B	27.25	7.16	4.27
C	27.31	7.12	4.26
D	27.30	7.22	4.42

Water quality parameters during the rearing period in all treatments were within a tolerable range for tilapia seed growth activities. The lowest temperature range was in treatment A of 27.180C and the highest range was in treatment C of 27.310C. The lowest pH was in treatment C at 7,12 and the highest pH was in treatment A at 7.30.

The highest oxygen content (DO) was found in treatment D of 4.42 mg / liter and the lowest was in treatment C of 4.26 mg / liter.

A good temperature for the survival of tilapia seeds ranges from 27-300C, this is in accordance with the statement of Marlan and Agustina (2014) which states that the optimum temperature for tilapia seed growing activities ranges from 25-330C. According to Utami, et al., (2013) water temperature or temperature greatly affects the metabolism and growth of fish and affects the amount of feed consumed by fish. Temperature also affects dissolved oxygen in water. The optimal temperature for koi fish to live is in the range 25-30 ° C. while Rabiati, et al., (2013) stated that for the growth of fish seeds, temperatures ranging from 26-30 ° C are required.

The appropriate pH for tilapia life ranges from 7-8, according to Utami, et al., (2013) pH is a constant of free hydrogen ions in a system. The pH range is set from 1 to 14, but the appropriate pH for the growth of living things is between 5 and 8. Meanwhile, Marlan and Agustina (2014) state that the optimum pH for the growth of tilapia is 6.5-8.5.

Oxygen content (DO), is the solubility of oxygen that occurs in water, oxygen is one of the parameters that need attention because it is a medium for breathing.

The optimum oxygen content for fish seed growth ranges from 3-5 mg/l. According to Saparianto (2011) oxygen is needed for respiration where feed conversion and growth rate are largely determined by oxygen availability. Waters that have relatively high oxygen content will be followed by fertile waters and trace substances needed by fish larvae as natural food. The usual oxygen content in water is 4-5 mg/liter.

IV. Conclusion and Suggestion

Provision of immersion in mangrove leaves of *Avicennia marina* (*api-api*) at different doses affected the survival of tilapia infected with the parasite *Trichodina* sp. The use of the mangrove leaf juice at a dose of 7.5 mg/liter gave the best survival rate with a percentage of 66.67%.

It is necessary to carry out further research on the use of mangrove leaf juice (*Avicennia marina*) with a higher juice dose and immersion time <30 minutes, because the soaking time can affect the intensity of *Trichodina* sp.

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