



EFFECT OF SOAKING BINAHONG (*ANREDERA CORDIFOLIA*) LEAF EXTRACT WITH DIFFERENT DOSES ON CARP (*CYPRINUS CARPIO*) SEEDS INFECTED BY *AEROMONAS SP*

¹ Juliana, Citra Panigoro ², Yuniarti Koniyo³

^{1,3}Aquaculture, FPIK Faculty of Fisheries and Marine Science
State University of Gorontalo

²Management of Aquatic Resources, Faculty of Fisheries and Marine Science
State University of Gorontalo

Email: juliana@ung.ac.id

ABSTRACT. Disease in aquaculture activities is one of the problems that often causes losses for farmers. Bacteria are one of the causes that can cause disease and even death in freshwater fish. Bacteria that often infect freshwater fish, especially carp are *Aeromonas sp.* These bacteria can cause disease and can even cause death in carp seeds. Disease control in freshwater fish aquaculture activities can be done by administering antibacterial both derived from synthetic chemicals and natural materials derived from plants. Binahong is one of the plants that contains flavonoid compounds that function as anti-bacteria. This study aims to determine the effect of soaking binahong (*Anredera Cordifolia*) leaf extract with different doses on carp seeds infected with *Aeromonas sp.* The research method is an experimental method consisting of four treatments with three replications. Test animals used were carp measuring ± 5 cm and were infected with *Aeromonas sp.* Goldfish seeds infected with *Aeromonas sp* were soaked in binahong extract solution with different dosages, namely A: 0.7g / l, B: 0.9g / l, C: 1.1g / l and D: control. Soaking is carried out for thirty minutes and after soaking the fish seeds are maintained using an aquarium with a density of 1 fish / l. The results showed that immersion of binahong leaf extract with different dosages affected the prevalence rate of *Aeromonas* that infects goldfish seeds.

Keywords: *Aeromonas*, Binahong, Carp, Disease.

Introduction

Carp (*Cyprinus carpio*) is a freshwater fish species that is much favored by the community. Freshwater fish farming is one of the ways that is also very popular with the community because it is considered to be able to improve the community's economy. One of the problems faced in freshwater fish farming activities is the presence of disease. Diseases that attack freshwater fish can be caused by bacteria, viruses, parasites and poor water quality. Freshwater fish that are attacked by diseases can cause physical symptoms such as the appearance of wounds on the surface of the skin, loss of appetite can even cause death in freshwater fish. This can lead to failure in freshwater fish farming business.

One of the diseases that often attacks freshwater fish is Motile *Aeromonas* Septicemia (MAS) which is caused by the attack of *Aeromonas sp.* (Kurniawan et al., 2014). *Aeromonas hydrophila* is a type of gram-negative bacteria that can cause disease in freshwater fish. *Aeromonas hydrophila* is one of the enterobacterium that is abundant in freshwater and is a pathogen in amphibians, reptiles and fish

that live in freshwater waters (Rian, Razquin, Lo, & Villena, 2004). At present there is no antibacterial that can prevent bacterial attack specifically *Aeromonas hydrophila* attack on freshwater fish farming.

One common method used to prevent bacterial attacks is by administering antibiotics. The use of antibiotics in the prevention of diseases caused by bacteria that exist in freshwater fish farming has adverse effects. The continuous use of antibiotics causes the culture organisms can experience resistance so that the antibiotics no longer have a good impact on the cultivation organism (Salikin et al., 2014). Prevention by using antibiotics can also affect the quality of the environment, the rest of the use of antibiotics can pollute the waters. This causes the need for natural ingredients that can function as anti-bacterial so as to avoid environmental pollution.

Binahong (*Anredera Cordifolia*) is one of the plants that contains active compounds that can function as antibacterial. Binahong leaves contain active compounds in the form of flavonoids, which is one of the phenol compounds that respond to bacterial infections. Flavonoids are compounds that are antibacterial because they have the ability to form complex compounds (Handayani et al, 2012). Antibacterial compounds derived from natural ingredients contained in binahong plants are expected to prevent or cure bacterial attacks on freshwater fish farming. The use of active compounds derived from natural ingredients can prevent pollution of the aquatic environment so that it is safe to use in freshwater fish farming. This study aims to determine the effect of soaking binahong leaf extract on survival rates and the prevalence of goldfish seeds infected with *Aeromonas hydrophila*. Research is also expected to provide knowledge about the benefits of active compounds contained in binahong which are antibacterial and can be used as natural ingredients that are environmentally friendly.

Research methods

This study is an experimental study and research design using a completely randomized design with four treatments with three replications. Treatment in the form of different dosages of binahong leaf extract solution consists of treatment A (0.7g / l), treatment (B: 0.9 g / l), treatment C (1.1 g / l) and D (control / without immersion). Binahong leaf extract is dissolved in one liter of water for each treatment at a dose that is in accordance with the specified treatment. Carp seeds used brasal from Gorontalo Province freshwater aquaculture hall measuring 5 cm, then infected with the bacteria *A. hydrophila* so that it shows clinical symptoms due to infection given. Infected fish seeds are soaked for thirty minutes based on a predetermined treatment dose. Fish seeds that have been soaked are kept in a 15 liter aquarium with a density of one fish per liter. During maintenance, fish seeds are fed in the form of a mile-sized pellet and the dosage is as much as 10% every day. Maintenance is carried out for one month and data collection on survival and prevalence is done once a week. The data obtained were analyzed using statistical analysis, namely analysis of variance with a confidence level of 95% to determine the effect of soaking binahong leaf extract.

Results and Discussion

Binahong leaf extract contains active compounds in the form of flavonoids, steroids and alkaloids which can be as anti-oxidants. These active compounds are also widely used to overcome problems that occur in infections due to bacteria, parasites and viruses. The results of research on the effect of immersion binahong leaf extract conducted on goldfish infected with *Aeromonas hydrophila* showed the results that did not affect the survival rate of fish, but affected the prevalence at 95% confidence level. The results of the research data by using analysis of variance on the continuity of the nose and the prevalence of seeds of carp infected with bacteria are presented in Table 1 and Table 2.

Table 1. Results of Analysis of Fish Carp (*C. carpio*) Survival

ANOVA					
Survival Rate	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.333	3	.111	.667	.596
Within Groups	1.333	8	.167		
Total	1.667	11			

Table 2. Results of Analysis of Variance in Carp (*C. carpio*) Prevalence

ANOVA					
Prevalence	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2500.000	3	833.333	6.250	.017
Within Groups	1066.667	8	133.333		
Total	3566.667	11			

Fish survival is greatly influenced by various factors including the quality of aquaculture media, parasitic, bacterial and viral infections which can cause disruption of fish physiology. Infected fish usually cause symptoms in the form of lack of appetite, slow motion, sores on the surface of the body and some even do not respond to the feed given. Changes in behavior experienced by fish affected by disease due to bacterial infections cause low survival of fish seeds. Several studies have been carried out to prevent and treat bacterial infections using extracts of natural ingredients derived from plants.

Research on the effect on mortality and histology of goldfish infected with *Aeromonas carviae* bacteria shows that mortality in goldfish begins to decrease on the 9th day after immersion. These results indicate that infected goldfish have begun to undergo a healing process and result in decreased mortality in carp after soaking using binahong leaf extract. Binahong leaf extract contains active compounds which also help to cause wound closure in goldfish due to bacterial infection of *A. caviae* (Salikin et al., 2014).

The use of plant extracts is very much developed, because the use of anti-bacterial originating from plants can prevent the deterioration of the quality of the aquatic environment. The use of antibacterial derived from chemicals can cause residues that can cause a decrease in the quality of environmental quality. Several types of plants have good potential as natural anti-bacterial substitutes, the results of research on the use of meniran leaves as immunostimulants for disease prevention in freshwater fish due to viral and bacterial infections give good results (Supriyadi & Iftitah, 2009).

The content of active compounds such as polyphenols have the same composition as flavonoids which are phenol compounds and act as protein coagulators. Flavonoid compounds have the ability to form complexes with bacterial cell proteins through hydrogen bonds. Hydrogen and flavonoid bonds cause the cell wall structure and bacterial cell membrane to become unstable and cause cell lysis. Another thing as a cause of inhibition of growth of *Vibrio harveyi* bacteria is because the flavonoid compounds in Binahong leaf extract interfere with the physiological processes in bacteria by inhibiting the formation of biofilms on *Vibrio harveyi* which are used for self-protection in a colony. Biofilm is produced by bacteria as an effort to carry out the process of adaptation by sticking to a surface, colonizing and covering itself so that it acts as a method of self-protection (Buana dan Wardani, 2013 in Raka, Kartika, & Andayani, 2016).

Prevention and treatment carried out using natural ingredients derived from plants must still pay attention to the right dosage, so it does not have an impact that can affect the production of cultured fish. Standardization of the dosage of the use of natural ingredients must be done to optimize the inhibition against bacterial infections that occur so that treatment of infected fish can provide optimal results. Research results obtained from herbal treatment of *Aeromonas hydrophila* infection using a

combination of *Andrographis paniculata* and *Azadirachta indica* species provide optimal results due to the effective standardization of doses. Improvements in herbal medicine can be tried on other fish species can be used as a basis for developing freshwater fish farming (Thiyagarajan, Bhavani, Ebbie, & Chandra, 2014).

Diseases caused by bacterial infections in several types of fish will have different effects according to infected fish species. G clinical symptoms of catfish that are attacked by *A. caviae* which shows a decrease in feed response, abnormal movements, injuries accompanied by bleeding on the surface of the skin. The results showed that the administration of binahong leaf extract on African catfish did not significantly affect the survival of African catfish after *A. caviae* infection. It is suspected that the dosage of binahong leaf extract added to the feed is less effective as an African catfish immunostimulant after *A. caviae* infection. (Pratama, Prayitno, et al., 2014)

Another factor that also influences bacterial infections in freshwater fish farming activities is the low quality of maintenance media. *Aeromonas hydrophila* is a bacterium that can breed well in poor water quality, so that it can infect freshwater fish that are cultivated. *Aeromonas hydrophila* bacteria can grow in the temperature range of 16-20°C and can even be active at low temperatures (6 °C) and quite high temperatures (38 °C). This shows that *Aeromonas hydrophila* can live in a very diverse temperature range, so that it can live on almost all fish culture media (Latifa et al, 2018).

A. paniculata extract can significantly increase the immunity of *C. catla* and can inhibit the growth of *Aeromonas hydrophila* and *Aeromonas veronii*. *A. paniculata* extract is thought to also be able to treat diseases caused by bacterial infections, so *A. paniculata* can be used as an effective immunostimulant against *Aeromonas hydrophila* and *Aeromonas veronii* so as to reduce the adverse effects of bacterial attack by pathogens and can be used in freshwater aquaculture activities (Palanikani, Soranam, & Muthu-, 2018)

One type of plant that can also be used as an anti-bacterial in aquaculture activities is *L. inermis*. The results of this study stated that *L. inermis* extract can be used as an immunostimulant if given at the right time and dosage. The effectiveness of using *L. inermis* is determined by the dose of use at a fairly low cost and environmentally friendly. In addition, *L. inermis* may have potential as an additional ingredient in fish feed. However, suitable field trials are still needed before using *L. inermis* extract as an immunostimulant in aquaculture (Soltanian & Fereidouni, 2016)

Conclusion

Soaking binahong (*Anredera cordifolia*) leaf extract using Different Doses has no effect on the survival rate of Carp (*Cyprinus carpio*) seeds infected with *Aeromonas hydrophila* bacteria. While the immersion of binahong leaf extract (*Anredera cordifolia*) using a different dosage has an effect on the prevalence of carp seeds (*Cyprinus carpio*) infected with *Aeromonas hydrophila* bacteria

References

- [1]. Akuakultur, D., Untuk, A., Infeksi, M., & Ikan, P. (2018). *Jurnal Sains Akukultur Tropis*, 2, 36–43.
- [2]. Handayani, A. (2012). *Carica Papaya*), 3(3), 213–220.
- [3]. Kurniawan, A., Prayitno, S. B., Studi, P., Perairan, B., Perikanan, J., Diponegoro, U., & Darah, P. (2014). *Journal Of Aquaculture Management And Technology Online Di : Http://Ejournal-S1.Undip.Ac.Id/Index.Php/Jamt Journal Of Aquaculture Management And Technology Online Di : Http://Ejournal-S1.Undip.Ac.Id/Index.Php/Jamt*, 3, 76–85.
- [4]. Palanikani, R., Soranam, R., & Muthu-, K. (2018). *Pathogenicity And Control Of Aeromonas Hydrophila And A . Veronii In Indian Major Carps (Catla-Catla) By The Effect Of Herbal Supplement Of Andrographis Paniculata (Lamiales : Acanthaceae)*, 6(3), 361–370.
- [5]. Pratama, P. N., Prayitno, S. B., Studi, P., Perairan, B., & Perikanan, J. (2014). *Journal Of Aquaculture Management And Technology Online Di : Http://Ejournal-S1.Undip.Ac.Id/Index.Php/Jamt Journal Of Aquaculture Management And Technology Online Di : Http://Ejournal-S1.Undip.Ac.Id/Index.Php/Jamt*, 3, 281–288.

- [6]. Raka, G., Kartika, A., & Andayani, S. (2016). Potensi Ekstrak Daun Binahong (*Anredera Cordifolia*) Sebagai Penghambat Bakteri *Vibrio Harveyi*, *2*, 49–53.
- [7]. Rian, J., Razquin, B. E., Lo, P., & Villena, A. J. (2004). Behavior Of An. *Society*, *70*(5), 2702–2708. Doi:10.1128/Aem.70.5.2702
- [8]. Salikin, R. Q., Prayitno, S. B., Studi, P., Perairan, B., Perikanan, J., & Diponegoro, U. (2014). Journal Of Aquaculture Management And Technology Online Di: [Http://Ejournal-S1.Undip.Ac.Id/Index.Php/Jamt](http://Ejournal-S1.Undip.Ac.Id/Index.Php/Jamt) Journal Of Aquaculture Management And Technology, *3*, 43–50.
- [9]. Soltanian, S., & Fereidouni, M. S. (2016). Effect Of Henna (*Lawsonia Inermis*) Extract On The Immunity And Survival Of Common Carp, *Cyprinus Carpio* Infected With *Aeromonas Hydrophila*. *International Aquatic Research*, *8*(3), 247–261. Doi:10.1007/S40071-016-0141-2
- [10]. Supriyadi, H., & Iftitah, D. (2009). Bagi Pengendalian Penyakit Ikan Akibat Infeksi Bakteri *Aeromonas Hydrophila*, *4*, 54–58.
- [11]. Thiyagarajan, P., Bhavani, A. L., Ebbie, M. G., & Chandra, G. (2014). A Study On The Control Of *Aeromonas Hydrophila* Infection In The Cat Fish By Medicinal Plants. *Scholars Academic Journal Of Biosciences*, *2*(2), 144–150.