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Effect of Giving Tempuyung Crude Extract (Sonchus arvensis L.) with Different Concentrations on Survival Rate of Carp (Cyprinus carpioL.) Infected with Aeromonas hydrophila Bacteria

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ABSTRACT

The purpose of this study was to determine the effect of giving tempuyung crude extract with different concentrations on the survival rate of carp infected with Aeromonas hydrophila bacteria. The purpose of this research is as a source of information for entrepreneurs and fish farmers which can be used as an alternative ingredient to treat fish that are attacked by diseases caused by the bacterium Aeromonas hydrophila. The results showed that administration of tempuyung crude extract (Sonchus arvensis L.) with different doses had a significant effect on the survival rate of carp (Cyprinus carpio L.) infected with Aeromonas hydrophila bacteria, this means rejecting Ho and accepting H1. The BNT test results showed that treatment A (3%) gave the highest survival rate of 93.33%, followed by treatment B (6%) of 73.33%, then treatment C (9%) and D (12%) of 60%. While the K treatment (control) was 20%. The relationship between the concentration of tempuyung crude extract and the survival rate of carp is in the form of a quadratic line equation $Y = -1.1 X^2 + 14.89 X + 31.996$ with R2 = 0.672 and r = 0.82. The higher the dose of antibacterial used, the faster the bacterial cells will be killed. But it is not effective to use doses that are too high in treatment. Besides causing bacterial resistance to certain antibacterials, the use of doses that are too high can kill the host (goldfish) and is also less economical to use.

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1. INTRODUCTION

Goldfish is a freshwater commodity that has been cultivated for a long time. This fish can be cultivated in ponds, cages, KJA and also in rice fields. According to data presented by FAO, the development of carp production in several Asian countries has increased since 1993.

In Indonesia, goldfish production continues to increase in line with increasing public awareness about consumption of fish as an alternative to animal protein which is cheaper when compared to protein derived from beef, goat, chicken and other animals. In 2003, the national carp production reached 199,532 tonnes worth Rp. 1.725 trillion (Cholik, Ateng, Poernomo and Jauzi, 2005). To overcome this bacterial attack, fish farmers usually use antibiotics and other chemicals.

Tempuyung is a medicinal plant native to Indonesia from the Asteraceae (asteran) family. It is a herbaceous plant that is perennial, upright, contains sap and has a strong taproot. This plant lives wild in Java, in areas where there is a lot of rain at an altitude of 50-1,650 m above sea level, growing in open or slightly sheltered places on cliffs, in bunds, on the edge of waterways (Anonymous, 2006). Tempuyung has single leaf and the lower part of the leaf grows together at the base to form a root rosette. The leaves are lanceolate or oval in shape, pointed at the tip, heart-shaped at the base, irregularly pinnate, 6-48 cm long and 3-12 cm wide.

This plant is upright with a height of 0.6-2 m, containing white latex, with a strong taproot. Stem hollow and ribbed. Single leaf, the lower part grows together at the base to form a root rosette (Sulaksana et al., 2004). Continuous administration of antibiotics can cause resistance to chemicals, so it is necessary to use alternative treatments using natural ingredients because they have many advantages, including lower side effects than chemical drugs, the body's acceptance of drugs made from plant materials is also easier. .

In haematological observations, healthy fish have intact erythrocytes without any damage to the cell membrane. Fish infected with bacteria show that the erythrocyte membrane is damaged and the cell nucleus shrinks. Whereas in fish that had been treated the erythrocytes were intact without any cell damage. The water quality of the rearing medium consisted of temperatures between 24o -25o C, the pH of the media between 6.1-7.08 while the DO of the media was between 5.2-8.4 ppm.

Based on the results of the study, it can be concluded that administration of crude tempuyung extract (Sonchus arvensis L.) with different concentrations has a significant effect on the survival rate (SR) of carp (Cyprinus carpio L.) infected with Aeromonas hydrophila bacteria with treatment A (3%) gives results The highest survival was 93.33% followed by treatment B (6%) of 73.33% then treatment C (9%) and D (12%) of 60%. Whereas the K treatment (control) where the fish were only infected without being treated showed a survival rate of 20%.

Based on this research, it can be suggested that for the treatment of fish attacked by Aeromonas hydrophila bacteria, it is better to use a concentration of tempuyung extract (Sonchus arvensis L.) of 3% to 6.77% 2 times and it is necessary to carry out further research on the degree of chronicity of Aeromonas hydrophila attack if done infection by direct injection.

2. METHOD

2.1 Types of research

The research method used in this study is the experimental method. The experimental method is a form of observation under artificial conditions, where these conditions are created and regulated by the researcher. That is, basically conducting an experiment to see the results, and the results of the experiment will confirm how the causal position is between the variables being investigated

2.2 Research Variables

The variables in the study consisted of independent variables which were test animals (goldfish) treated with natural antibiotics from tempuyung plants.

2.3 Research design

The research design used was a completely randomized design (CRD) with 5 treatments and 3 replications. As a treatment is the difference in the concentration of crude tempuyung extract, namely: 0%, 3%, 6%, 9% and 12%. The main parameter in this study is the survival rate (SR). While the supporting parameters are observations of hematology and water quality (temperature, pH and DO).

2.4 Sampling location

The research sample that will be carried out uses a type of carp with a test for giving bacterial culture, namely TSA (Tryptic Soya Agar), NB (Nutrient Broth) from the tempuyung plant.

2.5 Time and Place of Research.

This research was conducted at the Laboratory of Fish Diseases and Parasites, Faculty of Fisheries, Brawijaya University, Malang from December 2006 to February 2007.

2.6 Tools and materials

The tools used in this study include: Petridisk; Test tube; Tweezers; Tub; Volume pipette; Measuring pipette; Aerator; Stove; Hot plate; Incubator; Autoclave; Analytical balance; Ose needle; Bunsen; Erlenmeyer; Measuring cup; pH meter; DO meter.

Other ingredients :Pure culture of A. hydrophila; Tempuyung leaves (Sonchus arvensis L.); Tempuyung root (Sonchus arvensis L.); TSA (Triptic Soya Agar); Alcohol 70%; Newsprint; Laundry detergent; Spiritus; Aquades; Aluminum foil; Tissues; Cotton; Nutrient broth (NB).

2.7 Research procedure

preparation of the tools during the research test which begins with the sterilization of the tools by putting all the tools that will be used into the autoclave water then heating it on the stove for 15 minutes then preparing the media for the bacterial culture and then making tempuyung extract liquid.

2.8 Data analysis.

From the data obtained, statistical analysis was carried out. To find out the normality of the distribution of the data, a Barlet test was carried out, then an analysis of variance was carried out with the F test (ANOVA) in accordance with the design used, namely Completely Randomized Design (CRD). If from the results of the variance it is known that the treatments show significantly different (significant) or highly significant (highly significant) results, then a follow-up test is carried out in the form of the smallest significant difference test (LSD) to compare the values between treatments with the responses that occur with the level of comparison of treatments the best followed by the Least Significant Difference Test (LSD).

3. RESULTS AND DISCUSSION

3.1 Research result

The effect of giving tempuyung crude extract with different concentrations on the survival rate of carp (Cyprinus carpio L.)

Table 1. Analysis of the Variety of Goldfish Survival

Source of Diversity	DB	F 1JK	KT	F Count	F 5%	F 1%
Treatment	4	4827,74	1206.94	5,878*	* 3.48	5.99
Random	10	2053,4	205,34			
Total	14	6881.15				

Based on the results of variance, it was found that administration of crude tempuyung extract (Soncus arvensis L.) with different concentrations had a significant effect on the survival rate of carp (Cyprinus carpio L.) which was infected with A. hydophila bacteria, meaning that it rejected Ho and accepted H1.

To find out the level of difference between each of the different drug concentrations given to carp, a Least Significant Difference Test (LSD) was carried out with a level of 5% (95% confidence level) and 1% level (99% confidence level).

Table 2. BNT Test for Treatment Using Tempuyung Crude Extract.

Treatment	Average pass life (%)	Notation
K (0% concentration)	20	-
D (12% concentration)	60	a
C (9% concentration)	60	a
B (6% concentration)	73,33	ab
A (3% concentration)	93.33	bc

The BNT test results showed that treatment A (3%) gave the highest survival rate of 93.33%, followed by treatment B (6%) of 73.33%, then treatment C (9%) and D (12%) of 60%. Whereas the K treatment (control) where the fish were only infected without treatment showed a survival rate of 20%.

3.1.1 Infection and Identification of A. hydrophila Bacteria

The minimum bacteria to infect goldfish is 105Csel/ml, whereas according to Austin et al (1996) in Irianto et al (2004) at a density of 1.5 x 109 it can cause death in frogs. Based on the results of these studies, one of them can be used as a basis for determining the concentration used for infecting goldfish. Bacteria will attack the fish's body and enter through all parts of the fish's body such as the mouth, gills, skin surface and anal. On the surface of the fish skin there is mucus which is used by bacteria as a place for growth and reproduction. Through the mouth, the bacteria will enter the stomach and then to the digestive tract, namely the intestinal tract.

The bacteria will multiply in the intestines and take advantage of the mucus in the intestines for the process of colonization and infection and identification of fish if attacked by a disease. gasping on the surface of the water because the gills are damaged making it difficult to breathe and bleeding often occurs in the internal organs such as the liver, kidneys and spleen. The fins are damaged and the gills become whitish in color and the eyes are damaged and slightly protruding.

3.1.2 Treatment of Goldfish Affected by A. hydophila Bacteria

In this research, the crude extract of tempuyung (Sonchus arvensis L.) was used as a drug to kill A. hydrophila bacteria that infects carp seeds. In the in vitro study, the concentrations of 6% and 9% were bacteriostatic but at a concentration of 12% they were bacteriocidal, while the in vivo study produced the opposite, where the 3% concentration gave the highest yield with a survival rate of 93.33%. From this it can be seen that a concentration of 3% can already be used to treat fish infected with the bacterium A. hydrophila. Fish treatment is given by immersion. The crude extract of tempuyung which contains flavonoids which are derivatives of phenol will enter through the mouth and then follow the flow of water that enters when the fish drinks.

3.2 Discussion

Continuous administration of antibiotics can cause resistance and environmental pollution so that natural ingredients are needed to replace the use of these chemicals. Tempuyung is a medicinal plant that contains many chemical compounds that can be used as an alternative treatment, flavonoids are one of the antibacterial compounds found in tempuyung which can be used to treat diseases caused by bacteria. The use of this research is as a source of information for entrepreneurs and fish farmers who can be used as an alternative ingredient to treat fish that are attacked by diseases caused by Aeromonas hydrophila bacteria.

Based on the results of the study, it can be concluded that administration of crude tempuyung extract (Sonchus arvensis L.) with different concentrations has a significant effect on the survival rate (SR) of carp (Cyprinus carpio L.) infected with Aeromonas hydrophila bacteria with treatment A (3%) gives results The highest survival was 93.33% followed by treatment B (6%) of 73.33% then treatment C (9%) and D (12%) of 60%. Whereas the K treatment (control) where the fish were only infected without treatment showed a survival rate of 20%.

4. CONCLUSION

The results of research on giving tempuyung crude extract (Sonchus arvensis L.) with different concentrations on the survival rate of carp (Cyprinus carpio L.) infected with A. hydrophila bacteria can be concluded that giving tempuyung crude extract (Sonchus arvensis L.) with different concentrations significant effect on the survival rate (SR) of carp (Cyprinus carpio L.) infected with A. hydrophila bacteria with the highest survival rate obtained in treatment A (3%), namely 93.33%, followed by treatment B (6%) of 73, 33%, C (9%) and D (12%) by 60%. Whereas K (control) was 20% and the relationship between the concentration of Sonchus arvensis and the survival of goldfish was in the form of a quadratic regression $Y = -1.1 X^2 + 14.89 X + 31.996$ with $R2 = 0.672$ and $r = 0.82$ In haematological observations, healthy fish have intact erythrocytes without any damage to the cell membrane. Fish infected with bacteria show that the erythrocyte membrane is damaged and the cell nucleus shrinks. Whereas in fish that had been treated the erythrocytes were intact without any cell damage.

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It is recommended that for the treatment of fish infected with Aeromonas hydrophila bacteria, it is better to use a concentration of tempuyung extract (Sonchus arvensis L.) of 3% to 6.77% 2 times and it is necessary to carry out further research on the degree of chronicity of Aeromonas hydrophila attack if infection is carried out by injection. direct.

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