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Effect of Papaya Seed Freshing (Carica papaya) with Different Dosage As A Herbal Medicine Against The Parasite Argulus Indicus on Gold Cook Fish (Carassius auratus)

Pengaruh Perasan Biji Pepaya (*Carica papaya*) Dengan Dosis Yang Berbeda Sebagai Obat Herbal Terhadap Parasit *Argulus indicus* Pada Ikan Mas Koki (*Carassius auratus*)

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ABSTRACT

Goldfish include ornamental fish with many fans because of various strains (Syaifudin, 2004). The type of parasite that often attacks freshwater fish is *Trichodina sp. Dactylogyrus sp. Gyrodactylus sp. Ichtyopthirius Mulrifilis sp. Lernaea sp. Argulus sp. and Myxobolus sp* (Zheila, 2013).. Papaya seeds contain carpain alkaloids (Khrisna, 2008), which is also a vegetable insecticide (Kurnia et al., 2012). The data collection method used in this study is a complete random design (RAL) with 4 treatments as follows: A: Test media without papaya seed juice concentrate 0 ml/l of water, b test media with papaya seed juice concentrate 20 ml/l of water, C Test media with papaya seed juice concentrate 40 ml/l of water, d test media with papaya seed juice concentrates 60 ml/l of water. Requests D indicates the best dose among other treatments because carpain works to suppress the central nervous system (Nur, 2002). Duke (1992) says, karpain has the activity of suppressing the central nervous system by binding to Na+ ions to the nerves. Na+ ions function to deliver nerve impulses until action occurs. The argulus nerve is associated with a sucker that functions to stick. The pressed nerve cannot deliver nerve impulses to the sucker resulting in argulus unable to infestation of mascoki fish. Giving papaya seed juice with different doses has a very significant effect on argulus parasites, 60 ml/l (treatment d) can suppress very high argulus namely 30.56%, a 40 ml/L donation (treatment C) can suppress argulus ie 25% of 20 ml/L (treatment B) can suppress argulus, which the same as 0%.

ABSTRAK

Ikan mas koki termasuk ikan hias dengan banyak penggemar karena strain yang beragam (Syaifudin, 2004). Jenis parasit yang sering menyerang ikan air tawar adalah *Trichodina sp. Dactylogyrus sp. Gyrodactylus sp. Ichtyopthirius mulrifilis sp. Lernaea sp. Argulus sp.* dan *Myxobolus sp* (Zheila, 2013). Biji pepaya mengandung alkaloid karpain (Khrisna, 2008), yang juga bersifat sebagai insektisida nabati (Kurnia et al.,, 2012). Metode pengambilan data yang digunakan dalam penelitian ini adalah Rancangan Acak Lengkap (RAL) dengan 4 perlakuan sebagai berikut: A Media uji tanpa perasan biji papaya

konsentrasi 0 ml/l air,B Media uji dengan perasan biji pepaya konsentrasi 20 ml/l air,C Media uji dengan perasan biji pepaya konsentrasi 40 ml/l air,D Media uji dengan perasan biji pepaya konsentrasi 60 ml/l air. Perlakuan D menunjukkan dosis yang paling baik diantara perlakuan lainnya karena karpain bekerja menekan sistem saraf pusat (Nur, 2002). Duke (1992) mengatakan, karpain memiliki aktivitas menekan Central Nervous system dengan mengikat ion Na+ pada saraf. Ion Na+ berfungsi mengantarkan impuls saraf hingga terjadi aksi. Saraf Argulus berhubungan dengan sucker yang berfungsi untuk menempel. Saraf yang ditekan tidak dapat mengantar impuls saraf sampai ke sucker mengakibatkan Argulus tidak dapat menginfestasi ikan maskoki. Pemberian perasan biji papaya dengan dosis yang berbeda berpengaruh sangat nyata terhadap parasit Argulus, Pemeberian 60 ml/l (perlakuan D) dapat menekan Argulus yang sangat tinggi yaitu 30,56%, Pemeberian 40 ml/l (perlakuan C) dapat menekan *Argulus* yaitu 25% Pemeberian 20 ml/l (perlakuan B) dapat menekan Argulus yaitu 11,11% Pemeberian 0 ml (perlakuan A) tidak dapat menekan pertumbuhan Argulus atau sama halnya 0%.

Kata Kunci	*Perasan Biji Pepaya, Obat Herbal, Parasit Argulus Indicus, Ikan Mas Koki Carassius Auratus*
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INTRODUCTION

Ornamental fish cultivation is one option for running a business in the fisheries sector. This business choice is supported by the production of goldfish which reaches 6,732,000 fish per year (Nevada, 2011).

Goldfish are one of the export commodities for freshwater ornamental fish. Exports of goldfish are not as numerous as other types of freshwater ornamental fish, but almost every exporter includes goldfish in their shipments (Beauty et al., 2012). Goldfish are ornamental fish with many fans because of their diverse strains (Syaifudin et al., 2004).

Ectoparasites are parasites that attack fish on the outside such as the skin and scales. The type of parasite that often attacks freshwater fish is *Trichodina* sp.; *Dactylogyrus* sp.; *Gyrodactylus* sp.; *Ichtyopthirius mulrifilis* sp.; *Lernaea* sp.; *Argulus* sp.; and *Myxobolus* sp (Zheila, 2013).

Attacks by the Argulus indicus parasite do not cause death to fish because *Argulus indicus* only sucks the fish's blood so the fish become thin. Bite wounds on the fish's body are easily attacked by bacteria or fungi. This secondary infection can cause mass fish deaths (Afrianto & Liviawaty, 1992).

Papaya seeds are an agricultural waste that can be used as traditional medicine. The advantages of papaya seeds as medicine are that they do not cause side effects, are easy to obtain and are affordable. The use of papaya seeds is by making papaya seed juice because it is easy, cheap and fast (Kumar et al., 2012). Papaya seeds contain the alkaloid carpain (Khrisna, 2008) which also acts as a botanical insecticide (Kurnia et al., 2012).

METHODS

The method used in this research is an experimental method. The data collection method used in this research was a Completely Randomized Design (CRD) with 4 treatments as follows:

A = Test media without papaya seed juice, concentration 0 ml/l water,
B = Test medium with papaya seed juice with a concentration of 20 ml/l water,
C = Test medium with papaya seed juice with a concentration of 40 ml/l water,
D = Test medium with papaya seed juice with a concentration of 60 ml/l water.

In this study, at least 6 repetitions had to be used. The placement of each experimental unit was carried out randomly in 24 research containers.

Research Procedure

Before being used for research, a plastic basin or aquarium as a test medium is washed and cleaned using detergent, then rinsed with clean water and dried for 24 hours. The plastic basin that has been cleaned is then filled with 1000 ml of clean fresh water. Once it is all filled, the aquarium is left to sit and aerate for 24 hours.

Goldfish (*Carassius auratus auratus*) were acclimatized in a previously prepared container, after going through an aeration process and acclimated for one day before being treated. Acclimatization was carried out for 24 hours before treatment so that the fish were not stressed.

A special aquarium that was ready for use before the research process was filled with goldfish that had been infected with Argulus as hosts, combined with the research fish and then fed regularly and without water changes for ± 1 week, thereby triggering the growth of Argulus. After that, Argulus grew and attacked the research fish, then divided the fish infected with Argulus into each aquarium as many as 3 fish.

The papaya seeds used are black, come from ripe papaya fruit (yellowish green, soft skin and orange red flesh) (Dwi, 2014). Two kilograms of fresh papaya seeds are blended until the form resembles mush. The papaya seed pulp is then squeezed using filter paper. The papaya seed juice obtained was 850 ml with a concentration of 100% containing carpain compounds.

Three goldfish that were attacked by two Argulus each or each aquarium containing six Argulus were put into an aquarium containing papaya seed juice. The aquarium is filled with papaya seed juice according to a predetermined concentration. Observations were carried out for 60 minutes based on preliminary research. During treatment the fish were not given food.

RESULT AND DISCUSSION

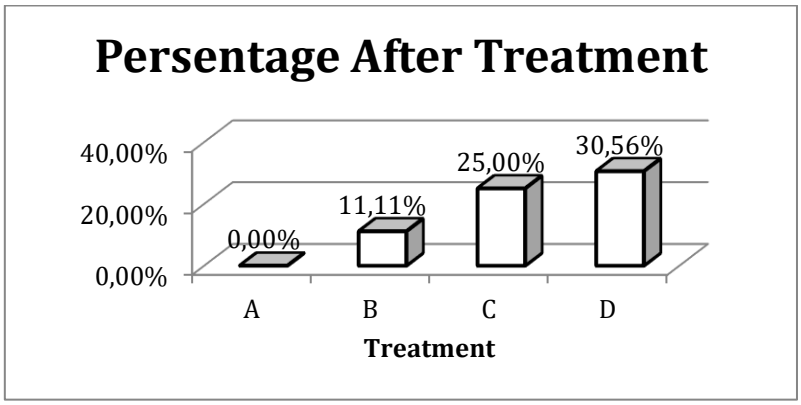
Argulus infestation is expressed by the number of *Argulus* attached to the surface of the goldfish's body. Argulus infestation was calculated after soaking with papaya seed juice. The average number of *Argulus* infestations can be seen in the following table:

Table: Average number of *Argulus* in goldfish after treatment

No.	Treatment	Mean final Argulus number ± SD
1	A (0 ml)	$6 \pm 0{,}0^{c}$
2	B (20 ml)	$5{,}33 \pm 0{,}516^{cb}$
3	C (40 ml)	$4{,}5 \pm 0{,}83^{ba}$
4	D (60 ml)	$4{,}17 \pm 0{,}98^{a}$

Note: a, b, c: lowercase letters on different lines indicate significant differences between treatments; SD: Standard deviation; A, B, C, D: Concentration of papaya seed juice (control, 20 ml, 40 ml, 60 ml).

The table shows that papaya seed juice has an effect on Argulus infestation in goldfish. Treatment A (control) was very significantly different from treatments B (20 ml), (C 40 ml), and (D 60 ml). Treatment B (20 ml) was not significantly different from treatments A (control) and C (40 ml). Treatment C (40 ml) was not significantly different from treatments B (20 ml) and D (60 ml). Treatment D (60 ml) is significantly different from treatment B (20 ml and C (40 ml). From the results of the table, shown in graphical form as follows:



Based on the graph, the percentage of optimal concentration of papaya seed juice in treatment D is 60 ml because it is able to prevent the least amount of Argulus attacks on average. Of the 6 infested Argulus, treatment D was able to suppress 30.56% of the invading *Argulus*.

Table 1. ANOVA test results for differences in doses of papaya seed juice

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	12.333	3	4.111	8.506	.001
Within Groups	9.667	20	.483		
Total	22.000	23			

Next, a BNT test was carried out to compare the differences between treatments.

Table 2. Tukey Duncan

Concentration Treatment	N	Subset for alpha = 0.05		
		1	2	3
D	6	4.17		
C	6	4.50	4.50	
B	6		5.33	5.33
A	6			6.00
Sig.		.416	.051	.112

Table 3. Water Quality

VARIABEL	**Measurement Range**	**Optimum Range**	**Sources**
Temperature	29-30	23-30°C	(Latha & Lipton, 2007)
pH	5-7	5-7	SNI3 7733:2018
DO	6-8	3-8 mg/L	SNI3 7733:2018

The results showed that there were real differences between treatments. These results prove that control concentrations of papaya seed juice, 20 ml, 40 ml, and 60 ml can prevent *Argulus* infestation with a soaking time of one hour. The prevention method used is dipping, namely soaking the fish in papaya seed juice. Dipping is an effective method to prevent Argulus infestation because carpain compounds are soluble in water (Whindhalz et al., 1989) in (Nur, 2002) so that carpain compounds can come into direct contact with parasites on the surface of the fish's body.

Papaya seed juice can prevent *Argulus* infestation in goldfish because it contains carpain, benzylisothiocyanate, benzylglucosinolate, glucotropacholine, benzylthiourea, caricin and myrosin enzymes (Boshra & Tajul, 2013). Of all the active ingredients in papaya seeds, carpain can be used as a vegetable insecticide Kurnia et al., 2012). Carpain in papaya seeds is an alkaloid with levels of 1000-1500 ppm (Duke, 1992).

The graph of the percentage dose of papaya seed juice shows that in treatment A the percentage of effectiveness was the lowest, namely 0% because treatment A was a control treatment. In the control treatment there was no addition of papaya seed juice so there were no carpain compounds that affected *Argulus*. Treatments B and C are not significantly different, namely having an effectiveness of 11.11% and 25%. Treatment C is not significantly different from treatment D. The effectiveness of treatment C is closer to treatment D compared to other treatments (A and B), namely 25% and 30.56% respectively. Treatment D's ability to squeeze papaya seeds to prevent *Argulus* infestation was the greatest compared to other treatments, namely 30.56%. This is because it is thought that at this concentration, the carpain compound can work optimally.

Treatment D showed the best dose percentage among the other treatments (A, B and C) because of the influence of carpain which works to suppress the central nervous system (Nur, 2002). (Duke, 1992) also said that carpain has the activity of suppressing the Central Nervous System (CNS) by binding Na+ ions to the nerves. Na+ ions function to deliver nerve impulses until action occurs. The *Argulus* nerve is connected to the sucker which functions to attach. The compressed nerve cannot transmit nerve impulses to the sucker, resulting in *Argulus* being unable to infest the goldfish.

Water quality was measured before and after treatment to determine changes in water quality due to the juice of papaya seeds. Water quality measurements in the research were temperature, pH and DO. The results of water temperature measurements before and after treatment were not different, namely 29°C in treatment A. Treatments B, C, and D experienced changes in temperature, namely from 29°C to 30°C. According to Latha & Lipton (2007) goldfish can live at temperatures of 23-30°C. Treatment A did not experience a change in DO because treatment A was a control. Meanwhile, observations of DO showed a decrease in treatments B, C, and D from 8 mg/L for each treatment to 6 mg/L. The decrease in DO occurs as the water temperature increases. Brown (1987) in Effendi (2003) said that an increase in temperature of 1°C will increase oxygen consumption by around 10%. The change in DO can be said to be good because goldfish can live with a DO range of 3-8 mg/L (SNI 7733, 2018). Observations of the pH before treatment were 7. In treatment A there was no change in pH because treatment A was a control. Treatments B, C, and D experienced a decrease in pH to 6. The decrease in pH had no effect on the fish because goldfish can grow well in the pH range 5-7 (SNI 7733, 2018). The results of these water quality measurements can be used as a consideration that the juice of papaya seeds can be used to prevent *Argulus* infestation in goldfish.

CONCLUSSION AND SUGGESTION

From the results and discussions that have been carried out research on the Effect of Papaya Seed Juice (*Carica papaya*) with Different Doses as a Herbal Medicine on the *Argulus indicus* Parasite in Goldfish (*Carassius auratus*) can be concluded as follows:

1. That giving papaya seed juice at different doses has a very significant effect on the *Argulus* parasite
2. Giving 60 ml/l (treatment D) can suppress Argulus parasites very high, namely 30.56%
   Giving 40 ml/l (treatment C) can suppress Argulus parasites by 25%
   Giving 20 ml/l (treatment B) can suppress Argulus parasites by 11.11%
   Giving 0 ml (treatment A) cannot suppress *Argulus* growth infestation or the same as 0%
3. During the research, water quality was obtained with an average temperature value of 29-30°C, pH 5-7, and DO 6-8 mg/L. From these results, the water quality is still within the normal range.

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