

EFFECTIVENESS TEST OF PAPAYA LEAVES EXTRACT (*Carica papaya* L.) AS ANTIHELMINTICS OF *Ascaridia galli* WORM

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Abstract: Introduction: Soil-transmitted helminth is a group of nematoda worm parasite that causes infection in human because the egg is swallowed or direct contact with the larva. More than two billion people in the world had infection for at least one spesies of the nematoda worm, especially *A. lumbricoides*, *T. trichiura* and *A. duodenale*. *Ascaridia galli* is a worm parasite that classifeid in nematoda fillum. *Ascaridia* worm has the same genus with *Ascaris Lumbricoides* that infect human. Anthelmintic is a drug that can eradicate the worm in human and animal body. There is a side effect in the anthelmintic drug like Mebendazole so another alternative like organical anthelmintic from papaya leaves (*Carica papaya* L.) is needed. This research is a true experiment with post test control group design. The subjects were 160 *Ascaridia galli* worm which were divided into 5 worms in each test group (5%, 10%, 20%, 40%, 60%, dan 80%), positive control group (Pirantel pamoat 0,5%) and negative control repeated as many as 4 replications. The treatment was given for 12 hours and observed the number of dead worm at each hour. Data were analyzed by statistical test of Kruskal Wallis Test and followed by post-hoc Mann-Whitney Test. It is also tested the probit analysis to determine lethal time (LT₅₀ and LT₉₀) and lethal concentration (LC₅₀ and LC₉₀). There was a significant difference ($p < 0.05$) between all test concentrations except between 5% to negative control. It could be evidenced that the papaya leaves (*Carica papaya* L.) has an anthelmintic effect on *Ascaridia galli*. The results of probit analysis for LC₅₀ and LC₉₀ were 6,182% and 14,422% respectively. It is known that LT₅₀ at concentrations of 25%, 10%, 20%, 40%, 60%, and 80% respectively were 11,84 hours, 10,536 hours, 9,328 hours, 6,794 hours, 5,472 hours and 2,892 hours. While the LT₉₀ at concentrations of 25%, 10%, 20%, 40%, 60%, and 80% respectively were 13,608 hours, 12,303 hours, 11,095 hours, 8,562 hours, 7,24 hours, dan 4,66 hours. The ethanol extract of Papaya leaves *Carica papaya* was shown to have an anthelmintic effect on *Ascaridia galli* effectificaly at concentrations of 10%, 20%, 40%, 60% dan 80%. The values of LC₅₀ and LT₅₀ at highest concentration (80%) at the end of the observations are 6,182% and 2,892 hours respectively. The values of LC₅₀ and LT₉₀ at the highest concentration (80%) were 14,442% dan 4,66 hours respectively. The higher concentration of ethanol extract of papaya leaves *Carica papaya* the greater the effectiveness in killing *Ascaridia galli*.

Keywords: Anthelmintic – *Ascaridia galli* – *Carica papaya* L. – Lethal Concentration – Lethal Time

INTRODUCTION

Worm infection is one of the most common diseases that found and affects more than 2 billion people in the world, especially those that caused by *A. lumbricoides*, *T. trichiura* and *A. duodenale*. Based on a survey conducted in several places in Indonesia, the prevalence of roundworm infection, *A. lumbricoides*, is around 60-90% and it is the highest prevalence compared to other worm infections.¹ Worm infection almost found in high humidity area especially with bad hygiene. The most prevalent infection are in elementary age.¹⁰ This is kind of chronic and endemic disease cause by parasite worm and will effect nutrition state and health community.¹

A. galli is a parasitic worm classified in fillum nematodes. *A. galli* and *A. lumbricoides* are in one family and equally react to piperazin and the host is infected by ingesting infective egg worm.²

Anthelmintics are drugs that can destroy worms in the body of humans and animals. Mebendazol is the broadest spectrum of worm medicine. This drug does not dissolve in water so it is stable in an open state. Mebendazol has side effects for the body. Side effects that arise can be diarrhea and mild abdominal pain.¹

Therefore, the papaya plant was chosen. Papaya (*Carica papaya L.*) has two main bioactive components, namely papain and chymopapain. Saponins and papain are chemical compounds found in papaya leaf (*Carica papaya L.*) which have an important role in treating intestinal worms. The work mechanism of sapoin can reduce the surface tension so it can damage cell membranes and cell proteins. While the work mechanism of the papain enzyme is t

o relax worms by damaging the body protein of worms in the digestive tract so that the supply of nutrients to the worms will be hampered.⁴

In order to overcome this problem, the use of drugs from natural ingredients was developed. The benefits of natural anthelmintics are made from natural ingredients, have fewer side effects, inexpensive and easily obtained.³

RESEARCH METHOD

This research used true experiment with post-test control only group design. There was an experimental group (intervention of *Carica papaya L.* leaf extract) and control group (positive control with the intervention of 0.5% pirantel pamoat and negative control without intervention of 0.5% pirantel pamoat).

A. galli was chosen as the population of this study, while the sample was 5 *Ascaridia galli* worm which is obtained at the slaughterhouse of Terban market in Yogyakarta city. Inclusion criteria were worms that are still alive and moving, body size is the same, male or female; exclusion criteria was worms that are dead or unable to move.

Anthelmintic tests were done in 6 test groups and 2 control groups with 4 repetitions according to the calculation of the sample size estimation. The I-VI test group was immersed in a suspension of papaya leaf ethanol extract (5%, 10%, 20%, 40%, 60% and 80%, respectively). Each group consisted of 5 *Ascaridia galli* worms. The data were analyzed using statistical test, the Kurskal Wallis test followed by post-hoc test 6 Mann-Whitney test. The probit analysis test was also conducted to determine lethal time (LT₅₀ and LT₉₀) and lethal concentration (LC₅₀ and LC₉₀).

RESULT AND DISCUSSION

Total mortality of *Ascaridia galli* worms in every hour can be seen in table 1.

Table 1. Total mortality of *Ascaridia galli* worms every hour at various conservations of papaya leaf extract (*Carica papaya L*) for 12 hours.

At Period	Treatment							
	5%	10%	20%	40%	60%	80%	K(+)	K(-)
1	0	0	0	0	0	0	0,25	0
2	0	0	0	0	0	1,25	3	0
3	0	0	0	0	0	3	4,5	0
4	0	0	0	0	0,25	4	5	0
5	0	0	0	0,5	2,25	5	5	0
6	0	0	0	1,25	3	5	5	0
7	0	0	0	2,75	4,75	5	5	0
8	0	0	0,75	4,25	5	5	5	0
9	0	0,5	2,5	4,75	5	5	5	0
10	0,25	1,5	3	5	5	5	5	0
11	1,5	3,25	4,5	5	5	5	5	0
12	2,75	4,5	5	5	5	5	5	0

Notes:

	: Significance
	: Not Significance

Table 2. Result of probit analysis for Letal Concentration

Lethal Concentration	Concentration	Lower Limit	Upper Limit
LC50	6,182	4,663	10,125
LC90	14,422	10,342	34,889

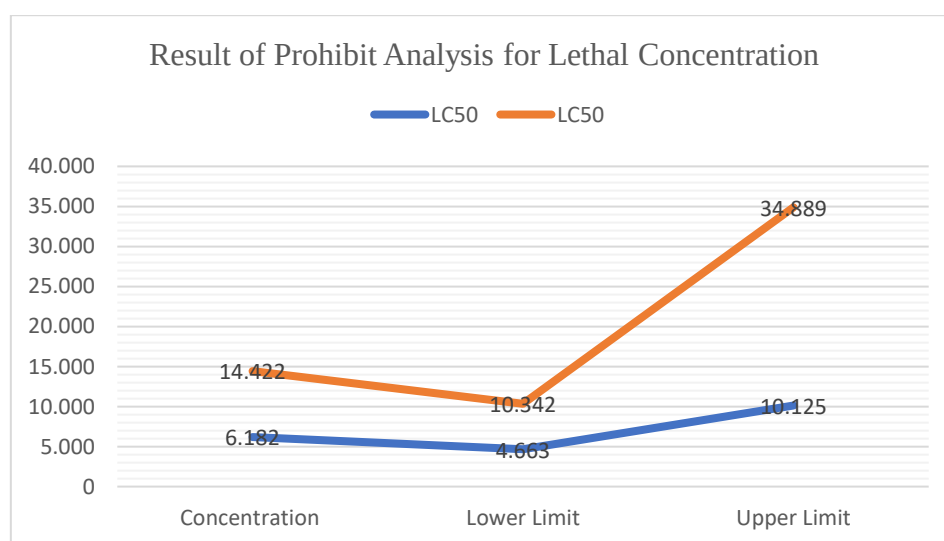


Figure 1. Result of probit analysis for Letal Concentration

Table 3. Result of probit analysis

Concentration	Lethal Time	Time (hour)		
		Estimation	Upper Limit	Lower Limit
5,00%	LT50	11.840	10.892	12.892
	LT90	13.608	12.586	14.960
10,00%	LT50	10.536	9.704	11.401
	LT90	12.303	11.435	13.431
20,00%	LT50	9.328	8.526	10.134
	LT90	11.095	10.279	12.143
40,00%	LT50	6.794	5.995	7.593
	LT90	8.562	7.753	9.597
60%	LT50	5.472	4.661	6.282
	LT90	7.240	6.421	8.285
80,00%	LT50	2.892	2.047	3.715
	LT90	4.660	3.832	5.692

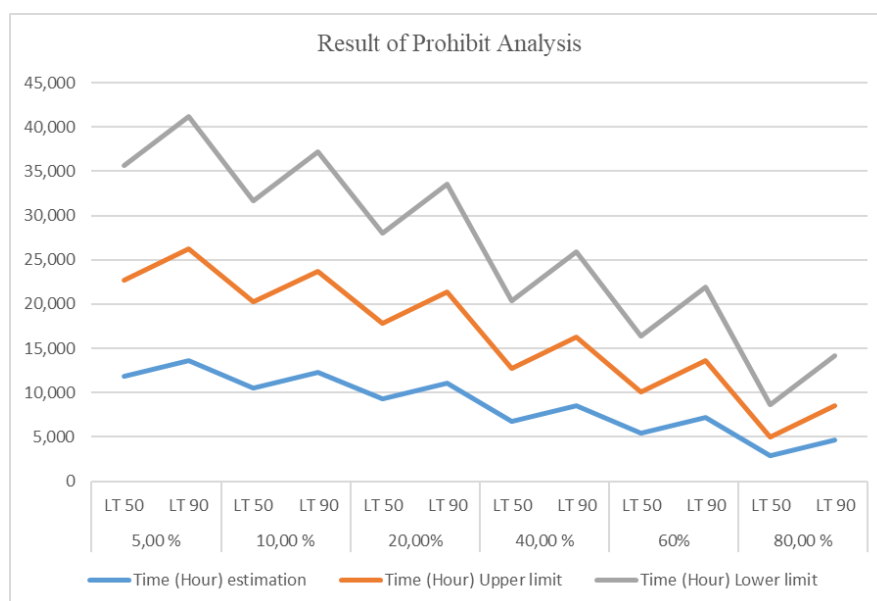


Figure 2 Result of probit analysis

Table 1 shows that giving papaya leaves ethanol extract (*Carica Papaya L.*) has an antihelmintic effect on *Ascaridia galli* worms, especially at concentrations of 20%, 40%, 60% and 80% which can kill all *Ascaridia galli* worms at 12 o'clock.

In Mann-Whitney test table, there were significant differences ($p < 0.05$) between all test concentrations of negative controls except at concentration of 5%. This can prove that papaya leaves (*Carica Papaya L.*) have an antihelmintic effect on

Ascaridia galli worms. Previously, the effectiveness of papaya (*Carica Papaya L.*) leaves on other worm species such as *Ascaris Suum* and *Pheritima posthuma* was carried out, all of which have antihelmintic effects.⁶ There were supporting results in the study⁵ where significant differences were found between various test concentrations (20%, 30%, 40%) and papaya leaf extract with negative control ($p < 0.05$). Papaya leaves (*Carica Papaya L.*) also had an antihelmintic effect on *Ascaris*

suum worms with a percentage of mortality at the smallest concentration 25% in 24 hours of observation.⁶ The probit analysis test to assess LC is listed in the table and it is known that LC₅₀ and LC₉₀ are 6.182% and 14.422% respectively.

These results indicate that a concentration of 6.182% is needed to kill 50% of the worm population and 14.422% to kill 90% of the worm population. Another study conducted⁷ shows LC₉₀ is 18,354%. With a lower limit of 15,386% and an upper limit of 25,825%. This difference may occur due to the use of papaya leaf infusion (*Carica Papaya L.*). Infusa has a different Lethal Concentration because according to some studies ethanol can produce more extracts, namely phytoconstituents (alkaloids, saponins, carbohydrates, tannis and flavonoids) compared to other solvents such as petroleum ether, chloroform and water.

Several other studies also support this result. In the research⁸ about larvacide effect of papaya fruit extract (*Carica Papaya L.*) toward third insted larvae of *Aedes Aegypti L.* show that it had LC₅₀ and LC₉₀ respectively 15.4% and 36.7% which were different from research on the effect of infusion of papaya fruit seeds (*Carica papaya L.*) on the death of *Aedes Aegypti* larvae which have LC₅₀ and LC₉₀ respectively 1.689% and 2.876%.²

The probit analysis test to assess the LT is listed in table 4. This result means that at a 5% concentration it takes 13.608 hours for 90% of the worm population to die, as well as for other concentrations. In the other study⁷ showed LT₅₀ and LT₉₀ in the infusion of papaya leaf were 20,975 hours and 26,476 hours respectively. Whereas in study⁹ about the test of antihelmintic effectiveness of papaya leaf on roundworms, LT₁₀₀ is listed as 28.885 hours. This difference can occur because the study used papaya leaf infusion and another study⁹ was carried out using *Ascaris suum* worms while this study used extracts of papaya leaf (*Carica papaya L.*).

CONCLUSION

Carica papaya L. leaf extract proven to have antihelmintic effect on *Ascaridia galli* worms, especially at concentrations of 10%, 20%, 40%, 60% and 80%. The higher concentration of leaf extract means the greater of effectiveness in killing *A. galli*.

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