

## Efek Perendaman Bawang Putih Terhadap Waktu Kematian *Ascaridia galli*

### Effect of Garlic (*Allium sativum*) Infusion On The Time of Death of *Ascaridia galli*

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#### Abstract

Infectious disease is a major problem for animal husbandry. One of infectious disease is caused by *Ascaridia galli* (*A. galli*). Ascariasis occurs in either broiler or layer that caused decrease of meat and egg productions. Garlic (*Allium sativum*) contain *allicin* that have the ability to kill parasites. This research was conducted to determine the effect of garlic on time of death of *A. galli*. In this research used *A. galli* with length 7-11 cm regardless the sex. The treatment used local (Indonesian garlic), kating and single garlic with concentration of 39.50%, 62.40% and 98.60%. The negative control used NaCl physiology (0.9 %). The result showed that all the treatment group can shortened the time of death of *A. galli* compared to control. The time of death of *A. galli* on local garlic infusion with 39.50 % concentration was 6.24 hours, on 62.40 % concentration was 4.94 hours and on 98.60 % concentration was 3.97 hours, kating garlic infusion on 39.50 % concentration was 5.08 hours on 62.40 % concentration was 3.81 hours, on 98.60 % concentration was 2.96 hours, single garlic infusion on 39.50 % concentration was 5.4 hours, on 62.40 % concentration was 3.86 hours, on 98.60 % concentration was 3.83 hours. The best treatment was kating garlic on 98.60% concentration because give shortest time of death.

**Keywords :** Garlic infusion, *Ascaridia galli*, *Allium sativum*, time of death

#### Introduction

Infectious disease is a major problem for animal husbandry. One of infectious disease is caused by *Ascaridia galli*. This worm attacks small intestine of poultry especially those one on the traditional farm type. Ascariasis occurs in either broiler or layer that caused decrease of meat and egg productions, of course it make a farmer has financial loss (Subekti *et al.*, 2011).

*A. galli* usually causes a chronic illness with slowly or subclinical symptoms (Permin *et al.*, 1998). Heavy infection by *A. galli* has effect on losing their blood, losing level of blood sugar, hiperurisemia, thymus atrophy, growth disorder and increase of mortality (Tabbu, 2002).

Study by Zalizar *et al.* (2007) on *A. galli* worm infection demonstrated lowering egg quality due to the decrease of egg weight (5.35%), thinner egg shell with the percentage decrease in egg shell thickness by 5.55% and a decrease in serum calcium level by 36.26%.

People in the rural areas, especially those work as farmers, preferred to traditional treatment

because the modern medicine is relatively expensive (Satrija *et al.*, 2007). In Indonesia there are many traditional medicines used to treat intestinal worms, one of them is garlic (Wijayakusuma, 2002).

In Indonesia there are several garlic varieties are grown, including yellow Lumbu, green Lumbu and white Lumbu. Other varieties is a modification of the three varieties, for example, is a single garlic varieties (Syamsiah and Tajudin, 2003). Indonesia has also been planting garlic from China that is Kating but its development is longer and the outcome are comparatively low compared to local garlic. In the end, Indonesia had to import Kating garlic because its less suitable cultivated in Indonesia (Wibowo, 1998).

Garlic contains many chemical compounds, among others are essential oil 0.2% (primary component of allicin), allicin, diallyl sulfide, allyl propyl sulfide, diallyl monosulfide, allyl polysulfide, allyl vinyl sulfide, and squalene (Yulianti, 2006).

Alliin works antagonizing acetylcholine thereby suppressing smooth muscle contraction caused paralysis in *Ascaris suum* (Amagase, 2010). Allicin disrupts the glycolytic pathway to form energy, so *Ascaridia galli* lack of energy and will eventually die (Zuliyannah, 2008).

The alcoholic extract of bulb of *A. sativum* has also shown moderate *in vitro* anthelmintic activity against human *Ascaris lumbricoides*. Oil of *A. sativum* has also been reported to possess anthelmintic activity and discards all parasites in the intestine (Londhe *et al.*, 2011).

Based on the background above, the research entitled anthelmintic effect of garlic infusion on time of death of *Ascaridia galli* was conducted.

## Materials and Methods

The research has been done in Veterinary Parasitology Department, Faculty of Veterinary Medicine, Universitas Airlangga Surabaya from April 29<sup>th</sup> until May 30<sup>th</sup> 2014. This research used *A. galli* with the length of 7-11 cm from small intestine of kampung chicken that purchased in poultry slaughtering house of Wonokromo traditional market. The materials that used were three types of garlic (local garlic, kating garlic and single garlic) infusion and 0.9 % NaCl.

Garlic was used in infusion form. Garlic was peeled then sliced. The slices were put into a blender and finely ground. Ground garlic was used for infusion. Concentration of garlic (*Allium sativum*) infusion used was 39.5 %, %, 62.41 %, 98.6% for each types of garlic. To prepare garlic infusion, 39.5 grams, 62.4 grams and 98.6 grams of each garlic (local garlic, kating garlic and single garlic) were put individually in 9 beaker glasses. Garlic was put in each beaker glass which is contains of 100 ml of 0.9 %. NaCl. The beaker glass was put in a water bath (90°C) for 15 minutes and stirred constantly. While it is warm, the solution was filtered with a flannel cloth until a recoverable volumes of 100 ml.

In this research the volume of infusion for each treatment in a petridish was 10 ml. Each petridish

contains 10 *A. galli*. Repetition was performed on each treatment as much as five times.

This study comprised of ten treatments :

Treatment I (Po) : Immersion the worms in 0.9% NaCl, Treatment II (P1) : Immersion of the worms in 39.50% local garlic infusion, Treatment IV (P3) : Immersion of the worms in 98.60% local garlic infusion, Treatment V (P4) : Immersion of the worms in 39.50% kating garlic infusion, Treatment VI (P5) : Immersion of the worms in 62.40% kating garlic infusion, Treatment VII (P6) : Immersion of the worms in 98.60% kating garlic infusion, Treatment VIII (P7) : Immersion of the worms in 39.50% single garlic infusion, Treatment IX (P8) : Immersion of the worms in 62.40% single garlic infusion, Treatment X (P9) : Immersion of the worms in 98.60% single garlic infusion

Incubation of each treatment was 37° C of temperature with an incubator. Observations made to record the dead worms. Observations were done in every hours until 12 hours.

## Experimental Design And Data Analysis

The experiment used completely randomized design with ten treatments and five repetitions for each treatment. The data were analyzed by Probit to determine time of death of *Ascaridia galli* and the best treatment. Statistical analyze used the Statistical Program Service and Solution (SPSS) for windows 21

## Results and Discussion

This research was conducted in two phases, preliminary research and originally research. Preliminary research was to determine the garlic (*Allium sativum*) infusion range concentration. In preliminary research used local garlic and the concentration were 25 %, 50 %, 75 %, and 100 %. The best result was concentration 100 % because it was killed all of the worms. The maximum observation time in preliminary research was 12 hours. Originally research result was demonstrated in Table 1 and Figure 1., it was the time of death of *Ascaridia galli* on each treatment.

**Table 1.** Time of Death of *Ascaridia galli* on Local, Kating and Single Garlic With Different Concentration

Treatment	Time of Death (Hour)
0.9% NaCl (Po)	15.26
Local Garlic	
39.50% (P1)	6.24 <sup>d</sup>
62.41% (P2)	4.94 <sup>bcd</sup>
98.60% (P3)	3.97 <sup>bc</sup>
Kating Garlic	
39.50% (P4)	5.08 <sup>cd</sup>
62.41% (P5)	3.81 <sup>ab</sup>
98.60% (P6)	2.96 <sup>a</sup>
Single Garlic	
39.50% (P7)	5.4 <sup>d</sup>
62.41% (P8)	3.86 <sup>abc</sup>
98.60% (P9)	3.83

a,b, c and d : Superscripts in the same columns give the significant difference ( $p < 0.05$ )

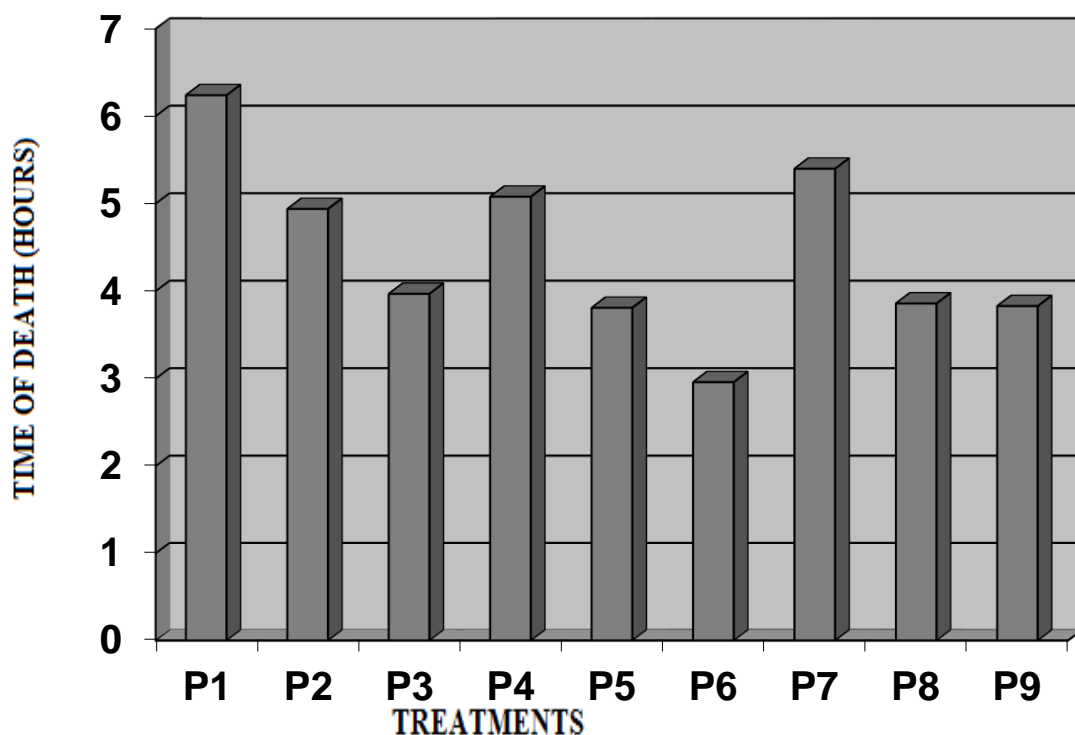
**Figure 1.** The Differences of Time of Death on Each Treatment ; P1: 39.5% Local Garlic, P2 : 62.41% Local Garlic, P3 : 98.6% Local Garlic, P4 : 39.5% Kating Garlic, P5 : 62.41% Kating Garlic, P6 : 98.6% Kating Garlic, P7: 39.5% Single Garlic, P8 : 62.41% Single Garlic, P9 : 98.6% Single Garlic

Figure 1. showed the difference effect of garlic infusion in each concentration on time of death of *A. galli*. The time of death of *A. galli* on local garlic infusion with 39.50 % concentration (P1) was 6.24 hours, on 62.40 % concentration (P2) was 4.94 hours and on 98.60 % concentration (P3) was 3.97 hours, kating garlic infusion on 39.50 % concentration (P4) was 5.08 hours on 62.40 % concentration (P5) was 3.81 hours, on 98.60 % concentration (P6) was 2.96 hours, single garlic infusion on 39.50 % concentration (P7) was 5.4 hours, on 62.40 % concentration (P8) was 3.86 hours, on 98.60 % concentration (P9) was 3.83 hours. Kating garlic infusion with concentration 98.60 % (P6) was the best treatment because their time of death was shorter than the other concentration.

The time of death of *A. galli* on 0.9 % NaCl was 30.09 hours, longer than other treatment because 0.9% NaCl was a isotonic liquid that not contain any chemical compound that has the capability to kill *A. galli*. P1 until P9 can shortened the time of death of *A. galli* but there were different time of death on each treatment. It caused by active ingredients that contain in each varieties of garlic was similar but has different percentages of each content (Wibowo, 1998).

The shortened time of death of *A. galli* was caused by allicin that works antagonizely acetylcholine thereby suppressing smooth muscle contraction caused paralysis in worms and also allicin disrupt the glycolytic pathway to form energy, so the worm will lack of energy that ends with death (Amagase, 2010). The signs of the dead worms such as, there was no movement when in immersion of garlic infusion, the worms was enervate and the colour of worms more pale (Zuliyannah, 2008).

Determined statistical analysis this research was appropriate with the other previous research. Zuliyannah (2008) done the research about garlic filtrate has anthelmintic effect on *A. galli* in vitro. The shortened time of death of *A. galli* was caused by allicin that penetrate to the cuticle of worm and covalently bonded with the phosphofructokinase enzyme in the cell of worm. This bond inhibited the changes of fructose-6-phosphate became fructose-1,6-phosphate so the ATP will not formed. Not formed of ATP made the worms lack of energy and cause dead.

This research proved that local garlic, kating garlic and single garlic infusion has capability to shortened the time of death of *A. galli*.

## Conclusion

Based on the research result has done on *A. galli* be concluded that local garlic, kating garlic and single garlic infusion with concentration of 39.5%, 62.41% and 98.6% had capability to shortened time of death of *A. galli*.

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