EFFECT OF RIMPANG TEMU GIRING (Curcuma Heyneana Val. & V. Zijp.) AND RIMPANG TEMU HITAM (Curcuma aeruginosa Roxb.) BOILED WATER ON THE MORTALITY OF Fasciola hepatica WORM IN VITRO

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ABSTRACT

Fascioliasis is a zoontic disease that infects herbivorous animals caused by Fasciola hepatica. Survey of some traditional markets and supermarkets in Semarang in 2003 obtained 51.4% of infected cattle liver F. hepatica and in 2007 fascioliasis in cattle in Indonesia reached 90%. About 2.5 million people worldwide have been infected by F. hepatica. Rimpang temu giring (Curcuma heyneana Val & V. Zijp.) and rimpang temu hitam (Curcuma aeruginosa Roxb.) are plants that are efficacious as an anthelmintic. This study aims to determine the effect of boiling water from the rhizome of rimpang temu giring and black against the mortality of Fasciola hepatica and minimal concentration of the cooking water from the rhizome of rimpang temu giring and black. The sample was 140 worms from cattle liver Slaughterhouse Pegirian in Surabaya. F. hepatica incorporated into the cooking water from the rhizome of rimpang temu giring and black with a concentration of 100%, 80%, 60%, 40%, 20% and 10% mortality by looking at time. The results show mortality F. hepatica at a concentration of 10% rhizome of temu hitam within 150 minutes, and mortality F. hepatica at a concentration of 10% rhizome of temu hitam within 165 minutes. Based on One Way Anova test, obtained p value 0.000 < 0.05, which indicates that the water decoction from the rhizome of rimpang temu giring and black worms affect the mortality of Fasciola hepatica in vitro.

Keywords: rimpang temu giring (Curcuma heyneana Val & V. Zijp.), rimpang temu hitam (Curcuma aeruginosa Roxb.), mortality Fasciola hepatica

INTRODUCTION

Fascioliasis is a parasitic zoonotic disease that infects herbivores (cows, goats, buffalo, sheep) and is caused by Fasciola hepatica. These worms are in the bile ducts causing liver damage. Prevalence of fascioliasis in ruminant livestock in Indonesia ranges between 60% - 90% (Kurniasih 2007). In 2007 Indonesia the prevalence of fascioliasis in cattle is as high as 90%. However, this species can also be transmitted to humans, approximately 2.5 million people worldwide are infected whereas human cases in Indonesia has yet
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to be reported (Kurniasih 2007). Fascioliasis can take place in acute or chronic. Acute Fascioliasis more is commonly seen in sheep and goats. Chronic Fascioliasis is often seen in the definitive host, including humans.

Incidence of fascioliasis in humans is closely related to the habit of eating raw vegetables or drinking contaminated raw water containing metacercaria larvae contained within the cyst form. If liver undercooked infected with Fasciola hepatica worm eaten, then the worms were also ingested, causing severe pharyngitis and edema of the larynx (Pusarawati 1990). This worm infection in humans causes non-specific symptoms such as malaise, intermittent fever, jaundice, mild anemia, eosinophilia, and the haunting pain. They lead to ectopic infections, particularly in the lung and subcutaneous tissue formed cysts (Kurniasih 2007).

Based Putratama study (2009) showed that the results of a survey of 30 samples of cow feces found seven types of worm eggs, one of which is Fasciola 13.33%. The survey results in animal markets and slaughterhouses in Indonesia indicate that 90% of cattle from infected livestock such as worms F. hepatica (Syailin 2009). Fasciola hepatica infection in beef liver sold in traditional markets and supermarkets in Semarang showed that of the 35 liver samples, obtained 51.4% (Al Amin 2001).

The growth of parasite resistance to treatment is a threat to the eradication of parasitic diseases in humans (Magdalena & Hadidjaja 2005). Therefore, look for alternative treatments that have little side effects, low cost, easy way of treatment, and easily available in the community (Koesdarto 2000). One of the plants is efficacious as anthelmintic temu giring rhizome (Curcuma heyneana Val. & V. Zijp.) And temu hitam rhizome (Curcuma aeruginosa Roxb.) (Dalimutha 2004, Santosoto 2008). Rhizome temu giring curcumin-containing compounds that can give a yellow color, 0.8 to 3% essential oils, starch, resins, fats, tannins, saponins, and flavonoids. Saponins and flavonoids as a potent anti-inflammatory and asirinya oil can kill the worms Fasciola hepatica (Santosoto 2008). Fitriyanti research results (2009) showed Fasciola gigantica worm mortality occurred at a concentration of 2% freshly temu giring rhizome (Curcuma heyneana Val. & V. Zijp.).

Rhizome temu hitam (Curcuma aeruginosa Roxb.) Contains essential oils, tannins, kurkumol, kurkumenol, isokurkumenol, kurzerenol, kurdion, kurkumalaktion, germakron, alpha-Elemene, beta-elemene, g-elemene, linderazulekurkumin, demethoxykurkumin, bisdemethoxykurkumin (Dalimutha 2004). The active substance is anthelmintik sesquiterpenes in the essential oil of temu hitam which can depress the central nervous system causing seizures followed by death worm (Tamara 2008).

The purpose of this study was to determine the effect of boiling water temu giring rhizome (Curcuma heyneana Val. & V. Zijp.) And temu hitam rhizome (Curcuma aeruginosa Roxb.) Against Fasciola hepatica worm mortality in vitro and determine the minimum concentration of the cooking water rhizome temu giring (Curcuma heyneana Val & V. Zijp.) and temu hitam rhizome (Curcuma aeruginosa Roxb.) on mortality worms F. hepatica. The benefit of this study is to provide information about the efficacy and complement temu giring rhizome (Curcuma heyneana Val & V. Zijp.) and temu hitam rhizome (Curcuma aeruginosa Roxb.) as an anthelmintic.

**MATERIALS AND METHODS**

This type of research is experimental laboratory. The sample for this study was a worm Fasciola hepatica obtained from Slaughterhouse Pegirian Surabaya. In this study using data collected observation of Fasciola hepatica worm observed after administration of some of the cooking water concentration temu giring rhizome (Curcuma heyneana Val & V. Zijp.) and analyzed using one way ANOVA.

For the manufacture of cooking water rhizome temu giring, dribbles Intersection rhizome fresh peeled, washed and sliced. Considering the temu giring rhizome slices as much as 100 grams. Incorporating 100 ml of distilled water to the erlenmeyer. Heating it to boiling water, entering temu giring rhizome slices in boiling water to cover the erlenmeyer with cotton and aluminum foil and wait for 4-5 minutes. After the stew rhizome temu giring cold, filtered so getting 100% concentration of the cooking water. Then make cooking water rhizome temu giring with some concentration. Decoction of the rhizome temu giring water concentration of 100% made 80% concentration, the concentration of 60%, the concentration of 40%, 20% concentration, and the concentration of 10% (Mahendra 2006).

For the manufacture of cooking water rhizome Intersection black, temu hitam rhizome fresh peeled, washed and sliced. Considering the temu hitam rhizome slices as much as 100 grams. Incorporating 100 ml of distilled water to the erlenmeyer. It was heated to boiling water. Entering temu giring rhizome slices in boiling water to cover the erlenmeyer with cotton and aluminum foil and wait for 4-5 minutes. After the stew rhizome temu giring cold, filtered so getting 100% concentration of the cooking water. Then make a
rhizome boiled water with some concentration of *temu hitam*. Rhizome decoction of *temu hitam* of concentration 100% made 80% concentration, the concentration of 60%, the concentration of 40%, 20% concentration, and the concentration of 10% (Mahendra 2006).

To observe mortality *Fasciola hepatica* worms, prepared 13 petri dish for each rhizome decoction of rhizome *temu giring* and black. Entering *temu giring* rhizome boiled water concentration of 100%, 80%, 60%, 40%, 20%, 10% respectively in 6 petri dish and incorporate *temu hitam* rhizome boiled water concentration of 100%, 80%, 60%, 40%, 20%, 10% respectively in 6 petri dish. One petri dish other used as a control containing buffer concentration saline. Then it was put in an incubator at a temperature of 37°C for 15 minutes. Entering 10 pieces of worms *Fasciola hepatica* into each petri dish on each rhizome *temu giring* cooking water concentration of 100%, 80%, 60%, 40%, 20%, 10%. Entering 10 pieces of worms *Fasciola hepatica* to each petri dish on each rhizome of *temu hitam* the cooking water concentration of 100%, 80%, 60%, 40%, 20%, 10%. 10 pieces of worms *Fasciola hepatica* into petri dish used as a negative control. All petri dish were incubated at 37°C. Observations were made every 15 minutes, by touching the worms with tweezers. Observations were made by looking at the worms, death due to the neurotoxic effects of sesquiterpenes. Symptoms of tremor were caused by the shorter time it takes to turn off (mortality) all the worms of *Fasciola hepatica* in the same time is 30 minutes. While the concentration of 80%, 60%, 40%, 20%, and 10%, to turn off all the worms mortality time of *Fasciola hepatica* requires a longer time than the concentration of 100%.

### RESULTS

After doing research the influence of the cooking water *temu giring* rhizome (*Curcuma heynana Val & V. Zijp.*) and *temu hitam* rhizome (*Curcuma aeruginosa Roxb.*) against *Fasciola hepatica* worm mortality we obtained results as in Table 1. In this study was used as the control worms *Fasciola hepatica* life in buffered saline solution. *Fasciola hepatica* worms was found to live longer than when the worm began immersed in buffered saline solution, incubated at 37°C until all the dead worms in each bath. From the observations obtained survival time *Fasciola hepatica* worms in a solution buffered saline with 2 replication time is 14 hours (840 minutes). So the influence of experimental observation time cooking water rhizome *temu giring* (*Curcuma heynana Val & V. Zijp.*) and rhizomes of *temu hitam* (*Curcuma aeruginosa Roxb.*) against *Fasciola hepatica* worm mortality in vitro performed with a maximum period of observation for 14 hours.

### DISCUSSION

Mortality worms *Fasciola hepatica* in boiling water rhizome *temu giring* due to volatile oil content of the rhizome *temu giring* that are anthelmintik. This accords with the statement Santos (2008) that the essential oil in the rhizome *temu giring* have anthelmintic power. Fitriyanti (2009) proved that there *temu giring* influence rhizome juice (*Curcuma heynana Val & V. Zijp.*) on mortality liver fluke (*Fasciola gigantica* L.).

From the results of the study also found a greater concentration of *temu hitam* rhizome boiled water, then the shorter the time it takes to turn off (mortality) all hepatica. Hal *Fasciola* worms caused the rhizome essential oil of *temu hitam* that has anthelmintic. Both rhizome rhizome *temu giring* and black have the same active substance content of sesquiterpenes in the essential oil. Anthelmintic potential of the cooking water and rhizome rhizome *temu giring* possible because contained in the essential oil can depress (pressing) and central nervous induce muscle fasciculations that the lack of coordination that cause tremors. Symptoms of tremor is due to the neurotoxic effects of sesquiterpenes. Sesquiterpenes inhibited smooth muscle contraction through covalent modification of proteins required.
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Unidentified contractile apparatus of smooth muscle. Sesquiterpenes also reduce the influx of Ca2+ into the smooth muscle cells, causing smooth muscle paralysis worms _Fasciola hepatica_ (Tamara 2008).

At the time table of _Fasciola hepatica_ worm mortality at a concentration of 60%, 20% and 10% water decoction of the rhizome _temu giring_ longer than 5-10 minutes in a boiling water rhizome of _temu hitam_. It is the possibility of water boiling sesquiterpenes content rhizome _temu giring_ lower than boiling water rhizome of _temu hitam_. At a concentration of 10% water decoction of the rhizome _temu giring_ and water boiled rhizomes of _temu hitam_ a minimum concentration can cause mortality of _Fasciola hepatica_ worms. Concentration of 10% was obtained boiled water of rhizome _temu giring_ the time of death (mortality) of _Fasciola hepatica_ worm is 165 minutes longer than the _temu hitam_ stew that is 150 minutes. Low content of sesquiterpenes in a concentration of 10% water decoction of rhizomes _temu giring_ cause sesquiterpenes not work optimally in depressing and inducing central nervous muscle fasciculations so to cause death (mortality) of _Fasciola hepatica_ worm takes longer than the cooking water concentration rhizome. The intersection was therefore, significant. By cooking water rhizome rhizome Intersection _temu giring_ and black against _Fasciola hepatica_ worm mortality.

CONCLUSION

The conclusion that can be derived from this study is the effect of boiling water there _temu giring_ rhizome (Curcuma heyneana Val. & V. Zijp.) and _temu hitam_ rhizome (Curcuma aeruginosa Roxb.) against _Fasciola hepatica_ worm mortality in vitro. Concentration of 10% boiled water _temu giring_ rhizome (Curcuma heyneana Val & V. Zijp.) And the concentration of 10% water decoction of _temu hitam_ rhizome (Curcuma aeruginosa Roxb.) Is the minimum concentration against _Fasciola hepatica_ worm mortality. Further research is needed to detect anthelmintic sesquiterpenes have power to the sleigh and rhizome rhizome Intersection Intersection black using the extraction method. In addition it is necessary for the surveillance and monitoring of heart worm infected cattle _Fasciola hepatica_.

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