

IDENTIFICATION OF WORM *SOIL TRANSMITTED HELMINTHES* VEGETABLES IN THE HOUSE EATING TELAGA REGION GORONTALO DISTRICT

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ABSTRACT

Worms is a health problem that is still widely found throughout the world. Based on data from (WHO), more than 1.5 billion people or 24% of the population are infected with *Soil Transmitted Helminthes* (STH), *Soil Transmitted Helminthes* is a group of parasitic worms (Nematode class) that can causes infection in humans through contact with eggs or parasite larvae that develop in moist soil, one type of vegetable that is often contaminated by *Soil Transmitted Helminths* (STH) is cabbage, cabbage (*Brassica oleracea*) is a vegetable that is generally consumed raw because it is seen from the the texture and organoleptic of this vegetable allows it to be used as fresh vegetables. The purpose of this study was to identify the eggs of *Soil Transmitted Helminthes* (STH) worms in cabbage at the Telaga Regional Restaurant, Gorontalo District.

Using the sedimentation method, this research is a quantitative descriptive study with a total sample of 15, using a microscope then the data is presented in tabular form and reported in percentage form using the frequency distribution formula.

The results showed that from 15 samples of cabbage that were examined 1 was positive with a percentage rate of 6.67%. It is hoped that the community, especially cabbage vegetable farmers and sellers of fresh vegetables, can improve the hygiene and cleanliness of vegetables (fresh vegetables) so that they are free from microorganisms, especially STH eggs, so that the prevention of worm infection can be done.

Keywords: worms, nematodes, cabbage, STH, sedimentation.

INTRODUCTION

Worms is a health problem that is still found throughout the world. More than 1.5 billion people or 24% of the population are infected with *Soil Transmitted Helminthes* (STH), a widespread infection in tropical and subtropical areas with the largest number occurring in Sub-Saharan Africa, America, China, and East Asia [13]. Many of the effects that can be caused by worm infections, worms affect the intake

(intake), digestion (digestive), absorption (absorption) and metabolism of food.

Cumulatively, worm infections can cause nutritional losses in the form of calories and protein, inhibiting physical development, intelligence and work productivity [9]. The prevalence of worms in Indonesia is around 28.12%. The prevalence of worms increased to 62%. this figure shows an increase within 2 years reaching 33.88% [4].

The STH infection survey was conducted in forty-one (41) elementary

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schools (SD) with 334 students, of the 334 students there were 29 people infected with STH from these results obtained a worm prevalence of 8.7%. The prevalence of worms in Gorontalo district, although still in the low category, is still a health problem (Based on the WHO Worms Prevalence Classification) [2].

Soil Transmitted Helminthes is a group of parasitic worms (class Nematodes) which can cause infection in humans through contact with eggs or larvae of the parasite itself that thrive in moist soil found in tropical and subtropical countries [10].

Soil Transmitted Helminthes infection is one of the most common infections worldwide. The main species that infect many people are roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*) and hookworms (*Necator americanus* and *Ancylostoma duodenale*) [13].

Soil Transmitted Helminthes by the excreted egg along with infected human feces. *Soil Transmitted Helminthes* eggs take 3 weeks to mature in the soil before becoming infective. These eggs are produced by adult worms that live in the human intestine. In areas with poor sanitation, these eggs can contaminate the soil. There was no direct person-to-person transmission by eggs of *Soil Transmitted Helminthes* [10].

Other transmissions of *Soil Transmitted Helminthes* eggs can occur through contaminated water, vegetables that are not cooked carefully, not washed properly and on vegetables that are not peeled before consumption, as well as in children who play on the ground and do not wash their hands beforehand. Feeding can increase the transmission of *Soil Transmitted Helminthes* eggs [13].

The spread of disease by *Soil Transmitted Helminthes* (STH) occurs due to soil contamination with feces. The eggs grow in clay, humid and shady places

with an optimum temperature of about 30°C. The eggs become infectious and enter through the mouth with food or drink and can also be through dirty hands (contaminated with soil with worm eggs). The frequency in Indonesia is still very high [6].

In some rural areas in Indonesia the frequency ranges from 30-90%. In highly endemic areas, infection can be prevented by treating Trichuriasis sufferers, making proper latrines and education about sanitation and personal hygiene, especially children. Washing hands before eating, washing properly vegetables eaten raw is especially important in countries where feces are used as fertilizer [10]

In the past, worm infections were very difficult to treat. Drugs such as thiabendazole and thiazanin do not produce satisfactory results. Treatment for infections caused by whipworms (*Trichuris trichiura*), roundworms (*Ascaris lumbricoides*), hookworms (*Ancylostoma duodenale* & *Necator americanus*) in the form of drugs Albendazole/Mebendazole and Oksantel pamoate [6].

The four species that most commonly infect humans are roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*), and anthropophilic hookworms (*Necator americanus* and *Ancylostoma duodenale*.) [7].

A. lumbricoides eggs (roundworms) have the characteristics: round or oval shape, size 60 x 45 microns, brownish color, strong egg wall consisting of the outside (formed from a layer of albumin membrane with a surface in the form of protrusions or jagged brownish color due to bile pigments) and the inside of the egg wall consists of a tough vitellin layer, so that the eggs can last up to 1 year [3].

This worm is found cosmopolitan (all over the world), especially in tropical areas and is closely related to hygiene and sanitation. More often found in children

in Indonesia the frequency ranges from 20-90% [3].

Diagnosis can be confirmed by finding eggs in the patient's stool or larvae in the sputum and by finding adult worms passing out in the feces or through vomiting in severe infections [3]. Ascariasis generally has a good prognosis. Without treatment, the disease can heal itself within 1.5 years. With treatment, the cure rate is 70–90% [3].

The adult worm *Trichuris trichiura* (*T. trichiura*) has a body shape similar to a whip, so that in everyday life this worm is better known as a whip worm. The anterior part, which is 3/5 of the body of the whipworm, is slender like a thread, while the other 2/5 of the body is the posterior, looking fatter. So that when it is associated with the shape of the whip, the posterior part is the grip of the whip, and the anterior is the part of the whip. The male *T. trichiura* worm is smaller and shorter than the female *T. trichiura* worm, the male worm is about 3-4 cm long, while the female worm is 4-5 cm long [6].

T. trichiura eggs have characteristics: size 50 x 25 microns, brownish color, shape like a barrel or jar, there is an operculum in both poles, contains fertile ovum [10]

Trichuris trichiura including the Trichuridae family. Humans are the host of this worm. The disease it causes is called trichuriasis [3].

Trichuris trichiura widespread throughout the world, but areas with high prevalence are tropical and subtropical areas. In temperate areas, those who are most frequently infected are those who live in institutions such as orphanages, prisons, and mental hospitals [6].

Adult cylindrical hookworms are gray-white. The length of the female worm is between 9-13 mm, while the male worm is between 5-11 mm long. at the posterior end of the male worm body

is the bursa of the copulatrix (a copulation aid) [6].

Ancylostoma duodenale (*A. duodenale*) and *Necator americanus* (*N. americanus*) adults were morphologically differentiated based on body shape, oral cavity and copulatrix exchange shape. With microscopic examination of feces, the egg shape of various hookworms is difficult to distinguish [6].

For prevention, especially by maintaining hygiene and sanitation, not defecating in any place, protecting food from dirt contamination, washing hands before eating, and not using human feces as plant fertilizer [3].

In a suitable environment, the fertilized egg develops into the infective form in approximately 3 weeks. The infective form when swallowed by humans, hatches in the small intestine. The larvae penetrate the small intestinal wall into the blood vessels or lymph channels, then flow to the heart, then follow the blood flow to the lungs. Larvae in the lungs penetrate the walls of blood vessels, then the alveolar walls, enter the alveolar cavity, then ascend to the trachea through the bronchioles and bronchi. From the trachea of the larvae to the pharynx, giving rise to stimulation of the pharynx. The person coughs because of this stimulation and the larvae are swallowed up into the esophagus, then towards the intestines. In the small intestine the larvae turn into adult worms. From the time the eggs mature, they are ingested until the adult worms lay eggs, it takes approximately 2-3 months [10].

Humans are the only host of *Ascaris lumbricoides*. The disease it causes is called ascariasis [3].

An important factor for the spread of the disease is soil contamination with feces. Eggs grow in clay, moist and wet places. The optimum temperature is about 30°C. In many countries the use

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of feces as garden fertilizer is a source of infection. The frequency in Indonesia is high. In some rural areas in Indonesia the frequency ranges from 30-90% [10].

For prevention, especially by maintaining hygiene and sanitation, not defecating in any place, protecting food from dirt contamination, washing hands before eating, and not using human feces as plant fertilizer [3].

One type of vegetable that is often contaminated by Soil Transmitted Helminths (STH) is cabbage, cabbage (*Brassica oleracea*) is a vegetable that is generally consumed raw, because it is seen from the texture and organoleptics of this vegetable that it is possible to be used as fresh vegetables, the level of consumption of cabbage vegetables in the Gorontalo community. very high because in every food stall providing cabbage vegetables as fresh vegetables, this cabbage vegetable has a grooved surface that allows worm eggs to settle in it. If the processing and washing of vegetables is not good, it is possible for worm eggs to still stick to the vegetables and be ingested when the vegetables are consumed [12].

One method of checking that can be done to identify *Soil Transmitted Helminthes* (STH) eggs in cabbage is the indirect method. In this method, the worm eggs are not directly made into preparations, but before the samples are made, they are treated in such a way that the worm eggs can be collected. This method produces a cleaner preparation than other methods [8].

The indirect method is divided into two ways, namely sedimentation (deposition) and flotation (flotation). The principle of the sedimentation technique is to separate the suspension and supernatant by means of centrifugation so that the worm eggs can settle. Meanwhile, the principle of the flotation technique is that the specific gravity of worm eggs is

smaller than the specific gravity of saturated NaCl so that the worm eggs will float on the surface of the solution [14].

Examination with sedimentation and flotation techniques has advantages and disadvantages. The sedimentation technique takes a long time, but has the advantage of being able to settle the eggs without deforming them. In the flotation technique, the examination is inaccurate if the density of the float solution is lower than the density of the eggs and if the density of the float solution is increased it will cause damage to the eggs [8].

Based on the above background, the researcher was interested in conducting a research on the identification of *Soil Transmitted Helminthes* eggs in cabbage sold at the Telaga Regional Restaurant, Gorontalo District.

RESEARCH METHODS

This type of research is *descriptive quantitative* research using a laboratory approach. The reason for this research is that the researcher wants to see whether there are *Soil transmitted helminthes* eggs in cabbage which are sold at the Telaga Regional Restaurant, Gorontalo Regency.

The location chosen as the research site was the Microbiology Laboratory of Bina Mandiri University, Gorontalo. While the sampling location is a restaurant located in the Telaga area of Gorontalo Regency, the reason the researchers chose this location as a research location is because the distance traveled is close to the place where the research sample was taken.

The time of this research is planned on 20-23 October 2020 for 4 days.

The variable to be examined in this study is the independent variable, namely eggs of *Soil Transmitted Helminthes* worms in cabbage vegetables.

The population in this study were all cabbage vegetables sold in restaurants in the Telaga area, Gorontalo district. The

sample in this study was some cabbage vegetables obtained from each restaurant in the Telaga area of Gorontalo Regency.

The sampling technique in this study was *purposive sampling* in which the research sample was selected according to predetermined criteria. with consideration of several cabbage sample criteria, namely:

1. Inclusion Criteria, the inclusion criteria in this study were cabbage that had just been put in uncooked cabbage. a bustling restaurant owner. restaurants are willing to be the object of research.
2. Exclusion Criteria, the exclusion criteria in this study were: cabbage that had been stored for 5 days. restaurants that are not crowded, restaurant owners are not willing to be the object of research.

The research instrument used was a centrifuge and a centrifuge microscope was used as a tool to separate the suspension and supernatant so that the worm eggs could be deposited, the microscope was used as a tool to observe the types of worm eggs contained in cabbage vegetable samples.

Preparation phase:

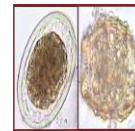
1. Sampling, samples were purchased at each restaurant and put into the sample pots, then the sample was weighed in the laboratory, the samples were weighed as much as 30 grams of cabbage from each restaurant.
2. Preparation of Tools and Materials, the tools used in this research are: beaker glass, centrifuge tube, centrifuge, timer, dropper, tube rack, glass object, deck glass, stirring rod and microscope. The ingredients used are: 0.9% NaCl, cabbage/cabbage.

This research began by taking a sample of cabbage vegetables, Soaking 30 grams of cabbage with 0.9% NaCl solution of 300 ml in a beaker glass, waiting for 30 minutes, then stirring the cabbage vegetables with a stirring rod

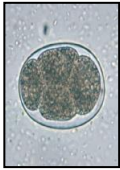
until evenly distributed, the cabbage is removed and The remaining water is put into the tube as much as $\frac{3}{4}$ the tube is left for 1 hour, after that 10-15ml of sediment is taken and then centrifuged at a speed of 1500rpm for 5 minutes, drop 1 drop on the glass object then close it using a deckglass, then do a microscopic examination with magnification of 10-40 times the identification of STH eggs was carried out by adjusting the form of STH found in the Parasitology Atlas.

Table 1. Characteristics of *Soil Transmitted Helminthes Eggs*

Ova	Form	Color	Field of View
<i>Ascaris lumbricoides</i>	The strong round or oval shape of the egg wall consists of the outer part (formed from an albumin membrane layer with a surface in the form of ridges or jagged	Brownish	10-40 x
<i>Trichuris trichiura</i>	A shape like a barrel or a jar, there is an operculum at both poles, containing fertile ova	Brownish	10-40 x



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<p><i>Necat</i> or <i>Americana</i> / <i>Ancylostoma</i> <i>duodenale</i></p>	<p>Wall oblong: thin, clear, colorless. The contents of the eggs in fresh feces are embryo stage morula 2 - 16 eggs</p>		<p>The walls are thin clear, yellowish black</p>	<p>10- 40 x</p>
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examined for the presence of eggs *Soil transmitted helminthes* with the sedimentation method obtained 1 (one) positive sample, there were worm eggs found, namely *Ascaris lumbricoides* with a percentage of 6.67%, while the other 14 samples were negative or there were no *Soil Transmitted Helminthes* eggs with a percentage of 93, 33%.

DISCUSSION

This research process took place from 20 October to 23 October 2020 with a sample collection of 15 samples. Researchers started the research process by buying a sample of cabbage in each restaurant, then put it in the sample pot and then the sample was weighed in the laboratory as much as 30 grams from each restaurant. After that, the researcher carried out the inspection process using the sedimentation method. The results obtained from the 15 samples examined were 1 positive sample containing *Soil Transmitted Helminthes* (STH) worm eggs (6.67%), while the other 14 (fourteen) samples were not found worm eggs/Negative (93.33%).

In this study, the type of worm egg species found was *Ascaris lumbricoides* with the characteristics of a strong round or oval egg wall consisting of the outer part (formed from a layer of albumin membrane with a surface in the form of protrusions or serrated brownish colored due to bile pigments). and the inside of the egg wall is composed of a tough, vitelline layer. This result is consistent with a survey conducted in several places in Indonesia which shows that the prevalence rate of *Ascaris lumbricoides* is quite high at 60-90%, this is in line with the theory put forward by previous researchers that clay, high humidity and temperature are 25o-30oC. it is an excellent condition for *A. lumbricoides* eggs to develop into the infective form [6].

The data is presented in tabular form and reported in percentage using the following formula:

$$P = \frac{f}{n} \times 100\%$$

Information

P : Percentage

F : The sample frequency of cabbage with worm eggs

N : The amount of cabbage checked.

RESEARCH RESULT

Based on the results of research conducted at the Microbiology Laboratory of Bina Mandiri University, Gorontalo, from 20 to 23 October 2020 as many as 15 samples of cabbage obtained from each restaurant in the Telaga area of Gorontalo Regency that met the inclusion criteria, the following data were obtained:

Table 2. Check up result *Soil transmitted helminthes eggs* on the sample cabbage

Check up result	<i>Soil transmitted helminthes eggs</i>	Characteristic features
Positive	<i>Ascaris lumbricoides</i>	The strong round or oval shape of the egg wall consists of the outer part (formed from an albumin membrane layer with a surface in the form of ridges or jagged brownish color due to the pigment of bile) and the inside of the egg wall consists of a tough layer of vitellin.

Source: Primary Data, 2021

Based on table 4.1 above, the results show that 15 samples of cabbage were

The results of this study are in line with research conducted by previous researchers on fresh vegetables of cabbage sold at the pecel lele food stall, Sukarame District, Palembang, where the results obtained from 24 samples of fresh vegetables cabbage (*Brassica oleracea*) obtained positive STH worm eggs as many as 2 samples (8,3 %) and negative results were as many as 22 samples (91.7%) [1].

Contamination of STH worm eggs in cabbage can be caused by various things, including when cultivating cabbage, watering cabbage with waste water, septic tanks or livestock waste. Cabbage vegetable farmers who use livestock waste or septic tank water to water the cabbage vegetables during cultivation have allowed the cabbage to be contaminated by feces containing STH eggs [9].

Previous research has shown that STH worm eggs are not found in cabbage so they are safe for public consumption. because the sales distribution has a fairly good level of hygiene. Several other influencing factors are cleanliness in the processing and utilization of vegetables such as how to wash vegetables or use running water rather than stagnant water [11].

In Table 4.1, it can be seen that the worm eggs found are only *Ascaris lumbricoides* worm eggs with the characteristics of the round or oval shape of the strong egg wall consisting of the outer part (formed from an albumin membrane layer with a surface in the form of protrusions or serrated brownish coloration. because the pigment bile) and the inside of the egg wall consists of a tough layer of vitellin. whereas eggs of *Trichuris trichiura* and *Ancylostoma duodenale/Necator americanus* were not found, this may be caused by different life cycle of *Trichuris trichiura* and *Ancylostoma*

americanus worms. Eggs of *Trichuris trichiura* and *Ancylostoma duodenale/Necator americanus* which come out with feces after 1-2 days will hatch into larvae, so that they are no longer found in the soil.

To be able to find out the types of worm eggs found, the researchers saw from a morphological perspective such as the shape and characteristics of each of these worm eggs, *Ascaris* eggs. lumbricoides (roundworms) have the characteristics: The strong round or oval shape of the egg wall consists of the outer part (formed from a layer of albumin membrane with a surface in the form of protrusions or jagged brownish colored due to the pigment of bile) and the inside of the egg wall consists of a clay vitelline layer, *Trichiuris trichiura* eggs have the following characteristics: The shape is like a barrel or a jar with an operculum on both poles, contains fertile ovum, *Ancylostoma duodenale* eggs and *Necator americanus* are the same, namely: oval walls: thin, clear, colorless.

The spread of *Soil Transmitted Helminth* (STH) worm eggs can also be done through washing the cabbage which is not good, as long as there is an environmental influence in the cultivation of these vegetables that allows food insecurity and the residual dirt on the vegetables. Thus washing is absolutely necessary before the vegetables are consumed. Raw vegetables have a big risk of being contaminated by microorganisms, therefore this contamination can have unfortunate health impacts, so washing can minimize the number of STH worm eggs which can harm health. Prevention of *Soil Transmitted Helminth* (STH) is mainly by maintaining hygiene and sanitation, not defecating in any place, protecting food from dirt contamination, washing hands before eating,

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Based on the theory put forward by previous researchers, another factor that causes the worm eggs of *Trichuris trichiura* and *Ancylostoma duodenale/Necator americanus* is not found is the preference factor for cabbage. Environmental conditions that are incompatible with the eggs of *Trichuris trichiura* and *Ancylostoma duodenale/Necator americanus* to be infective can result in the absence of contamination in cabbage. Habitat in clay, humid, and shady areas, besides that plant roots provide a humid means and are able to attract STH worm eggs to migrate and lay their eggs [10].

The results obtained from this study that the only type of STH worm eggs found was *Ascaris lumbricoides*, possibly influenced by several factors, one of which was the nature of the type of eggs. Parasitic nematodes in plants are divided into two groups, namely ectoparasites and endoparasites. *Ascaris lumbricoides* is a persistent endoparasitic nematode and its entire body sinks into the tissues and bodies of its host plants, so it is still difficult to lose if the vegetables are cleaned or washed [5].

The impact that can be caused by worm infection is affecting digestion (digestive), absorption (absorption) and metabolism of food. Cumulatively, worm infections can cause nutritional losses in the form of calories and protein, inhibiting physical development, intelligence and work productivity [8].

CONCLUSION

Based on the results of the research that has been done, it can be concluded that 6.67% of cabbage in the Telaga Regional Restaurant, Gorontalo Regency, identified eggs of *Ascaris Lumbricoides*, *Trasnmitted Helminthes* worms.

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