CONTAMINATION OF ASCARIS LUMBRICOIDES WORM EGGS ON LEAVES AND BURGERS IN MEDAN CITY

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ABSTRACT

The STHs that most commonly infect humans are roundworms (Ascaris lumbricoides), whipworms (Trichuris trichiura), and hookworms (Necator americanus and Ancylostoma duodenale). It is estimated that around 807 million people in the world are infected with Ascaris lumbricoides, 604 million are infected with T. trichiura and Hookworm (A. duodenale and N. americanus) infect about 576 million humans worldwide. The purpose of this study was to determine the type and prevalence of STH eggs in lettuce contained in burgers in Medan City. Knowing the type of STH eggs found in lettuce in burgers and knowing the prevalence of STH eggs found in lettuce in burgers. This study is an analytical study with an experimental approach to identify the results of the analysis of the type and prevalence of Soil Transmitted Helminths (STH) eggs in lettuce found in burgers. From the results of this study, it can be seen that from 11 samples of lettuce contained in burger food, 4 samples (36.36%) were found that were positive for Ascaris lumbricoides worm eggs. In general, the lettuce washing technique carried out by burger traders is good. This can be seen from the very small percentage of worm eggs found.

Keywords: Pollution, Eggs, Worms, Ascaris Lumbricoides

I. INTRODUCTION

Soil Transmitted Helminths (STH) infection is still endemic in many areas of the world, especially in developing countries with poor environmental sanitation and personal hygiene. Based on data from the World Health Organization, more than 1.5 billion people or 24% of the world's population are infected with STH. The infection is widespread in the tropics and subtropics, with the greatest number occurring in sub-Saharan Africa, America, China and East Asia (WHO, 2015).

The STHs that most commonly infect humans are roundworms (Ascaris lumbricoides), whipworms (Trichuris trichiura), and hookworms (Necator americanus and Ancylostoma duodenale). It is estimated that around 807 million people in the world are infected with Ascaris lumbricoides, 604 million are infected with T. trichiura and Hookworm (A. duodenale and N. americanus) infect about 576 million humans worldwide [1].

Indonesia as an agricultural country has various types of vegetables. In the vegetable production process, farmers generally use water and manure derived from animal and human waste. This allows the presence of STH eggs in the resulting vegetables. Indonesian people have a habit of consuming vegetables in a raw state or often called fresh vegetables. If the processing and washing of fresh vegetables is not hygienic, it is possible that eggs or even STH larvae can still be found in the fresh vegetables [1].

Lettuce (Lactuca sativa) is a type of vegetable that is generally consumed raw, because judging from its texture and organoleptic lettuce leaves allow it to be used as fresh vegetables [2]. Foreign foods such as burgers, which are currently widely found in Indonesia, often use lettuce as a complement to vegetables in their filling. With the development of this burger food, it is necessary to provide guidance and health supervision to the people who manage the food in order to avoid various diseases that can be caused.

The results of research that have been carried out in traditional and modern markets in Padang City, found that STH was positive in 32 of 44 lettuce vegetables from traditional markets with a percentage of 73% and 3 of 5 lettuce
vegetables from modern markets were positive with a percentage of 40%. Most of the STH found in this study were Ascaris lumbricoides eggs followed by Trichostrongylus orientalis larvae and Hookworm eggs [3].

Based on research that has been done in traditional markets and modern markets in Bandar Lampung City, it was found that the STH contamination rate in cabbage and lettuce was quite high. The contamination rate of STH eggs in traditional markets is 76.1% with the proportion of Ascaris lumbricoides eggs 43.2%, Trichuris trichiura 10.2% and both 22.7%. In the modern market, the contamination rate of worm eggs is 58.3% with the proportion of Ascaris lumbricoides eggs 16.6%, Trichuris trichiura 19.7%, and both 21.8% [4]. Another study found 3 samples that were positive for hookworm larvae in 11 samples of lettuce found in burgers in Medan City. The examination was carried out 2 times with the results of the first study as much as 13.33% and the second study as many as 16.67% Hookworm larvae [5].

Based on the results of the research above, I want to examine whether there are still STH eggs in lettuce vegetables that are ready to be consumed in burgers. The aims of this research are (1). Knowing the type and prevalence of STH eggs in lettuce found in burgers in Medan City, (2). Knowing the type of STH eggs found in lettuce in burgers and (3). Knowing the prevalence of STH eggs found in lettuce in burgers.

II. METHODS

Research Design

This study is an analytical study with an experimental approach to identify the results of the analysis of the type and prevalence of Soil Transmitted Helminths (STH) eggs in lettuce found in burgers.

Object of research

The object of research is the lettuce contained in burger food obtained from 11 burger traders in Medan Petisah District, Medan City.

Data collection technique

This study uses the sediment method, where the sample is immersed in 0.2% NaOH solution and then deposited through a centrifugation process so that the eggs and worm larvae can settle perfectly to the bottom of the tube. In this examination, the researcher was accompanied by Laboratory Staff of the Faculty of Medicine, University of Prima Indonesia.

Tools and materials

The tools in this research are, Object glass, Deck glass, Beaker glass, Sediment tube, Tube rack, Centrifuge, Pipette, Plastic, Toothpick, Microscope. While the research materials used were lettuce, 0.2% NaOH and 1% Eosin.

Work procedures

In the field: (1). Take a sheet of lettuce that is ready to be consumed for stuffing burgers. (2). Lettuce that is good to be checked is lettuce that has not been mixed with sauce or has not been put into toasted bread because it is feared that the lettuce will wilt or not be fresh anymore so that worm eggs that are suspected to be attached to lettuce leaves cannot be properly analyzed. (3). Put the lettuce leaves in a separate plastic bag.

In the laboratory (1). Remove the lettuce leaves from the plastic and weigh 15 grams for each sample. (2). Soak each lettuce leaf sample that has been weighed in a beaker glass using 0.2% NaOH until the entire leaf surface is submerged. Leave it for 30 minutes. (3). Remove the lettuce from the beaker glass and put the remaining water into the sediment tube. Leave it for 1 hour. (4). Take 10-15 ml of sediment and then centrifuge at 1500 rpm for 5 minutes. (5). Place the centrifuged precipitate on a glass object, add 1% eosin solution, and cover with a glass deck. (6). Examine under a microscope with a magnification of 10-40 times.

III. RESULTS AND DISCUSSION

Description of research locations and samples

Lettuce samples were obtained from 11 burger vendors in Medan Petisah District, Medan City. A good lettuce to check is lettuce that hasn't been mixed in with the sauce or hasn't been put on toasted bread. The samples were then
put in separate plastic containers and brought to the laboratory for examination of Soil Transmitted Helminths (STH) eggs.

**Types of Soil Transmitted Helminths (STH) eggs in lettuce found in burgers**

The following is data on the types of Soil Transmitted Helminths (STH) eggs in lettuce found in burgers in tabular form:

<table>
<thead>
<tr>
<th>No</th>
<th>Sample Code</th>
<th>+/-</th>
<th>Type of STH Egg</th>
<th>Number of STH Egg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>+</td>
<td>Ascaris lumbricoides</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>+</td>
<td>Ascaris lumbricoides</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>E</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>G</td>
<td>+</td>
<td>Ascaris lumbricoides</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>H</td>
<td>+</td>
<td>Ascaris lumbricoides</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>I</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>J</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>K</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

Based on Table 1, it is known that samples B, C, G, and H were positive for Soil Transmitted Helminths (STH) eggs. The type of STH eggs found were Ascaris lumbricoides eggs.

Based on research that has been conducted in traditional and modern markets in Padang City, it was found that 32 of 44 lettuce vegetables from traditional markets were positive with a percentage of 73% and 3 of 5 lettuce vegetables from modern markets were positive with a percentage of 40%. Most of the STH found in this study were Ascaris lumbricoides eggs followed by Trichostrongylus orientalis larvae and Hookworm eggs [6].

Based on research that has been done in traditional markets and modern markets in Bandar Lampung City, it was found that the STH contamination rate in cabbage and lettuce was quite high. The contamination rate of STH eggs in traditional markets is 76.1% with the proportion of Ascaris lumbricoides eggs 43.2%, Trichuris trichiura 10.2% and both 22.7%. In the modern market, the contamination rate of worm eggs is 58.3% with the proportion of Ascaris lumbricoides eggs 16.6%, Trichuris trichiura 19.7%, and both 21.8% [2].

Another study found 3 samples that were positive for hookworm larvae in 11 samples of lettuce found in Medan City. The examination was carried out 2 times with the results of the first study as much as 13.33% and the second study as many as 16.67% Hookworm larvae [5].

The results of the examination carried out by researchers at the Parasitology Laboratory of the Faculty of Medicine, Prima Indonesia University on lettuce in burger food obtained from 11 burger traders, found 4 positive samples containing Soil Transmitted Helminths (STH) eggs while 7 other samples did not contain STH eggs.

Sample B contained 10 eggs of Ascaris lumbrichoides from all fields of view. Sample C contained 2 eggs of Ascaris lumbrichoides from all fields of view. Sample G contained 5 eggs of Ascaris lumbrichoides from all fields of view. Sample H contained 2 eggs of Ascaris lumbrichoides from all fields of view.

The discovery of STH eggs in the lettuce can be caused by several factors, including the place or where this lettuce comes from, the storage process, the washing process, and the process of serving lettuce in burger meals [7].

STH egg contamination in lettuce can also be affected by the process of storing lettuce before processing. The lettuce used in burgers is stored in the refrigerator and some is not. Burger traders who do not store lettuce in the refrigerator usually only put the lettuce in the kitchen or in a vegetable basket that is not yet known to be clean. If the vegetable storage area is not clean and moist, it will allow STH eggs to survive and develop into infective forms.
that can infect humans. In addition, it can also allow cross-contamination both from STH eggs left in storage and from old vegetable residues to other vegetables [8].

STH egg contamination can also occur in lettuce stored in the refrigerator. Storing vegetables in the refrigerator can maintain the freshness of vegetables, but cannot remove or damage worm eggs. Ascaris lumbricoides eggs can survive at temperatures less than 8oC, although at this temperature they can damage Trichuris trichiura eggs [9]. In addition, cross-contamination can also occur in the refrigerator. Cross-contamination can occur when fresh vegetables are mixed with other vegetables that have the potential to contain STH eggs [10].

The storage of lettuce after washing also needs to be considered. Lettuce stored in an open and unhygienic place (not covered) can invite flies to perch on it. Flies that previously landed on the ground or dirt can carry worm eggs and contaminate the food that is not covered [11].

Another factor that greatly affects the contamination of STH eggs in lettuce is the vegetable washing process. Lettuce grows on the ground with short stems and leaves arranged in nodes, allowing STH eggs to settle in it. In addition, vegetable farmers generally use water and manure derived from animal and human waste in watering lettuce. This is what causes lettuce contaminated with STH eggs that come from the feces of an infected person. If the washing of the lettuce is not good, the STH egg may still be attached to the lettuce and can be swallowed when the vegetables are consumed [12].

How to wash vegetables is something that needs to be considered before vegetables are served. Washing by soaking in a container such as a bucket or basin, dirt and worm eggs that were released can stick back in the vegetables. Washing vegetables under running water will make vegetables clean, because water that flows into vegetables in clean conditions will carry dirt, dust, germs, and parasites off and thrown away with the water [13].

STH egg contamination in lettuce can also be influenced by the way the lettuce is served. From observations, burger vendors serve lettuce to eat burgers without using gloves or food tongs. Merchants only use their bare hands to serve lettuce on burgers. This unhygienic way of serving allows the transmission of worm eggs from the hands of traders to lettuce. Transmission of worm eggs can occur through fingernails which contain worm eggs and can enter the mouth when food is consumed [13].

The type of STH eggs found in this study were Ascaris lumbricoides eggs. Ascaris lumbricoides eggs have better resistance in the environment. New eggs will die at a temperature of more than 40oC within 15 hours while at a temperature of 50oC will die within 1 hour. At cold temperatures, Ascaris lumbricoides eggs can survive to temperatures less than 8oC which at this temperature can damage Trichuris trichiura and Hokwoorm eggs.

The prevalence of Soil Transmitted Helminths (STH) eggs in lettuce found in burgers

The following is data on the prevalence of Soil Transmitted Helminths (STH) eggs in lettuce found in burgers in tabular form:

Table 2 Results of examination of the prevalence of Soil Transmitted Helminths (STH) eggs in lettuce found in burgers

<table>
<thead>
<tr>
<th>No.</th>
<th>Lettuce in Burger</th>
<th>STH Egg Prevalence</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Positive (+)</td>
<td>4</td>
<td>36.36</td>
</tr>
<tr>
<td>2.</td>
<td>Negative (-)</td>
<td>7</td>
<td>63.63</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>11</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on Table 4.2, it is known that from 11 samples of lettuce examined, 4 samples (36.36%) were found positive for containing Soil Transmitted Helminths (STH) eggs.

From the examination carried out on lettuce in burger food obtained from 11 burger vendors, it was found that 4 positive samples contained Soil Transmitted Helminths (STH) eggs or as much as 36.36% and 7 samples did not contain Soil Transmitted Helminths (STH) eggs or as much as 63.63%.
From the observations made, burger traders generally use the same lettuce washing technique. Lettuce is washed in the water contained in a bucket by removing the lettuce leaves one by one from the stems and shaking them in the bucket.

The lettuce washing technique carried out by burger traders is generally good, this can be seen from the very small percentage of worm eggs found. Of the 11 samples examined, only 3 samples contained worm eggs, which was about 36.36%.

Even better, washing lettuce can be done by removing the lettuce leaves one by one from the stems and washing them in running water, so that worm eggs and other impurities can be removed with the flow of water. Another washing method that can also be used is to use 0.02% potassium permanganate (KMnO4) solution, then rinse with cold boiled water. By using this solution, it can kill disease germs and parasites such as worm eggs attached to the vegetables [14].

IV. CONCLUSION

From the results of this study it can be seen that (1). Of the 11 samples of lettuce found in the burger meal, 4 samples (36.36%) were found that were positive for Ascaris lumbrichoides worm eggs. (2). In general, the lettuce washing technique carried out by burger traders is good. This can be seen from the very small percentage of worm eggs found.

REFERENCES


