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COMPARISON OF NITROGEN LEVELS IN NORMAL FAECES AND FAECES INFECTED BY ASCARIS LUMBRICOIDES AND TRICHURIS TRICHURA

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ABSTRACT
Nitrogen is part of the main building blocks of protein in the human body. Nitrogen is formed from the breakdown of protein by the body. Nitrogen levels in the body will be disrupted if the absorption of nutrients is disturbed by the body, for example during a worm infection. The purpose of this study was to determine the ratio of nitrogen levels in the feces of patients with Ascariasis and Trichuriasis infections and normal feces. The results showed that the nitrogen content in the feces infected with worms included sample A of 0.19%, sample B obtained a nitrogen content of 2.16%, and sample C of 2.05% with an average of 1.46% while the nitrogen in normal stool specimens obtained results of sample A of 0.19%, sample B of 0.24% and sample C of 0.25% with an average of 0.22%. This indicates an increase in nitrogen levels in the body due to ascariasis and trichuriasis infections in the body
Keyword: Nitrogen, Worm Egg Positive Stool, Ascaris lumbricoides, Trichuris trichiura

INTRODUCTION

Nitrogen is a very important element for organisms. Nitrogen is one of the main constituents of protein, which is the main compound in organisms. The function of nitrogen in the human body is as the main ingredient in the preparation of proteins, as the structure of the nitrogenous bases of DNA and RNA, hormones, phospholipids and heme and other similar structures (Yazid and Nursanti, 2015). Nitrogen is different from the other elements in its group. This is because nitrogen is in the form of a gas at room temperature. Nitrogen is a gas that does not have a definite volume and shape [1].

Nitrogen that is in the body can be obtained from protein. The proteins that exist or are obtained by the body from outside the body will then be broken down into free amino acids. About 1-2% of protein in the body will experience decomposition every day. At least 75-80% of the freed amino acids will be reused for the formation of new proteins [2].

The process of digesting protein into amino acids occurs in the small intestine with the help of the enzymes aminopeptidase, tetrapeptidase, dipeptidase, and erepsin. The excess of amino acids in the body and the remaining nitrogen from the breakdown of protein will be delivered to the liver, which is then converted by the liver to urea and excreted from the body through

the kidneys in the form of urine (95%) and also through the anus in the form of feces (5%) (Setiadi, 2007).

Besides being found in nature and in the human body, nitrogen can also be found in feces or faeces, both human and animal feces, such as cows. Stool is a waste material, the residual product of the digestive process of food that is excreted by the body through the anus. Normally a person can produce an average of 83 grams of stool per day. Human feces are mostly water, digestive residues, organic substances (about 20%) and inorganic substances such as nitrogen, phosphoric acid, and sulfur which have been digested while in the small intestine. Estimated nitrogen content in feces is 5.0 – 7.0% based on dry weight (Waluyo, 2018). Meanwhile, the nutrient content in cow manure is a nitrogen content of 0.3% [3].

Nurmalasari (2011) in his research on the analysis of nitrogen content in guano (bat excrement) found in Andulan Cave, Lewu Regency, stated that the results of the analysis of nitrogen content in guano (Kalilawar droppings) found in Andulan Cave, Lawu Regency were an average of 0 .17%.

The existence of soil-transmitted helminth infections such as Ascaris lumbricoides, in the small intestine can cause abnormalities in the intestinal mucosa, such as inflammatory processes in the intestinal wall, widening and shortening of the villi, increasing the length of the crypts, decreasing the ratio of villus crypts and round cell infiltration into the lamina propria, so that it can cause interference with the absorption of food by the body. Some of these abnormalities can return to normal if the worms are removed from the body. The direct effect that can be measured is an increase in nitrogen levels in the feces, steatorrhea due to impaired absorption of fat, impaired absorption of carbohydrates as measured by the xylose test [4].

Based on the above background, the authors are interested in conducting research with the title "Examination of nitrogen levels in stool specimens infected with Soil Transmitted Helminth" in this case, the worm Ascaris lumbricoides.

RESEARCH METHODS

This study uses a type of laboratory experimental research meaning that it is a research carried out by carrying out experimental activities in the laboratory (Mastura and Anggita, 2005). nitrogen in normal (uninfected) stools. Examination was carried out from each of three different samples, namely 3 stool specimens infected with Ascaris lumbricoides and 3 normal stool specimens [5].

Work procedures :

Determination of nitrogen content in stool specimens was carried out using the Kjeldahl method. The Kjeldahl method for determining nitrogen content is carried out in stages, starting from the destruction stage, the distillation stage and the titration stage [6].

Destruction Stage :
A total of 0.5 grams of sample was weighed, then put into a Kjeldahl flask and added to 0.5 grams of a mixture of selenium and 3 mL of 98% concentrated sulfuric acid. Furthermore, it is destructed in a fume cupboard, initially using a low temperature and slowly increasing the temperature until it boils and the color of the sample solution turns clear.
Distillation Stage

The sample solution that has cooled is then diluted with distilled water until the volume becomes half the boiling flask. Then add 10 mL of 40% NaOH and then distilled. The distilled distillate was collected in an erlenmeyer containing 10 mL of 4% boric acid and 3 drops of each were dripped with MR indicator (Methyl Red) and BCG indicator (Brom Cresol Green).

Titration Stage :
The distillate that has been obtained is diluted with distilled water and put into a 100 mL volumetric flask. Then 5 mL was taken and then put into Erlenmeyer and titrated with 0.02 N sulfuric acid solution. The titration was stopped after a color change occurred in the solution from blue to pink.
Calculation of Nitrogen Levels in Stool Specimens

$$\text{Kadar Nitrogen (\%)} = \frac{(\text{al} - \text{a2})\text{mL} \times 14 \times 0{,}05 \times 5}{\text{c}} \times 100$$

The titration results that have been obtained are then entered into the following formula:

Information :

a1 : Standard 0.1 N H2SO4 average used in the sample titration (mL)

a2 : Standard 0.1 N H2SO4 average used in the balance titration (mL)

14 : N equivalent weight

0.05 : Concentration of H2SO4

5 : Dilution Factor

C : Sample weight (mg).

RESULTS AND DISCUSSIONS
The results obtained can be seen below.
Identification of Worm Eggs.

Stool specimens that will be examined for nitrogen levels, previously examined for worm eggs to determine whether the stool specimen is positive for worm eggs or not. Stool specimens that are positive for worm eggs will then be examined for nitrogen levels. Based on the stool examination, found worm eggs from the Trichuris trichiura species with characteristics like a crock, at both ends of the egg cells there are clear knobs, and are yellow in color and Ascaris lumbricoides with characteristics of a round shape consisting of three

layers, yellow in color. reddish due to eosin stain. The following is a picture of the results of the identification of helminth eggs in faecal specimens viewed under a microscope using a 40x objective lens.

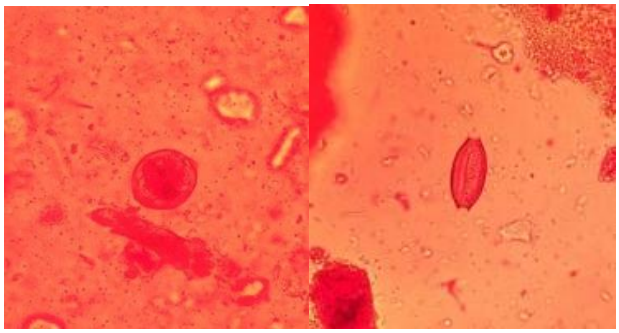

Figure 1. Ascaris lumbricoides eggs b. Trichuris trichiura eggs
(Source: Private collection)

Examination of Nitrogen Levels in Positive STH Stool Specimens

Table 1. Examination of Nitrogen Levels in Stool Specimens

No	Sample code	Nitrogen content
1	A	0,19%
2	B	2,16%
3	C	2,05%

Table 2 The above obtained nitrogen levels in stool infected with Ascaris lumbricoides stool sample B 2.16%, sample C 2.05% and sample A 0.19%

Examination of Nitrogen Levels in Normal Stool Specimens

Table 2. Examination of Nitrogen Levels in Stool Specimens

No	Sample code	Nitrogen content
1	A	0,19%
2	B	0,24%
3	C	0,25%

Table 2. The above obtained nitrogen levels in the stool specimens that are not infected with worms are sample C 0.25%, sample B 0.24% and sample A 0.19%.

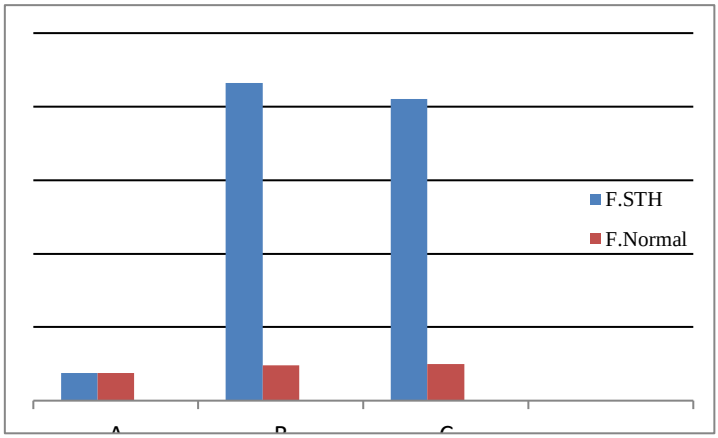

Figure 2. Graph of Comparison of Nitrogen Levels in Normal Stool Specimen and STH Infected Feces

CONCLUSION

From the results of research on stool samples infected with Ascaris lumbrocoides worm eggs, Trichuris trichiura and normal stool specimens, it was found that the average nitrogen content in feces infected by worms was 1.46%, while the average nitrogen content in normal stool was 0.22%.

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