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COMPARATIVE STUDY OF BRANDS OF SALT RAPID CONSUMPTION IN THE PROCESS OF INTESTINAL NEMATODE EGG FLOTATION

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ABSTRACT
Introduction: Based on its type, salt consists of; industrial salt, curing salt, table salt, and consumption salt. Consumable salt can be used as an alternative material in the flotation method. It has been proven in previous research (2021) that salt consumption can cause intestinal nematode eggs to float. The concentration used in the research was 32%. The aim is to find out the fastest time for the brand of salt consumed in the intestinal nematode egg flotation process. Method: This research is an experimental laboratory research, using samples of consumption salt with a concentration of 32%, adding a suspension of intestinal nematode worm eggs, then observing the flotation. Results; There is no time difference between JPL and BTM brands of salt because consuming both types of salt from the first 10 minutes of the experiment can cause flotation until the last minute of the experiment, namely the 40th minute, still causes flotation. Conclusion ; The results of the experiment guarantee that the two types (brands) of salt consumed are; JPL and BTM with a concentration of 32% can both cause intestinal nematode eggs to float, starting from the first 10 minutes to 40 minutes
Keywords: consumption, salt, flotation, method

INTRODUCTION

Worms are still a public health problem in Indonesia, especially in elementary school children. Based on research findings Aaron &; Octaviani, 2020 In elementary school children in Pulau Panggang, Thousand Islands, worms are still found.

By species *Ascaris lumbricoides* infected about 820 million people. Generally infected are children of preschool and school age because they are more likely to ingest soil, food, or water contaminated with the stage of infection, (Maurelli et al., 2021)

Types of intestinal nematodes that infect many humans, especially children, are; *Ascaris lumbricoides* (roundworm), *Trichuris trichiura* (whipworms), *Ancylostoma duodenale* and *Necator americanus,* (Allan et al., 2020).

Diagnosing intestinal nematode eggs can be done in two ways. First, the eggs are tested for presence or absence in the feces. Secondly, eggs are calculated based on their number in the feces, (Dr. drh. I Made Dwinata et al., 2019)

Detecting helminthic diseases can be done by several simple methods of examination in the laboratory. Although with the development of the times and advances in worm examination technology, PCR techniques have been used, but this examination requires relatively expensive costs, Examinations

that are still a mainstay at low prices for researchers are one of them is flotation using NaCl salts as a flour solution, (Emperor et al., 2017)

Salt is a chemical used in the home to give flavor to food and as a food additive. In the body, salt takes the form of a white powder composed of crystals. Consumption salt consists of sodium chloride.

In addition to NaCl, other substances commonly found in contaminated salt and salt include CaSO4, MgSO4, and MgCl2. The NaCl content in salt varies depending on the production region, but the NaCl content is above 95%, (Wibowo, 2021)

There are four types of salt available on the market: table salt, consumption salt, preservation salt, and industrial salt. This salt has various purposes

Sodium chloride salt, or NaCl, is commonly used for human needs. Consumer salt is needed by many people as a food additive, but industrial NaCl salt is usually used in industry in its pure form. (Redjeki et al., 2020)

The results of the researcher's research (Rony Puasa, 2021) using four brands of consumption salt gave varying results. This suggests that salt consumption can be used to perform laboratory tests of flotation methods to identify intestinal nematode eggs.

Examination of worm eggs using the flotation method using saturated NaCl solution or saturated sugar solution, where floating eggs will be easily identified.

The advantage of the flotation method compared to the native method is that the stool sample used is more than 5-10 grams, so as to find worm eggs is greater when the density of worm eggs is low. The results of Dian Putri Muhrija's 2021 research concluded that the flotation method is more than the sedimentation method, (Muhrija et al., 2021)

The results of a 2021 study conducted by a researcher (Rony Puasa) concluded that salt consumption with a concentration of 32% can float intestinal nematode worm eggs.

In terms of price, consumption salt is cheaper than industrial salt or NaCl (pa), while in terms of convenience, consumption salt is easier to obtain on the market than industrial salt or NaCl (pa).

Salt is not only consumed at home as a flavoring and preservative, but is also used in laboratories as an identification material for intestinal nematode eggs. This is because the specific gravity (BJ) of salt can exceed the specific gravity of intestinal nematode eggs, which is 1.05-1.20, (Ngwese et al., 2020)

Recent developments to detect intestinal nematode worm eggs have used more modern methods, namely *Polymerase Chain Reaction* (PCR), which can distinguish species from hookworms; *Necator americanus* and *Ancilostoma duodenale* which is indistinguishable microscopically. However, the cost required is expensive compared to the flotation method, (Fischer et al., 2018)

The specific gravity of intestinal nematode worm eggs quoted from Mirabeau Mbong Ngwese's writing ranges from 1.05 to 1.20, but needs to be explained in detail the Specific Gravity (BJ) of each species, (Ngwese, 2020)

This illustrates that the species of intestinal nematodes have different BJs or can be the same between species, with the range of BJ, it is possible that flotation times between species can be different or the same.

Theoretically the time required to observe the occurrence of flotation using NaCl (pa) is 45 minutes. Some researchers use different times, where (Rihibiha &; Aqmalia, 2021), using the last flotation observation time at minute 30, while (Qomariyah1 et al., 2021) observations were made at 60 minutes.

A good flotation process requires just the right amount of salt to produce BJ which is thought to float intestinal nematode eggs. Consumption salt can be used as an alternative flotation material in the flotation process.

Looking at the results of the researchers' research in 2021 where the concentration used was 32% able to produce flotation from intestinal nematode worm eggs, then in this 2022 follow-up study researchers will see the difference in flotation time of intestinal nematode worm eggs. any brand of salt.

Time variations were observed every 10 minutes, starting at the initial 10 minutes and ending at the 40th minute.

METHOD

The research design used was a laboratory experiment, where the samples used were two brands of consumption salt made with a concentration of 32% and added egg suspension Intestinal nematode species *Ascaris lumbricoides* (roundworm), *Trichuris trichiura* (whipworms), *Ancylostoma duodenale* and *Necator americanus* (hookworm), (Prof. Dr. Sugiyono, 2016).

A suspension of worm eggs was added to each tube as much as 50 L, then observed flotation time ranging from 10 minutes to 40 minutes. The samples used are two types (brands) of consumption salt, where 1 type (brand) is made as many as 40 tubes, so that the number of tubes used for both types (brands) is 80, and is observed with a period of time every 10 minutes for 40 minutes. The results of the experiment are depicted in the form of tables and narratives.

RESULTS AND DISCUSSION

The results obtained from the microscopic identification of two brands of salt consumption can cause the floating of intestinal nematode worm eggs ; Ascaris lumbricoides, Trichuris trichiura, Ancylostoma duodenale and Necator americanus, are included in the suspension.
The results of identification of intestinal nematode eggs are observed every 10 minutes, as shown in the following table;

Table 1 ; Salt Flotation Results JPL consumption every 10 minutes

Types of Salt	Flotation Time				Total
	10 minut	20 min	30 minutes	40 minutes	
NaCl (pa) 32% (control)	2	3	1	2	**8**
NaCl (pa) 33% (control)	2	5	2	10	**19**
JPL	193	38	166	8	**405**

Data; Primary

Table 2 ; Salt Flotation Results BTM consumption every 10 minutes

Types of Salt	Flotation Time				Total
	10 minut	20 min	30 minutes	40 minutes	
NaCl (pa) 32% (control)	13	40	22	16	**91**

NaCl (pa) 33% (control)	22	50	18	25	**115**
BMT	173	56	20	178	**427**

Data; Primary

Generally, the flotation method uses saturated NaCl (pa) solution as a flotation material. The floating of worm eggs occurs because the specific gravity (BJ) of worm eggs is lighter than the float solution so that worm eggs float on the surface of the tube. Buoyancy materials can be used solutions of saturated sugar and saturated salt, (Apriana, 2020)

To anticipate the availability of NaCl (pa) in the laboratory to identify intestinal nematodes, researchers tried to utilize salt consumption as an alternative to NaCl (pa).

Research conducted by researchers in 2021 concluded that the two salts are; JPL and BTM brands can float intestinal nematode eggs, so the research results are still continuing in 2022 at this time.

The results in table 1 and table 2 of each time, namely the 10th minute to the 40th minute of salt consumption of both brands, gave flotation or flotation results. This can be caused by making consumption salt in Indonesia according to the standards set by SNI, namely a minimum NaCl content of 94.7%, (Deglas et al., 2020)

Microscopic identification and calculation of the number of intestinal nematode worm eggs are shown in Tables 1 and 2. The intestinal nematode eggs observed are those that undergo flotation with different amounts each time.

The difference in the number of worm eggs each time (every 10 minutes) does not show that the longer the flotation time, the more the number of worm eggs that float.

Results in table 1; JPL brand, the initial minute of evaluation, namely the 10th minute, found 193 worm eggs, and in the 20th minute there was a decrease to 38 worm eggs. But in the 30th minute there was an increase to 166 worm eggs, and again in the 40th minute there was a decrease to 8 eggs.

The same thing happened to the BTM salt brand in table 2 which provides an overview of fluctuating results.

The results obtained for both brands of salt during the experiment did not reflect the length of time flotation could lead to more worm eggs floating.

This condition occurs because the number or distribution of worm eggs in the suspension is not well suspended, so that when the suspension is pipetted, there are many worm eggs, some even contain a few worm eggs.

Another thing that can cause fluctuations in the number of worm eggs during identification is unstable mixing or shaking because it is done manually without a standard beater.

The same condition can also occur in the controls used, both 32% and 33% controls, where there are fluctuations in the number of worm eggs.

The results of this study are different from (Widiyanti et al., 2020) saturated NaCl (pa) was used as flotation material and 31 intestinal nematode eggs were floated within 10 minutes. There were 34 pieces in 20 minutes, 48 pieces in 30 minutes, and 48 pieces in 30 minutes, and 40

minutes with a total of 66 eggs showing that the longer the time used for the flotation process, the more intestinal nematode eggs that undergo flotation.

The disadvantages of salt consumption compared to salt or NaCl (pa) are; Consumption salt, if allowed to stand for more than 10 minutes after dripping on the glass object for identification, can form a small amount of salt deposits that can interfere with identification.

CONCLUSION

Based on the results of microscopic identification every 10 minutes, for 40 minutes intestinal nematode worm eggs that undergo flotation on two brands of salt consumption can be concluded; Two brands of consumable salt; JPL and BTM, with a concentration of 32%, can cause flotation of intestinal nematode eggs. There was no difference in flotation time between the two brands of salt consumption because from the first 10 minutes of the experiment both were able to flotate intestinal nematode eggs. This research can be continued at stages to see the fastest time to experience flotation of species Ascaris lumbricoides, Trichuris trichiura, Ancylostoma duodenale and Necator americanus

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