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Alkalinization Of The Gastroesophageal Region And Blood Coagulation Abilities Of Oyster Mushroom *(Pleurotus Ostreatus)*

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Abstract- *Improper intake of food that people eat can cause a lot of diseases. Too much intake of food high in acid may affect the condition of the stomach and may lead to Gastroesophageal Reflux Disease or Acid Reflux Disease. Apart from it, there are also diseases that a lot of people endure in relation to their blood clotting. Oyster mushroom (Pleurotus ostreatus)is known for the presence of numerous nutritional compositions and various active ingredients, and it have been reported to have antidiabetic, antibacterial, anticholestrolic, antiarthritic, antioxidant, anticancer, eye health and antiviral activities (Deepalakshmi, et.al, 2013).This study aimed to find out the alkalinization of the gastroesophageal region and blood coagulation abilities of oyster mushroom (Pleurotus ostreatus).Thus, this study undergone salivary and blood coagulation tests, and the researchers utilized ANOVA and t-test to determine the significant differences among the treatment groups. Based on the results obtained from the entire experiments, it was found out that Pleurotus ostreatus can: increase the pH level of gastroesophageal region, decrease the blood bleeding time, and accelerate the blood clotting time.*

Keywords: *Coagulation, gastroesophageal, oyster mushroom.*

INTRODUCTION

Improper intake of food that people eat can cause a lot of diseases. Even fruits and vegetables in large amount can bring a person into a certain disease. Too much intake of spicy and sour food or any other food high in acid may affect the condition of the stomach and may lead to Gastroesophageal Reflux Disease or Acid Reflux Disease. Apart from it, there are also diseases that a lot of people endure in relation to their blood clotting.

Gastroesophageal reflux diseases, or GERD, are a digestive disorder that affects the lower esophageal sphincter (LES), which is the ring of muscle between the esophagus and stomach (WebMD, 2015).

Acid reflux and gastroesophageal reflux diseases (GERD) are closely related, but the terms do not necessarily mean the same thing. Acid reflux is the backward flow of stomach acid into the esophagus — the tube that connects the throat and stomach. Acid reflux is more specifically known as gastroesophageal reflux. During an episode of acid reflux, one may taste regurgitated food or sour liquid at the back of his or her mouth or feel a burning sensation in his or her chest (heartburn) (Mujumdar & Misar, 2004). Some of its causes are: eating certain food such as: citrus, tomato, chocolate, mint, garlic, onions, or spicy or fatty food.

Conditions that cause clotting or coagulation problems include liver disease, thrombophilia (excessive clotting), and hemophilia (inability to clot normally).Clotting is what prevents excessive bleeding when one cuts himself or herself. However, the blood moving through vessels should not clot. If such

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clots form, they can travel through the bloodstream to the heart, lungs, or brain, causing a heart attack, stroke, or even death (Kumar, Vijayakumar, Govindarajan, & Pushpangadan, 2007).

Oyster mushrooms *(Pleurotus ostreatus)* are popularly consumed all over the world due to their taste, flavor, high nutritional values and medicinal properties. Because of the presence of numerous nutritional compositions and various active ingredients in this mushroom, it have been reported to have antidiabetic, antibacterial, anticholestrolic, antiarthritic, antioxidant, anticancer, eye health and antiviral activities (Kale, Misar, Dave, Joshi, & Mujumdar, 2007).

Nutritionally, it has unique flavor and aromatic properties and it is considered to be rich in protein, fiber, carbohydrates, minerals and vitamins as well as low fat (Aberoumand, 2012).

Mushrooms make welcome additions to calorie-conscious diets. They provide essential nutrients - including fiber, riboflavin and phosphorus - that support cell function and maintain tissue health. Making mushrooms a regular part of one's diet also benefits his or her immune system because they provide nutrients needed for healthy white blood cells (Groopman, 2008).

This study aimed to find out the pH level of gastroesophageal region and coagulation abilities of oyster mushroom *(Pleurotus ostreatus)*

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OBJECTIVES OF THE STUDY

This study generally investigated the alkalinization of the gastroesophageal region and coagulation abilities of oyster mushroom *(Pleurotus ostreatus).*

Specifically, this study aims to do the following:

1. identify and measure the pH level of gastroesophageal region of the experimental mice in different treatments;
2. determine the bleeding time and clotting time of the experimental mice in different treatments; and
3. determine if there are significant differences on the pH level of the gastroesophageal region and on the bleeding and clotting times of the experimental mice in different treatments.

MATERIALS AND METHODS

The researchers utilized the experimental method of the researches in gathering those needed and necessary procedures of this study. This is an experimental research where the researcher manipulates variable control/randomizes the rest of the variables.

General Procedure

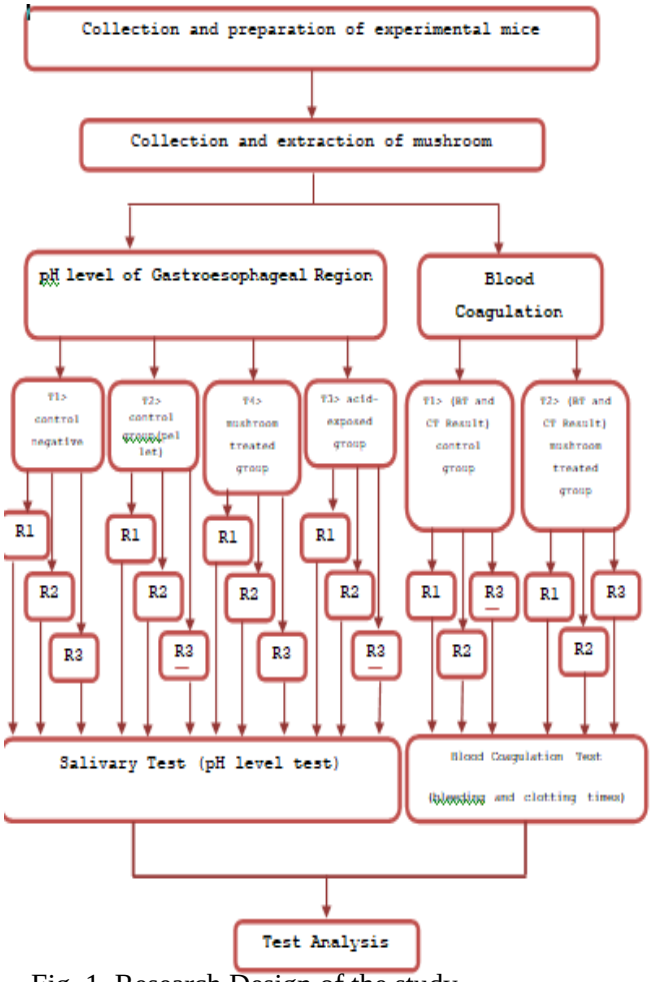

Fig. 1. Research Design of the study.

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Figure 2 shows the research design of this study. It shows the process of the experiment to achieve the objectives of the study.

Experimental Procedures

In the extraction of mushroom, the following materials were used: laboratory gown, gloves, knife, chopping board, funnel, beaker, reagent bottle and filter paper. And for experimental mice, cage, weighing scale, syringe and gloves were used.

Collection of Mushroom

Oyster mushrooms were gathered from Science City of Muñoz, Nueva Ecija which weigh1.5kg and were extracted manually.

Preparation of the Experimental mice

Experimental animal specifically Albino Mice were gathered at G.S Water Pet Shop, Brgy. Dimasalang, Cabanatuan City. Three Albino Mice were used. The experimental mice were 3 months old and were acclimatized in a safe room at room temperature condition before they underwent experimentation in seven (7) days. They weigh 35-40 g and were caged in 12x10x15 inches cage and fed regularly with available food pellets with a water bottle which contained tap water only that were refilled regularly. The cage was positioned in a room with an average room temperature, isolated from external disturbance.

Extraction of Oyster Mushroom

The oyster mushroom was extracted through manual extraction only and the researchers gathered 150 mL from it. This was fed to experimental mice within 3 days.

Exposure of Experimental Mice in Acid

After a week of acclimatization, while the first group of mice were not fed by their food (only water), and the second group of mice were fed by pellets, mice under acid-exposed group were fed regularly by a variety of food high in acid within three (3) days.

Administration of Pure Extract

The experimental mice were taken from their cage by holding their tail for the administration of pure extract. Administration of pure extract was done to each mouse restraining it with the two palms of hands, clasped together. A syringe was used to administer the pure extract with a volume of approximately .5ml where its needle has been removed. Another person held the mouse to help it open the mouth to force the syringe inside the oral cavity. With that, the pure extract of oyster mushroom was delivered inside the mouth down to the stomach. This process took twice in a day within three days.

Salivary testing

To identify and measure the pH level of the gastroesopahegeal region of experimental mice,the researchers used Biostyx 4SG Reagent Strips.

Salivary testing was done for each treatment. Each of the three mice was taken from their cage by holding their tails. Another person held the mouse to help it open the mouth. A cotton bud was forced inside the oral cavity of the mouse to get a sample of its saliva. Right after that, a cotton bud with saliva was dropped on a reagent strip. The color that might appear has a corresponding number determining the level of pH of each mouse.

Blood Coagulation Testing

To identify and measure the blood coagulation of the experimental mice, the researchers were assisted by registered medical technologist from Nueva Ecija Doctor's Hospital in Cabanatuan City.

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Statistical Analysis

The researchers utilized experimental method to this study. The mice that were used had undergone salivary test to measure the pH level.

In order to determine the significant changes of the three groups, average of each was computed through analysis of variance (ANOVA). Results were compared, tabularized and expressed in graphical form.

Analysis of Variance (ANOVA)

Analysis of variance (ANOVA) is a collection of statistical models used to analyze the differences among group means and their associated procedures (such as "variation" among and between groups). It is a method for portioning the variation observed in experimental data into different parts attributed to a known source. The statistical test of significance is employed when three or more groups are involved when the variable measure is of the ratio or interval type.

T-test

The t-test assesses whether the means of two groups are statistically different from each other. This analysis is appropriate whenever it is wanted to compare the means of two groups, and especially appropriate as the analysis for the posttest-only per two-group randomized experimental design (socialresearchmethods.net).

RESULTS AND DISCUSSION

This part presents the findings of the study, analysis of data and interpretation of results.

Result in Salivary Testing for the pH Level of Albino Mice Table 1 presents the salivary testing for the pH level of Albino Mice.

Table 1**.** Results of the Test for the pH Level of the Saliva of Albino Mice

Based on the result, the researchers found out that Treatment 1 (control negative) got the pH of 8.5 for every replication, thus got an average of 8.5 which falls under alkaline/base.

TREATMENT	R1	R2	R3	MEAN
T1: Control (negative)	8.5	8.5	8.5	8.5
T2: Control (pellet)	8.5	8.0	8.5	8.33
T3: Acid-exposed Group	7.0	7.0	8.0	7.33
T4: Mushroom-treated Group	8.5	8.5	8.5	8.5

Treatment 2 (control pellet) got the pH of 8.5 for R1, 8.0 for R2, and 8.5 for R3 with an average of 8.33 which is also an alkaline.

Treatment 3 (acid-exposed group) got the pH of 7.0 for both R1 and R2, and 8.0 for R3 with an average of 7.33.

Lastly, Treatment 4 (mushroom-treated group) got the pH of 8.5 for every replications, thus got an average of 8.5 which falls under alkaline/base.

Therefore, the researchers found out that onion, garlic, tomato, fish, meat and corn can decrease the pH level of mice while oyster mushroom can increase the pH level which resulted to being alkaline/base and it is because according to *Syakira (2016),* one way to reduce hyperacidity is to consume the oyster mushrooms. Hyperacidity is a health problem associated with excess stomach acid. The oyster mushroom is food that produces alkaline residue when metabolized by the body. It helps in balancing the acidity of the stomach.

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Bleeding Time Results

Table 2 presents the result of the bleeding time for experimental mice.

Table 2. Bleeding Time Results

TREATMENT	R1	R2	R3	AVERAGE
BT Result (Control Group)	2 mins and 21 secs	2 mins and 5 secs	2 minutes and 32 secs	2 mins and 19 secs□
BT Result (Mushroom treated Group)	2 mins and 16 secs	2 mins and 12secs	2 minutes and 12 secs	2 mins and 13secs □

Legend: □ = variables are significantly different at □ = 0.05

Based on the result, the researchers found out that the control group got the bleeding time of 2 mins and 21 secs in R1, 2 mins and 5 secs in R2, and 2 mins and 32 secs in R3.

The mushroom treated group got the bleeding time of 2 mins and 16 secs in R1, 2 mins and 12 secsin R2, and 2 mins and 12 secs in R3.

In general, based on the averages, both treatments got the normal level of bleeding time(1-3 minutes) because control group got an average of 2 mins and 19 secs while the mushroom treated group got 2 mins and 13 secs. Hence, the researchers found out that the oyster mushroom *(Pleurotus ostreatus)* can decrease the bleeding time of experimental mice.

Blood Clotting Results

Table 3 presents the results of clotting time of the Albino Mice.

Table 3.Blood Clotting Results

TREATMENT	R1	R2	R3	AVERAGE
CT Result (Control Group)	4 mins and 2 secs	3 mins and 50 secs	4 minutes	4 mins and 24 secs□
CT Result (Mushroom treated Group)	3 mins and 55 secs	3 mins and 40 secs	3 mins and 36 secs	4 mins and 10 secs□

Legend: □ = variables are significantly different at □ = 0.05

Based on the result, the researchers found out that the control group got the clotting time of 4 mins and 2 secs in R1, 3 mins and 50 secs in R2, and 4 mins in R3. While the clotting time for mushroom treated group got 3 mins and 55 secs in R1, 3 mins and 40 secs in R2, and 3 mins and 36 secs in R3.

In general, based on the averages, both treatments got the normal level of clotting time(2-6 minutes) because control group got an average of 4 mins and 24 secs while the mushroom treated group got 4 mins and 10 secs. Hence, the researchers found out that the oyster mushroom *(Pleurotus ostreatus)* can accelerate the clotting time of experimental mice.

CONCLUSION AND RECOMMENDATION

Conclusions

Based on the results obtained from the entire experiments, the researchers concluded the following:

Pure extract of Oyster Mushroom *(Pleurotus ostreatus)* can increase the pH level

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of the gastroesophageal region, decrease the bleeding time, and accelerate the clotting time.

Mushroom treated group has a shorter bleeding time and fastest clotting time compared to the control groups.

There is no significant difference when it comes to the pH level of the gastroesophageal region of Albino Mice while when it comes to blood coagulation there are significant changes among the treatment groups.

Recommendations

The researchers recommend the following for further study:

1. Cite other varieties of mushroom that has a great effect on the gastroesophageal region specifically of Albino Mice.
2. Formulate a suitable dosage of mushroom extract to be administered on the experimental mice.
3. Determine the other effects of Oyster Mushroom on the gastroesophageal region.
4. Use a more complete tester for a more complete result when it comes to the testing of pH level.

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