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Feasibility of Brown Sugar and Yeast Solution as a Potential Organic Mosquito Trap (OMT)

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Abstract: Mosquitoes, as well as its larvae, are important food for aquatic animals such as birds, bats, and other arthropods. However, mosquitoes transmit pathogens that cause some of the worst diseases known, including malaria, yellow fever, encephalitis and most of all, dengue fever. Sugars are the smallest carbohydrates containing five to six carbon atoms, hydrogen, and oxygen. Saccharomyces cerevisiae, commonly called yeast, is a single-celled organism that feeds on glucose, and through fermentation converts carbohydrates to alcohols while releasing carbon dioxide (CO2). Carbon dioxide is attractive to mosquitoes. Therefore, solution containing sugar and yeast can be used as baits.

This study aimed to examine the feasibility of using brown sugar and yeast solutions as baits for mosquitoes. Two types of sugar were used -brown sugar and dark brown sugar (muscovado). Four mixtures were prepared consisting of the same amount of water (200 ml) and yeast (1 g) but with different types and amounts of sugar: 1) 50 g brown sugar, 2) 100 g brown sugar, 3) 50 g dark brown sugar, and 4) 100 g dark brown sugar. Another four mixtures were prepared with the same quantities of water and sugar but without added yeast, which served as the negative controls. The mosquito traps are made of soda 1.5 plastic, covered with newspaper make the inside of the trap dark. The mosquito traps were placed in different corners of the classrooms. The OMT was left in the classrooms for 3days. Three trials were made with two sets of the OMT.

Trapped mosquitoes averaged to 14 and 8.6 for solutions with yeast-100 g dark brown sugar and yeast-50 g dark brown sugar, respectively. For solutions with yeast-100 g brown sugar, and yeast-50 g brown sugar, the average trapped mosquitoes were 12 and 6, respectively. For the control solutions (without yeast), the average trapped mosquitoes were 11 for solutions with100 g dark brown sugar solution, 8 for those with 50 g dark brown sugar, 6 for those with 100 g brown sugar, and 3 for those with 50 g brown sugar. Comparison of results in mosquito traps with and without yeast (control) showed that the best mosquito traps are the solutions with yeast containing brown sugar. Solutions with 100 g or 50 g

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brown sugar with yeast showed 50% increase in trapped mosquitoes compared to those of the control. Based from the result, the OMT is a good enough as a preliminary study for eliminating pathogenic mosquitoes and a better and cheaper alternative as well.

Keywords: Brown Sugar, Yeast, Organic Mosquito Trap (OMT)

1. Introduction

Mosquitoes, as well as its larvae, are important food for aquatic animals such as birds, bats, and other arthropods. However, mosquitoes transmit pathogens that cause some of the worst diseases known, including malaria, yellow fever, encephalitis and most of all, dengue fever. Sugars are the smallest carbohydrates containing five to six carbon atoms, hydrogen, and oxygen. Saccharomyces cerevisiae, commonly called yeast, is a single-celled organism that feeds on glucose, and through fermentation converts carbohydrates to alcohols while releasing carbon dioxide (CO_2). Carbon dioxide is attractive to mosquitoes. Therefore, solution containing sugar and yeast can be used as baits.

2. Materials and Methods

Materials:

1. 2-L plastic bottles
2. 200 ml water
3. Brown sugar
4. Dark brown sugar (Molasses)
5. 1 gram of yeast

Mixture Ratio:

Positive Control

Brown Sugar	Dark Brown Sugar
Trap 1: 50g: 200 ml Water: 1 g yeast	Trap 3: 50 grams: 200 ml water: 1 g yeast
Trap 2: 100g: 200 ml water: 1g yeast	Trap 4: 100 grams: 200 ml water: 1 g yeast

Negative Control

Brown Sugar	Dark Brown Sugar
Trap 1: 50g: 200 ml Water	Trap 3: 50 grams: 200 ml water
Trap 2: 100g: 200 ml water	Trap 4: 100 grams: 200 ml water

Procedure for OMT Trap:

The plastic soda bottles were cut in half and the neck portions were set aside to be used after the solutions were prepared. The solutions were prepared by mixing brown sugar/ molasses with hot water and cooled. The yeastwas added. (Carbon dioxide will be created) then funnel part was placed upside down

into the other half of the bottle to close the trap. The traps were wrapped by a newspaper then placed in the corners of the classrooms. Three trials were made and after every 3 days, the number of dead mosquitoes inside the trap was counted. It was recorded and comparisons between solutions with yeast and solutions without yeast were analyzed.

PROJECT FLOWCHART:

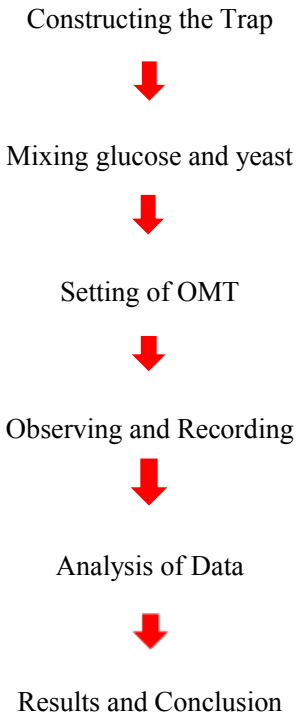

Figure 1. Flowchart of the study

3. Results and Discussion

Table 1. The mean average of collected mosquitoes for the three trials in site 1

	with yeast	**without yeast (control)**	**number of reduction**	**% reduction from the control**
100 g dark brown sugar	14	11	3	21
50 g dark brown sugar	8.6	8	0.6	6.98
100 g brown sugar	12	6	6	50
50 g brown sugar	6	3	3	50

Table 1. From the above data, the best solutions are those with yeast containing 50 g and 100 g brown sugar

Comparison of results in mosquito traps with and without yeast (control) showed that the best mosquito traps are the solutions with yeast containing brown sugar. Solutions with 100 g or 50 g brown sugar with

yeast showed 50% increase in trapped mosquitoes compared to those of the control. Based from the result, the OMT is a good enough as a preliminary study for eliminating pathogenic mosquitoes and a better and cheaper alternative as well.

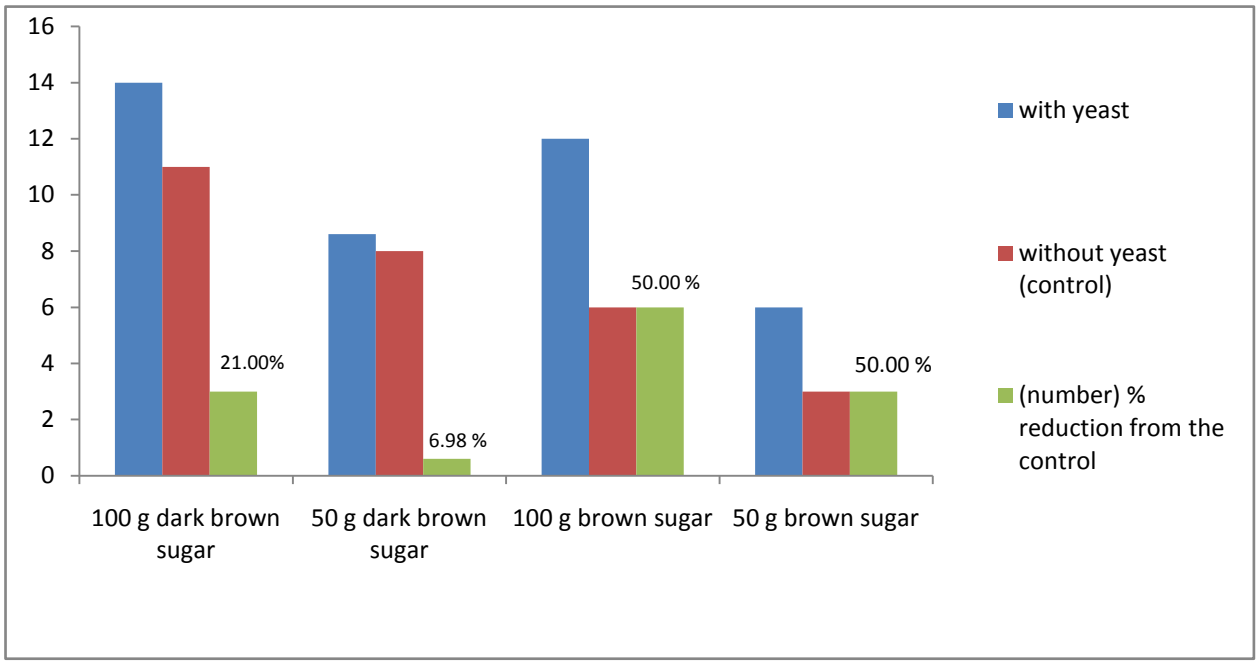

Figure 2. The mean average of collected mosquitoes for the three trials and percentages of reduction.

The first set of bars represents the means for 100g dark brown sugar. The second set of bars refers to the means for 50g dark brown sugar. The third set of bars represents the means for 100g brown sugar and the fourth set of bars represents the means for 50g brown sugar. It can be seen from Figure 3 that the solutions with 100 g and 50 g brown sugar with yeast showed 50% increase in trapped mosquitoes compared to solutions of 100g dark brown sugar and 50g dark brown sugar with 21% and 6.98% respectively. The comparison of results in mosquito traps with and without yeast (control) showed that the best mosquito traps are the solutions with yeast containing brown sugar.

4. Conclusion

Based on the findings of this study, the solution of brown sugar is a better ingredient than dark brown sugar in making an organic mosquito trap (OMT) and the best concentration to be used is 100g and 50gbrown sugar for every 200 mL of water.

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