

Original Research Article

Comparative Analysis on the Effectiveness of the Different Brands of Commercialized Dishwashing Liquids

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Abstract: This study was conducted to determine the effectiveness of different brand of commercialized dishwashing liquid namely: Joy, Axion, Surf, Mr. Clean, specifically it was conducted to compare the effectiveness of different brands of commercialized dishwashing liquid tested on Cagayan State University College of Medical Technology Clinical Laboratory using the organisms *E. coli* and *Staphylococcus aureus*. Likewise, the study determined the zone of clearance in the oil and grease. Both had used alcohol as a positive control and water as a negative control. The analysis of variance in the three replication and six treatments was used in the study. Based on the results of the study, it was found out that the four commercialized dishwashing liquid exhibited an antibacterial activity on the two test microorganism. Joy showed greater inhibitory activity on the test microorganism, followed by Axion, Surf and Mr. Clean. On the other hand, the results of the analysis of variance showed that there is no significant effect on the elimination of food borne bacteria and as to the removal of oil and grease. Commercialized dishwashing liquid are more effective against the elimination of *E. coli* than *Staphylococcus aureus*, and in the removal of oil and grease than alcohol and water.

Keywords: *Escherichia coli*, *Staphylococcus aureus*

INTRODUCTION

BACKGROUND OF THE STUDY

Every day we come into contact with and use large number of chemical products, often unknowingly. The majority of these chemicals are relatively harmless. However, some are dangerous and our complacency in their use and storage is cause for concern. Modern household cleaning products are significantly more effective than the products our mother and grandmother used. Synthetic cleaning compounds, anti-deposit ion agents, chlorine bleaches, builders and optical brightness have produced a generation of cleaners that work under more varied conditions, against more forms of dirt, in colder water, and with less effort than ever before. But if our attempts to get our clothes whiter than white and homes cleaner than clean (and in less time than ever before), we've accepted a plethora of chemicals in conventional cleaners whose presence raises significant health and environmental concerns.

In fact, many of the chemicals that are found-unregulated- in conventional household cleaning products are not allowed in work places due to occupational health and safety Administration regulations. The good news is that there are things each of us can do to greatly lower our risk of exposure to

harmful chemical and protect our families from the negative health effects than can cause. It's often as simple as replacing the toxic products we use in our homes with safer alternatives and learning more about how to protect ourselves from these hazards that might remain. Seventh Generation was born out of a desire to provide effective, useful household products that will not harm the earth on its inhabitants.

Dishwashing agents, soaps and detergent make life more pleasant that it would otherwise be, but they also have draw backs. These are the substance used to enhance the cleansing action of the water. It is an emulsifier, which penetrates and breaks up the oil film that binds dirt particles, and a wetting agent, which helps them to flat off. Many additives are used in detergents to provide scent, brightening or bleaching action.

Different dishwashing liquids have the property in killing bacteria. It suppresses the growth of different bacteria that can cause odor, skin infections, food poisoning, intestinal illnesses and other commonly transmitted diseases.

Oil and grease in dishes will increase the contamination of food by producing different strains of bacteria that could lead to food spoilage and causes disease to human when ingested. They must be removed on utensils these are the factors in the increased growth of bacteria in the dishes. Chemical bleaching agent or oxidizing agent of dishwashing plate such as hydrogen peroxide, sodium hypochlorite, and sodium chlorite have been used to bleach and removed oils from utensils particularly plastics. These perform by oxidizing the various pigments from their natural state to their colourless oxidized forms. Oil will contact to the chemical and the natural states are continuously removed.

Nowadays, scientist and chemist discovered different brands of dishwashing liquid which are commercially used worldwide. Here in the Philippines the commonly available are Joy, Axion, Surf and Mr. Clean dishwashing liquids. People regard them as essential because of their property in eliminating food borne bacteria and removing oil and greases.

It is for this reason why the researcher conducted this study to find out the effectiveness of different commercialized dishwashing liquid.

STATEMENT OF THE PROBLEM

The study sought to compare the effectiveness of the different brands of commercialized dishwashing liquid as to:

- a. Elimination of food borne bacteria
- b. Removal of oil and grease

Specifically, the study was conducted to answer the following questions:

- a. What brand is best to use in elimination of food borne bacteria?
- b. What brand is best to use in removing oil and grease?

SIGNIFICANCE OF THE STUDY

The result of this study will give information to the people, which brand of commercialized dishwashing liquid is effective as an antibacterial agent to such bacteria which include gram negative bacteria (*Escherichia coli*) and gram positive bacteria (*Staphylococcus aureus*). These will greatly lower our risk of exposure to fatal bacteria's and protect our families from the negative effects that they cause.

The study was conducted at Cagayan State University- College of Medical technology, Clinical Laboratory, Tuguegarao City.

The study is limited only with the four dishwashing liquid namely, Joy, Axion, Surf and Mr. Clean in the elimination of food borne bacteria and the quantity and quality of oil and grease which varies depending on food.

The quantity, quality and the source of the oil and grease were prepared by the researchers. By mixing the left over oil from spoiled meat and excess oil from fried fish and meaty products.

Flavor of the dishwashing liquid was disregarded in the study.

The study will give information and knowledge to people on which brand of dishwashing liquid is best to use in the elimination of food borne bacteria and removal of oil and grease.

OBJECTIVES:

Generally, the study was conducted to determine the effectiveness of commercialized dishwashing liquids.

Specifically, the study was conducted to compare the effectiveness of different brands of commercialized dishwashing liquid as to:

1. Elimination of food borne bacteria.
2. Removal of oil and grease.

HYPOTHESIS

H₀: There is no significant difference on the effectiveness of different brand as to:

- a. Elimination of food borne bacteria.
- b. Removal of oil and grease.

RESEARCH DESIGN

The study employs the descriptive inferential design in assessing the effect of different commercialized dishwashing liquid. This study uses different commercialized dishwashing liquid and also water as a control.

The Complete Randomized Design (CRD) was used, researcher went to the grocery and randomly had chosen five dish washing liquids and luckily these four commercialized dishwashing liquids were chosen.

1. Treatment 1 ----- Joy
2. Treatment 2 ----- Axion
3. Treatment 3 ----- Surf
4. Treatment 4 ----- Mr. Clean
5. Treatment 5 ----- Negative control (Water)
6. Treatment 6 ----- Positive control (Alcohol)

LOCALE OF THE STUDY

The study was conducted at Cagayan State University – College of Medical Technology Clinical Laboratory, Tuguegarao City.

MATERIALS AND METHODS

The following materials and equipment used in the experimental part of the study are:

- a. Water (-) control , Alcohol (+) control
- b. Four (4) different brands of dishwashing liquid namely:
 - 1. Joy
 - 2. Axion
 - 3. Surf
 - 4. Mr. Clean
- c. Culture Media (Mueller Hinton Agar)
- d. Measuring device (ruler)

The researcher made use of the antibacterial Susceptibility Test by isolating some organisms that is specially seen in dishes these

- a. Combining or mixing rancid oil and grease
- b. Fill the plates with mixed oil and grease (2ml of oil & 2ml of grease)
- c. Exposed the plate within two hours

The researcher put two drops of different brands of dishwashing liquid into the oily and greasy dishes and determine which brand is best in removing oil and grease by measuring the zone of clearance by using ruler.

RESEARCH PROCEDURES
For Antibacterial Property:

RESULTS AND DISCUSSION

Table 1: Effectivity of commercialized dishwashing liquid to eliminate foodborne bacteria

Dish-Washing Liquid	Zone of inhibition (cm)							
	<i>Escherichia coli</i>				<i>Staphylococcus aureus</i>			
	Trial 1	Trial 2	Trial 3	Mean	Trial 1	Trial 2	Trial 3	Mean
1. Joy	11	23	30	21.33	25	37	38	33.33
2. Axion	10	15	22	15.67	18	22	31	23.67
3. Surf	7	7	12	8.67	11	18	22	17
4. Mr. Clean	6	6	8	6.67	10	12	18	13.33
5. Negative Control (water)	0	0	0	0	0	0	0	0
6. Positive control (Alcohol)	5	5	5	5	7	7	7	7

Table 1 Presents the mean degree of zone inhibition in centimetre produced by the dishwashing liquid against *E. coli* and *Staphylococcus aureus*. And also includes the three replications. The data revealed that dishwashing liquid has the greater capability of inhibiting the growth of *Staphylococcus aureus* compared to *Escherichia coli*.

It also includes that Joy has the greater potential in eliminating food borne bacteria followed by axion, surf and Mr. Clean. These means that these four commercialized dishwashing liquid has no significant difference because they have similar basic component.

Table 2: Statistical table which shows the computed frequency in the effectivity of commercialized dishwashing liquid to eliminate food borne bacteria

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN OF SQUARE
BETWEEN	114.0214	1	114.0214
WITHIN	1001.0188	10	100.10188
TOTAL	1115.0402	11	Fc= 1.1390

If the frequency computed (Fc) is lesser than the tabulated frequency (Ftab) accept the null hypothesis. And if the frequency computed (Fc) is greater than the tabulated frequency (Ftab) reject the null hypothesis.

The data implies that four dishwashing liquid has no significant difference in the elimination of food borne bacteria. It means that Joy, Axion, Surf and Mr. Clean are capable in the elimination of food borne bacteria. Because they have similar basic components which includes alcohol, potassium sulphate and carboxylic acid.

Table 2: Effectivity of commercialized dishwashing liquid in the removal of oil and grease

Dishwashing Liquid	Zone of Clearance (cm)							
	<i>Escherichia coli</i>				<i>Staphylococcus aureus</i>			
	Trial 1	Trial 2	Trial 3	Mean	Trial 1	Trial 2	Trial 3	Mean
1. Joy	20	30	37	29	10	14	35	19.67
2. Axion	12	20	28	20	9	11	15	11.67
3. Surf	8	10	14	10.67	7	9	11	9
4. Mr.Clean	5	6	8	6.33	5	6	6	5.67
5. Negative control (water)	0	0	0	0	0	0	0	0
6. Positive control (alcohol)	2	5	2	2	2	3	4	3

Table 2 presents the mean degree of zone of clearance in centimetre produced by the dishwashing liquid in the removal of oil and grease. And also includes the three replications. It illustrates that Joy has the greater potential in the removal of oil and grease followed by Axion, Surf and Mr. Clean.

If frequency computed (F_c) is lesser than the tabulated frequency (F_{tab}) accept the null hypothesis. And if the frequency computed (F_c) is greater than the tabulated frequency (F_{tab}) reject the null hypothesis.

Table 3: Statistical Table which shows the computed frequency in the effectivity of commercialized dishwashing liquid in the removal of oil and grease

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN OF SQUARE
BETWEEN	30.0516	1	30.0516
WITHIN	873.1985	10	87.31985
TOTAL		11	$F_c = 1.1390$

If the frequency computed (F_c) is lesser than the tabulated frequency (F_{tab}) accept the null hypothesis. And if the frequency computed (F_c) is greater than the tabulated frequency (F_{tab}) reject the null hypothesis.

The data implies that four dishwashing liquid has no significant difference in the removal of oil and grease. It means Joy, Axion, Surf and Mr. Clean are capable in the elimination of food borne bacteria. Because they have similar basic components which includes alcohol, potassium sulphate and carboxylic acid.

Summary

The main objective of the study was to compare the effectiveness of the different brand of commercialized dishwashing liquid as to elimination of food borne bacteria and removal of oil and grease.

Generally, the four commercialized dishwashing liquid mainly Joy, Axion, Surf and Mr.Clean were found to exhibit antimicrobial activity against the two test microorganisms namely: *Escherichia coli* and *Staphylococcus aureus*. And also its effectiveness in the removal of oil and grease. They have no significant difference.

The greater the zone of inhibitions means the more effective is the commercialized dishwashing liquid in the elimination of food borne bacteria. And the

greater the zone of clearance implies that the commercialized dishwashing liquid is effective in the removal of oil and grease.

The sid microbiological test that we used is the antimicrobial susceptibility test. Aside from their property of eliminating food borne bacteria we also tested its capability in removing oil and grease. Researcher made use of the isolated microorganisms and they also prepared rancid oil.

The study was conducted at Cagayan State university- College of Medical Technology Clinical Laboratory, Tuguegarao Campus. The analysis of data includes comparison of means and analysis of variance (ANOVA).

Results indicated that the four dishwashing liquid are capable of eliminating food borne bacteria and their property of removing oil and grease. It was found that the four dishwashing liquid are more effective in eliminating *Staphylococcus aureus* as compared to *Escherichia coli*.

Researcher did three replication in performing the said study.

Conclusions

In the above result, it was stated that the commercialized dishwashing liquid are capable of

eliminating food borne bacteria, as well as oil and grease.

Among the four commercialized dishwashing liquid Joy, has the greater potential in the elimination of food borne bacteria, grease and oil. This was based on the computed mean. Followed by Axion, Surf and Mr.Clean.

It also found out that the four commercialized dishwashing liquid are more effective in eliminating *Staphylococcus aureus* as compared to *E. coli*.

Further they are more effective than using purely water and alcohol.

Recommendations

1. Do not wash plate with plain water; instead wash it with dishwashing liquid because washing plates with purely water can't able to eliminate bacteria that cause diseases to humans.
2. Other organisms can also be tested aside from *Escherichia coli* and *Staphylococcus aureus*.
3. Test other commercialized dishwashing liquid aside from Joy, Axion, Surf and Mr. Clean.
4. Always wash utensils with dishwashing liquid to prevent the occurrence of diseases particularly diarrhea.
5. Same study can be conducted using commercialized dishwashing paste.
6. Further study should be conducted why the tested commercialized dishwashing liquid are more effective in the elimination of *Staphylococcus aureus* than *Escherichia coli* using T-test.

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