

Effect of Lysol on *Serratia marcescens*

Introduction

Microorganisms are virtually important as decomposers, chemosynthetic autotrophs, and nitrogen fixers, however, some are capable of destroying food, contaminating water, cause diseases, and even can be used as bio-warfare driving force; hence inhibiting their growth is vital.

Background of the Study

Lysol is the common market name of Brand I.C. Quaternary Disinfectant cleaner in most Medical settings, Livestock Industry, Food and Beverage Industry, most offices, Laboratories, and household settings. It is also an agent for decontamination (LYSOL Brand I.C. Quaternary Disinfectant Cleaner (concentrate), 2007). It may come in concentrated pack indicated as: Pseudomonacidal, Staphylocidal, Salmonellacidal, Bactericidal, Fungicidal, Virucidal, and mildewstatic disinfectant (LYSOL Brand I.C. Quaternary Disinfectant Cleaner (concentrate), 2007). It is also commonly known as decontaminant in almost all spheres where microorganisms are not welcome (LYSOL Brand I.C. Quaternary Disinfectant Cleaner (concentrate), 2007). Its active ingredients are Didecyl dimethyl ammonium chloride, 10.14%, and n-Alkyl (C_{14} 50%, C_{12} 40%, C_{16} 10%) dimethyl benzyl ammonium chloride, 6.76%. Its inert ingredients are 83.10% (LYSOL Brand I.C. Quaternary Disinfectant Cleaner (concentrate), 2007).

According to Reckitt Benckiser the company of professionals that market Lysol, the product has been found to be effective at controlling transmission by eradication of common microorganisms that have been the etiologic agents of human and animal diseases such as colds diarrhea, Rhinovirus (LYSOL Brand I.C. Quaternary Disinfectant

Cleaner (concentrate), 2007). Thus, Lysol is anti-bacterial, anti-fungal, and anti-virus agent (LYSOL Brand I.C. Quaternary Disinfectant Cleaner (concentrate), 2007).

However, its capability of inhibiting growth of *Serratia marcescens* must be tested.

Serratia marcescens is the common strain of bacteria normally used as laboratory experimental subjects. This bacterial strain has a characteristic colony color of red, and has been found to be selectively pathogenic to human beings (Owens & McGowan, 1999). As pathogenic organisms, they are capable of causing infectious diseases (Owens & McGowan, 1999). They may also be contaminants of materials (Owens & McGowan, 1999). However, they can be easily eradicated by physical contact with Lysol as proven by the professionals of Reckitt Benckiser company (LYSOL Brand I.C. Quaternary Disinfectant Cleaner (concentrate), 2007).

Statement of the question

Does Lysol inhibit the growth of *Serratia marcescens*?

Hypothesis

Ho: Lysol does not inhibit growth of *Serratia marcescens*.

Description of Experiment

The control set-up consist of 2 Petri dishes of agar streaked with *Serratia marcescens* marked 0% Lysol, and the experimental Set-up consist of 10 Petri dishes of agar streaked with *Serratia marcescens* marked 100%, 50%, 25%, 12.5%, and 6.25% Lysol. In addition, 12 small paper dots, and 50 ml per concentration of Lysol was prepared.

Prediction

If a solution contains high concentration of Lysol, then there will be greater zone of inhibition on a plate streaked with *Serratia marcescens*, and lower concentrations will not show, if at all, zones of inhibition.

Significance of Prediction

The extent of zones of inhibitions would reveal Lysol's effects on *Serratia marcescens*, whether at high concentration or at low concentration.

Methods and Materials

a) Independent variable

i) Lysol, *Serratia marcescens*, and 1 week were the independent variables.

ii) Lysol was prepared at: 100%, 50%, 25%, 12.5%, and 6.25% concentrations, while *Serratia marcescens* was streak on 12 agar plates.

iii) These were chosen to determine at what concentration of Lysol will there be greater or lower zones of inhibitions on *Serratia marcescens* as streaked on 12 agar plates.

iv) 0% Lysol was indicated for the control group.

b) Dependent variables

i) The zones of inhibitions were the dependent variables.

ii) The zones of inhibitions were a true measure of the effect of the independent variable Lysol on *Serratia marcescens* because it would indicate if there was increase or decrease in the population.

iii) The zones of inhibitions as dependent variables were defined and measured by small white paper dots placed on streaked *Serratia marcescens*.

c) The control variables were the zones of inhibitions on the agar plates with *Serratia marcescens* where 0% Lysol was applied.

d) *Serratia marcescens* was streaked on 12 agar plates. Six of these Petri dishes were assigned as set 1. Another six Petri dishes were assigned set 2. Each of the Petri dish on set 1 and set 2 was correspondingly labeled according to the concentration of Lysol. Small white paper dots were dipped accordingly and were carefully laid on the surface of the respective *Serratia marcescens*. The 1st set was done first and was set aside for one (1) week. After one week, observations were made and gathered from set 1. Then the 2nd set was prepared following the same procedures done on set 1.

Results

a)

i)

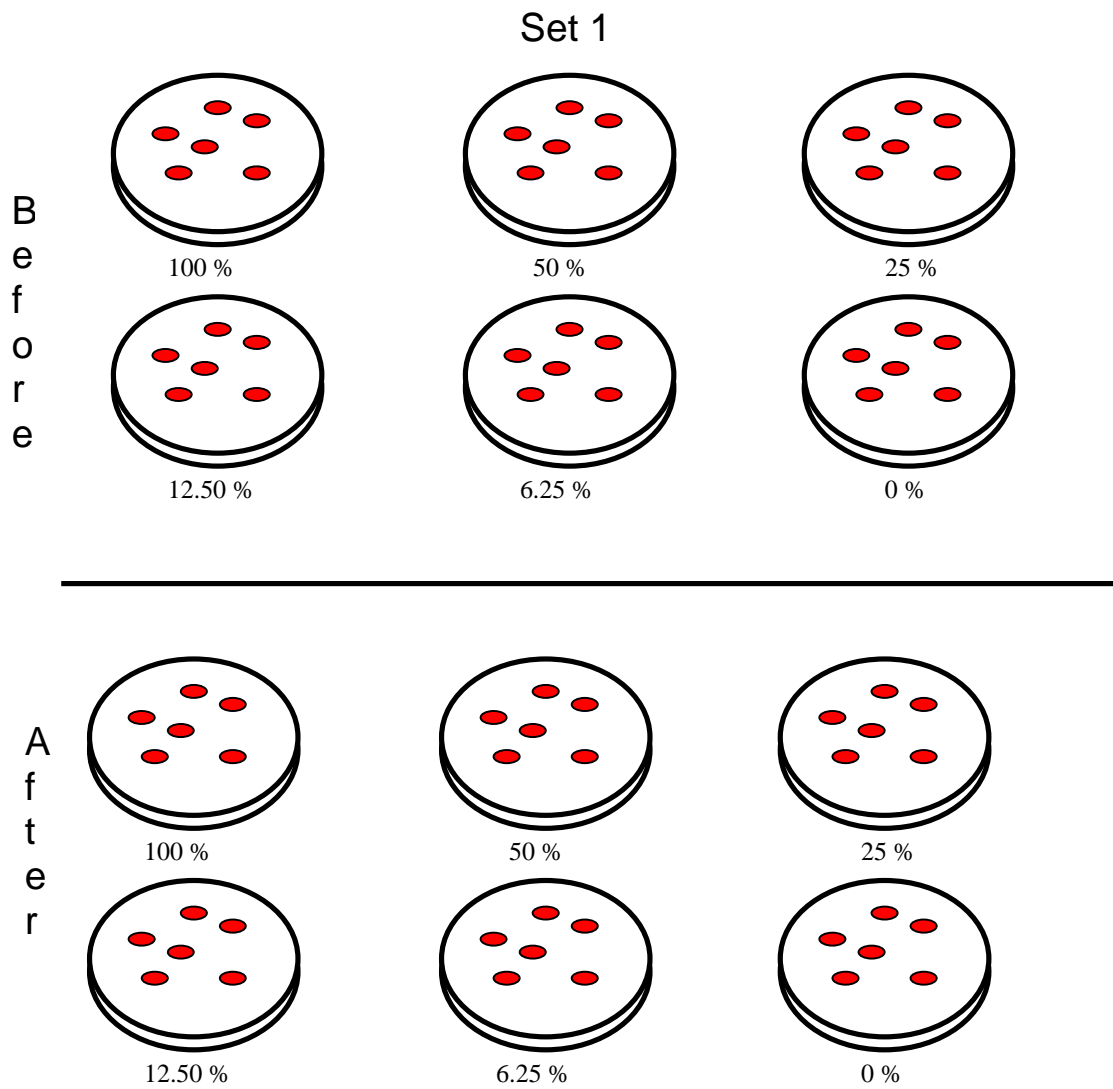
a) Experimental set 1	b) Experiment set 2
100% Lysol – no zone of inhibition	100% Lysol – no zone of inhibition
50% - no zone of inhibition	50% - no zone of inhibition
25% - no zone of inhibition	25% - no zone of inhibition
12.5% - no zone of inhibition	12.5% - no zone of inhibition
6.25% - no zone of inhibition	6.25% - no zone of inhibition

The table shows that there were no zones of inhibitions with the varied concentration of Lysol in set 1. The same results were showed in set 2.

ii) In set 1, there were no zones of inhibitions with the varied concentration of Lysol.

Similarly, set 2 revealed exactly the same results as that of set 1.

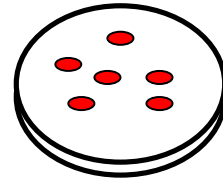
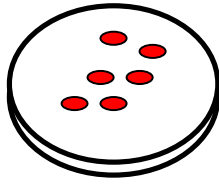
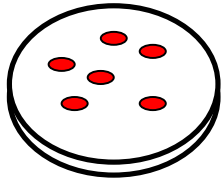
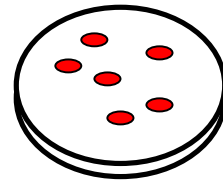
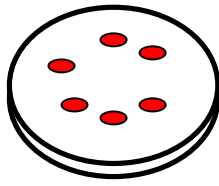
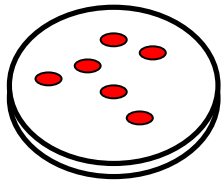
i)



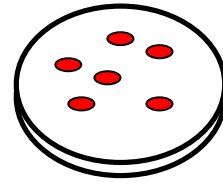
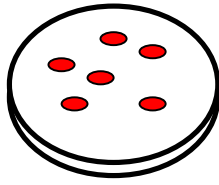
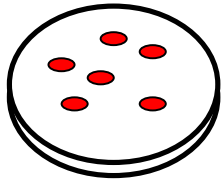
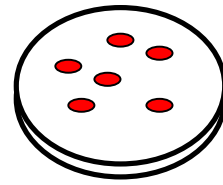
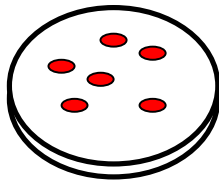
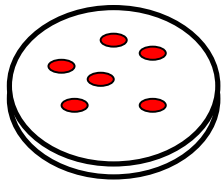
Percentages indicate Lysol concentration
Red dots indicate *Serratia marcescens* colonies

Set 2

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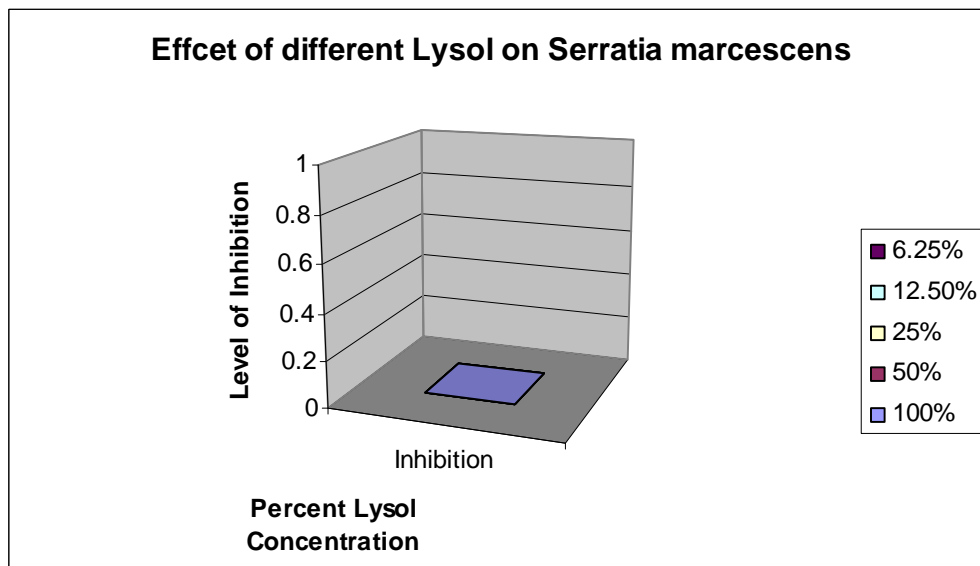
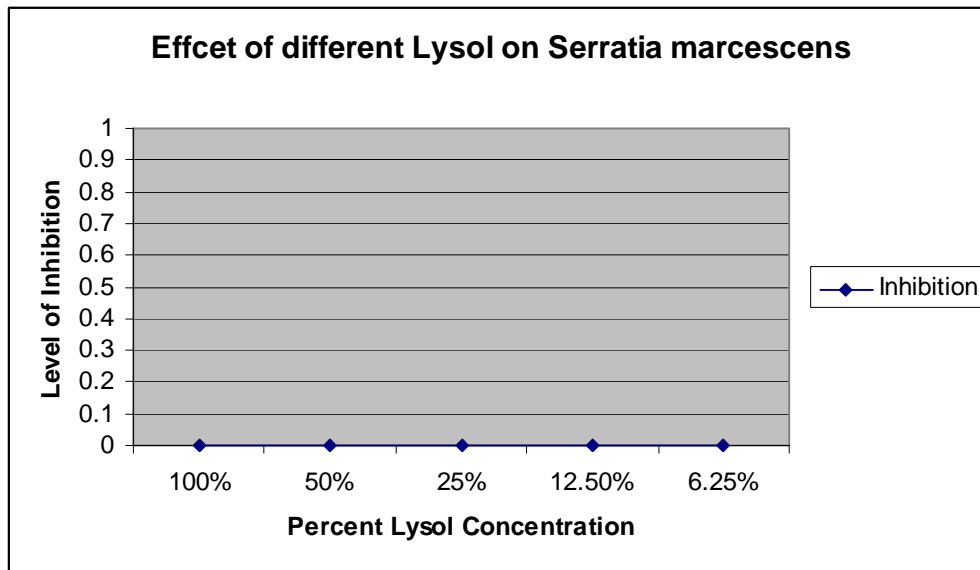


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Percentages indicate Lysol concentration
Red dots indicate *Serratia marcescens* colonies

ii.



c) Results revealed no zones of inhibition in the series of test conducted.

Discussion

- a) The first trial and the second trial experimental results consistently revealed negative zones of inhibitions implying the inability of Lysol to have an effect on *Serratia marcescens*.

- b) The null hypothesis, Lysol does not inhibit growth of *Serratia marcescens* is thus accepted.
- c) The inability of Lysol to inhibit growth of *Serratia marcescens* was not consistent with the assertion of Reckitt Benckiser Company as the producer of Lysol. It claimed that certain microorganisms can be eradicated by physical contact with Lysol.
- d) Lysol does not inhibit growth of *Serratia marcescens*.
- e) The amount of Lysol applied per concentration depended on the absorbing and holding capacity of the white paper dots which could have caused subsequent inability of Lysol to show zones of inhibitions.
- f) As Lysol was found to have not caused any degree of inhibition on the growth of *Serratia marcescens*, then it would not be an efficient agent to help resolve the crisis that microorganisms may bring about; destroying food, contaminating water, causing diseases, and even can be used as bio-warfare driving force. This was proven by the extent of zones of inhibitions that would have been revealed if Lysol affects *Serratia marcescens*, whether at high concentration or at low concentration.

Works Cited

- Owens, Shirley and McGowan, Catherine. "Digital Learning Center for Microbial Ecology: Microbe Zoo". The Miracle Microbe: Serratia marcescens. International Society for Microbial Ecology: Comm Tech Lab, Michigan State University. 1999.
- Reckitt Benckiser Inc. LYSOL Brand I.C. Quaternary Disinfectant Cleaner (concentrate). www.reckittprofessional.com. Parsipany, NJ: U.S.A. 2007