

Estimation of Antibacterial Properties in Ginger, Garlic and Ginger-Garlic Paste Against Food-Poison Causing Bacteria

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Abstract: Many of the spices used in our daily diets have been noted to have great medicinal values and antibacterial properties as well. Ginger (*Zingiber officinale*) and garlic (*Allium sativum*) are one of these spices which are very useful and important and are used as therapeutic agent against many infections. The aim of this research paper was to estimate the antibacterial properties found in ginger, garlic and their paste against three strains of food poisoning bacteria such as *Pseudomonas*, *Klebsiella*, *Escherichia coli*. The method that was used for this was the cork borer well diffusion method. The samples were loaded by 1% v/v dilution in the well following the incubation for 24hrs. The growth was observed which evidently showed that garlic has the most antibacterial properties against all three bacteria's whereas ginger and ginger-garlic paste have minimum antibacterial properties against these bacteria.

Keywords: Ginger, Garlic, Antibacterial properties, Food poison, Infection, Inhibition

I. INTRODUCTION

Food poisoning, also called food borne illness, is an infection that spreads through food and drinks. Food poisoning or food borne disease (FBD) is one of the major problems in public health worldwide. According to WHO, each year 600 million people around the world become ill after consuming contaminated food. In most cases food poisoning is acute, meaning it happens suddenly and lasts a short period of time. Most of the cases last less than a week and some of the people get better on their own without treatment. While in certain cases it can last longer lead to some serious complications. Chemicals, fungi, viruses, bacteria and parasites can cause food poisoning. Though most of the food poisoning reports are associated with bacterial contamination. More than 90% of the cases each year are caused by bacteria like *Pseudomonas*, *Klebsiella*, *Clostridium*, *Perfringens*, *Campylobacter*, *Bacillus Cereus* and *Escherichia coli*. Commonly prevention of food spoilage is achieved by the use of chemical preservatives. But repeated application of these chemical preservatives may result into some negative effect such as accumulation of chemical residues in food, acquisition of microbial resistance to the applied chemicals and unpleasant side effects of these chemical preservatives on human health. Because of such reasons, consuming food which have antibacterial properties naturally can help us avoid such situations at certain level. This experiment focuses on the antibacterial properties found in simple spices like ginger and garlic which is used in our food commonly. Including them in our food increases the shelf life of our food. Thus this help us built some percent of immune against food-poison causing bacteria by consuming them through our daily diet making our food healthier and safer.

II. METHODOLOGY

2.1 Preparation of Samples

Samples were prepared using two ingredients which are ginger and garlic. Ginger and garlic was first finely crushed making a thick paste of it. Then three samples were prepared from it which included ginger paste, garlic paste and one mixing both of them together forming ginger-garlic paste. After which 1gm of each sample were diluted in 10ml of saline solution (1% v/v) to form a semi-liquid consistency.

2.2 Inoculation of Bacteria

Klebsiella, *Pseudomonas* and *Escherichiacoli* were isolated and inoculated in saline solution and kept in incubator for 1hr to observe a matte growth. After incubation, the saline suspension was pipetted out from a sterile 10ml pipette and loaded in agar plates. The bacteria was then spread equally to all sides using a sterile spreader.

2.3 Sample Loading

Using quadrant method, wells were made in the agar plates with a sterile Cork borer. The quadrants were numbered and the samples were loaded into the wells precisely.

2.4 Observing Growth-

The agar plates were kept in incubation for 24hrs. After incubation, it was observed that garlic showed visible zone of inhibition against all the bacteria's whereas ginger and ginger-garlic paste also showed very minimal zone of inhibition against the used bacteria.



Fig.1: *Klebsiella*



Fig.2: *Pseudomonas*

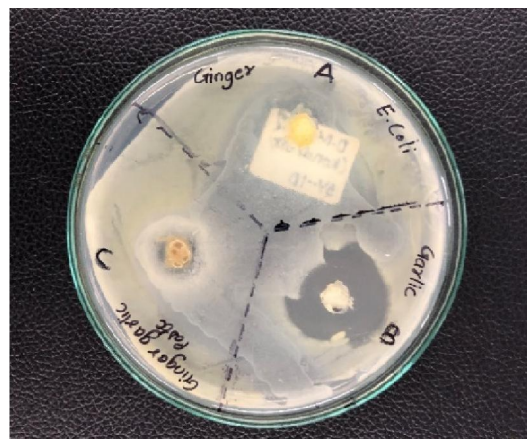


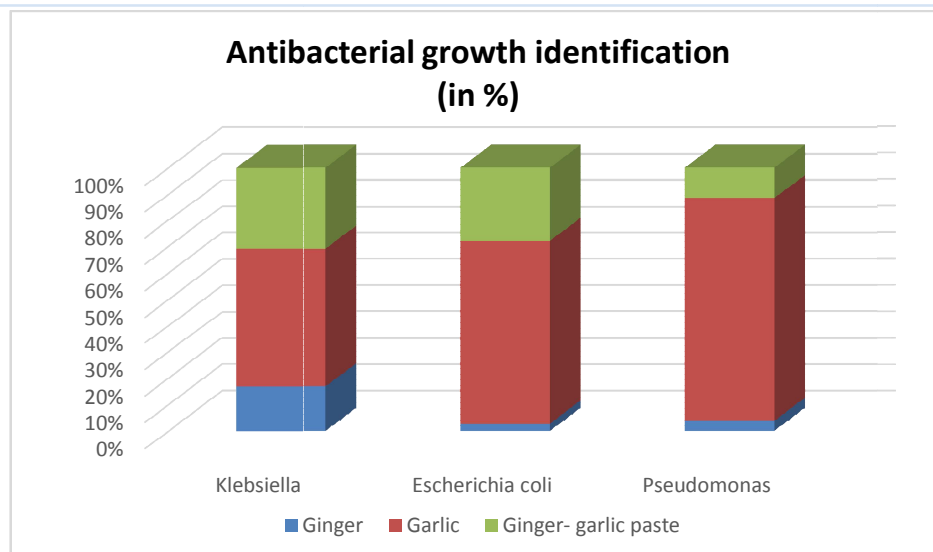
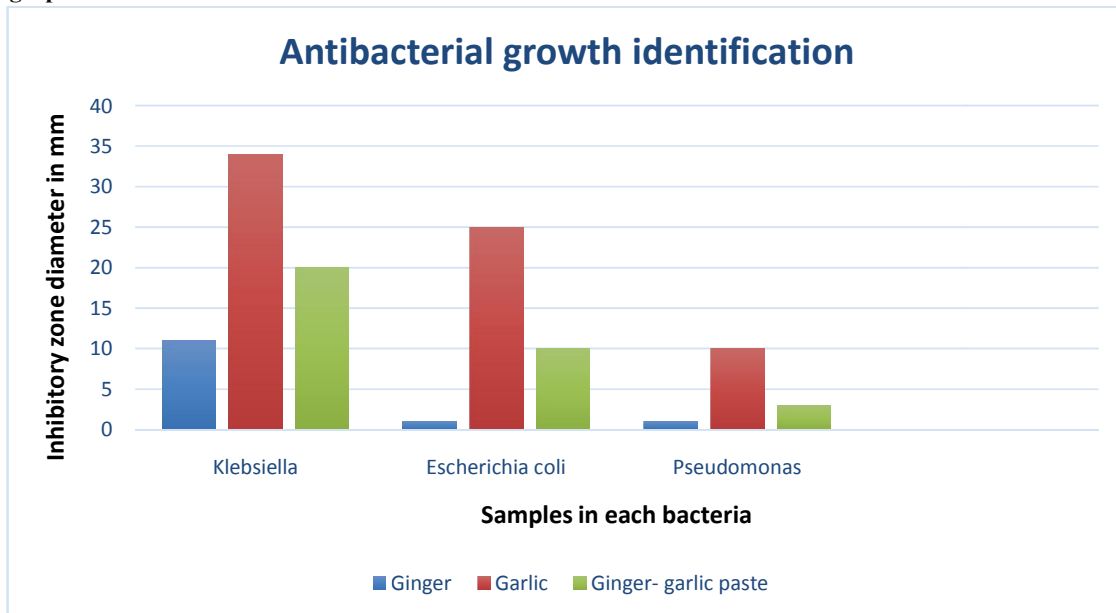
Fig.3: *Escherichia coli*

Observation Table:

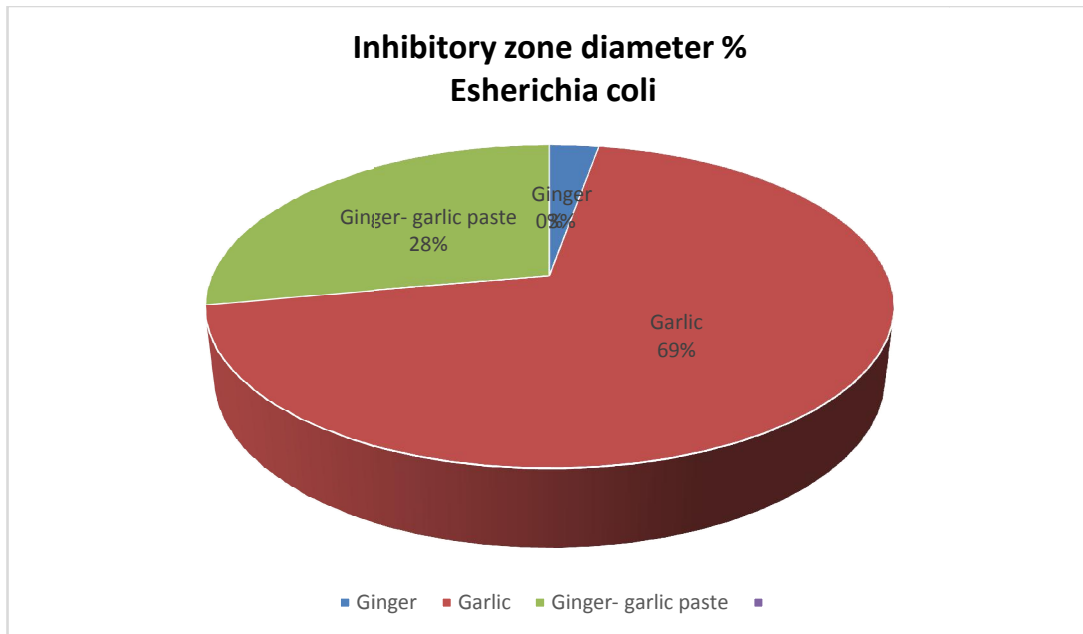
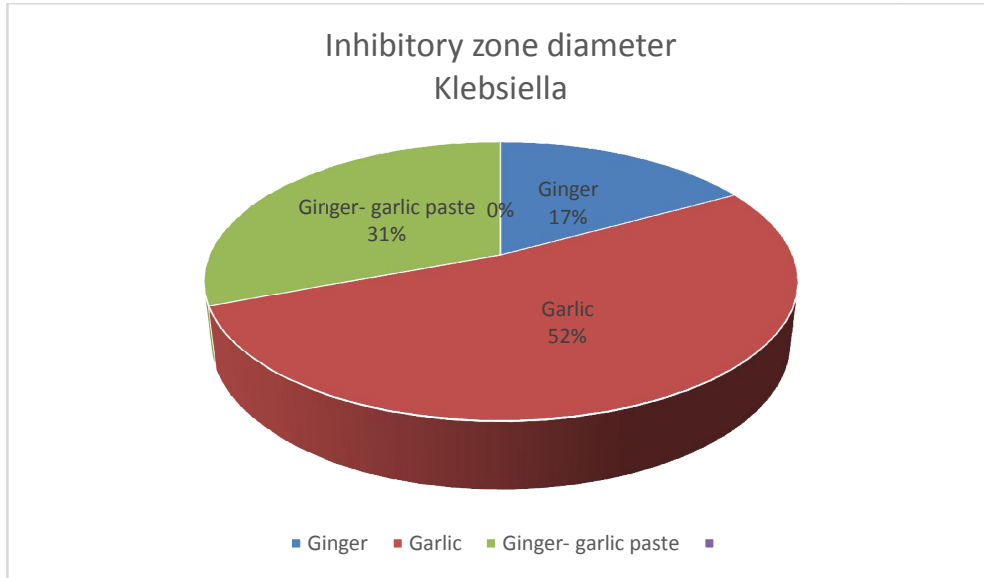
Bacteria	Sample	Inhibitory zone diameter (in mm)
	Ginger	11mm
<i>Klebsiella</i>	Garlic	34mm
	Ginger-garlic paste	20mm
	Ginger	1mm
<i>Escherichia coli</i>	Garlic	25mm
	Ginger-garlic paste	10mm
	Ginger	1mm
<i>Pseudomonas</i>	Garlic	22mm
	Ginger-garlic paste	3mm

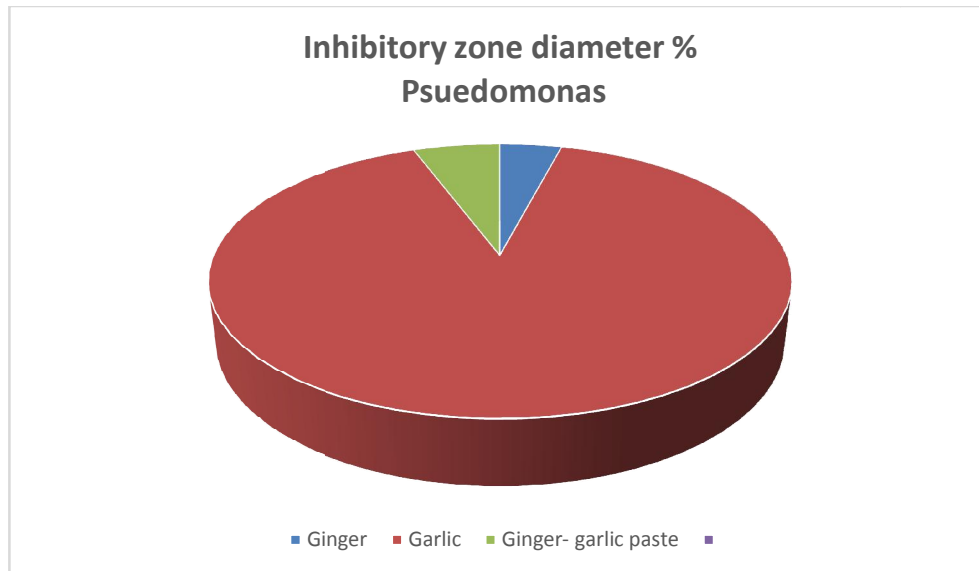
Graph:

Bar graph:



Pie Diagram:





III. RESULT

After incubation, zone of inhibitions were observed around the well of each samples. Garlic showed visible zone of inhibition in all three agar plates under the used bacteria viz *Klebsiella*, *Escherichia coli* and *Pseudomonas*. Ginger and ginger-paste showed minimal zone of inhibition.

IV. CONCLUSION

This experiment concluded stating that naturally available spices like ginger and garlic possess antibacterial properties which can be effective against food-poison causing bacteria like *Klebsiella*, *Escherichia coli* and *Pseudomonas*. So we can use these to prepare natural sanitizer also. These substances will be helpful in increasing our immunity and fight against many infectious bacteria. As, these are having organic source, there will not be any side effect which can be seen in case of antibiotics. Finally, according to my research these substances are useful.

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