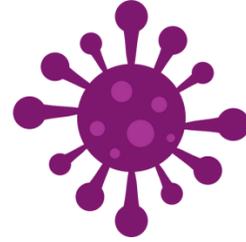


What Substances Reduce Bacterial Growth?

Introduction

As the coronavirus pandemic hit the world the rise of questions wondering about the effectiveness of home remedies and company-claimed antibacterial substances had increased.

To resolve the communal rumours and myths about these supposedly antibacterial substances an experiment testing how well they inhibited bacteria in petri dishes was conducted.



The Experiment

Aim:

To investigate and determine which household substances affect bacterial growth.

Overview of the Experiment:

During the experiment filter paper dipped in the five substances were placed at the centre of separate petri dishes with agar plates to encourage bacteria growth. The amount of growth of bacteria surrounding the substances was noted through measuring the size of the inhibition zone and estimating the percentage of bacteria coverage over the whole petri dish over 3 and 6 days after placing the bacteria.

The five substances used in the experiment were distilled water as a control, honey, garlic oil, tea tree oil and Antiseptic Dettol Liquid.

References

<https://www.healthline.com/health/does-alcohol-kill-germs#:~:text=Alcohol%20kills%20germs%20through%20a,its%20critical%20components%20%E2%80%94%20becomes%20exposed>

Hypothesis

It is expected that the Antiseptic Dettol Liquid will be the most effective substance in reducing bacterial growth, whereas the honey will be the least effective substance. This is because the Dettol Liquid has antibacterial properties due to the alcohol in the antiseptic Dettol Liquid, whilst honey contains nutrients that sustain and encourage bacterial growth.

Observations

The substances of tea tree oil and Antiseptic Dettol liquid were shown to have affected the bacteria, as it inhibited bacterial colonies growth around it indicated through the inhibition zones.

The Dettol substance appeared to be the most effective, with the largest inhibition zone of 2.6 cm and the smallest amount of bacterial coverage of 20%.

The tea tree oil also affected the bacterial growth with an inhibition zone of 2.2-2 cm surrounding the filter paper sample, with a relative bacterial growth coverage of 25%.

The remaining substances of garlic oil and honey had the same results as the control substance; distilled water. These three substances produced no inhibition zone and showed bacterial development on the filter paper despite the paper being soaked in each home remedy, showing that these substances weren't effective deterrents against bacteria.

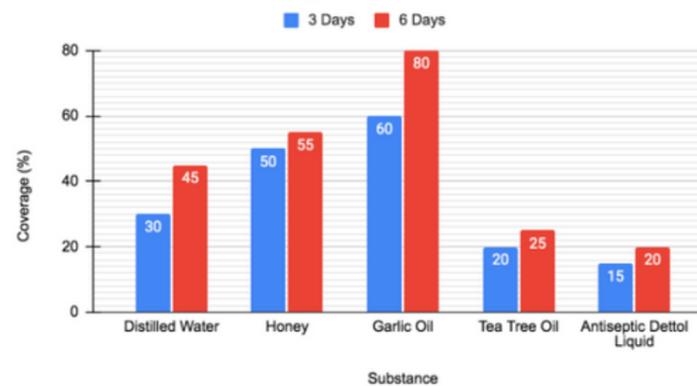
Analysis

With background research as to why the Antiseptic Dettol Liquid and tea tree oil had inhibited the bacteria it is understood that due to the Dettol containing chloroxylenol and isopropyl alcohol, these substances have antiseptic and disinfectant properties. Chloroxylenol and isopropyl alcohol affect bacterial growth by denaturing the molecular structure of a bacterial cell. This process of alteration occurs through the alcohol breaking down the protective fat membrane of the cell (lipid), which allows the alcohol to denature the organism's proteins, effectively killing the bacteria. The tea tree oil was able to inhibit the bacteria as the essential oil contains antimicrobial compounds which can reduce bacterial activity.

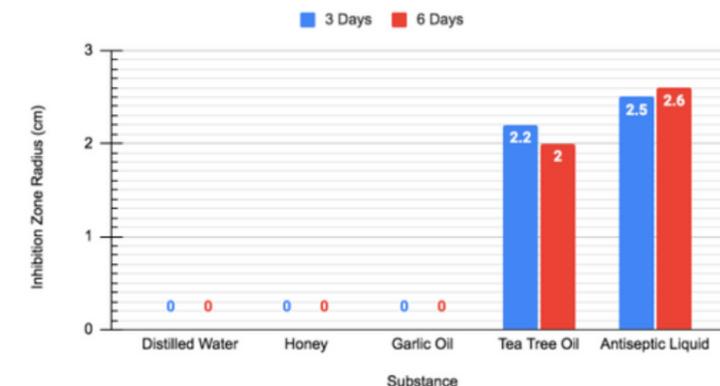
Substance	Inhibition Zone (cm) [3 DAYS]	Inhibition Zone (cm) [6 DAYS]	Class Average Inhibition Zone (cm)	% Coverage [3 DAYS]	% Coverage [6 DAYS]
Distilled Water	0	0	0	30	45
Honey	0	0	0.16	50	55
Garlic Oil	0	0	0.425	60	80
Tea Tree Oil	2.2	2	2.3	20	25
Antiseptic Dettol Liquid	2.5	2.6	3.425	15	20



Bacterial Growth Coverage on Petri dish



Inhibition Zone of Different Substances



Conclusion

Through the results collected from the experiment it is evident that Antiseptic Dettol Liquid is the most effective out of the five substances in inhibiting the bacteria growth, which supports our hypothesis. Honey also displayed that it wasn't very effective in stopping the growth of bacteria, although garlic oil and distilled water also showed the same effects. Tea tree oil was evidently seen as mildly effective against the bacteria. Therefore the tea tree oil and Dettol Liquid were effective as they had chemicals in them which killed the bacteria cells such as alcohol.