

# How Can we Prevent Bacteria at Bird feeders?

## Introduction

### ■ Problem:

■ We discovered that crowding at bird feeders has led to the widespread transmission of diseases. These diseases include salmonella, trichomoniasis, aspergillosis and avian pox.

### ■ Aim:

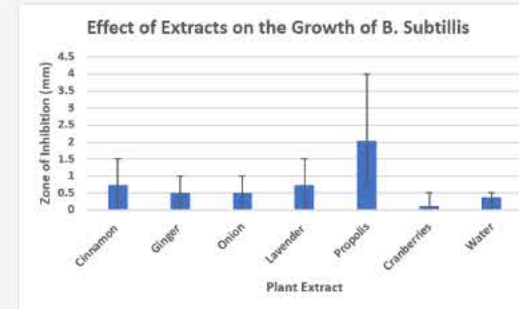
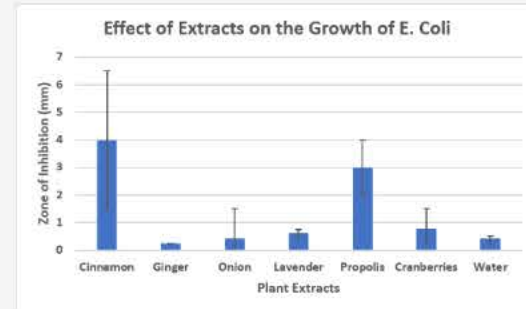
■ Our aim is to identify a suitable method to reduce bacterial growth at feeder by investigating the antimicrobial properties of different natural substances. We also hope to create a prototype bird-feeder which would reduce levels of bacteria.

## Methodology

We carried out our methods with the help and guidance of our biology and chemistry teachers. We tested the effectiveness of a number of plants at reducing bacteria found at feeders such as *B. Subtilis* and *E.coli*. We used plants such as mint and cranberries. We also used a substance made naturally by bees called propolis. The next experiment we carried out was to create a propolis spray that would potentially coat the bird feed inside the feeder and create a seal to prevent oxygen from decaying the food. For the bird feeder model, we investigated the length of exposure to uv light needed to reduce bacteria. We planned to place a UV light in the top of the feeder to shine on the food for 15mins, four times daily.

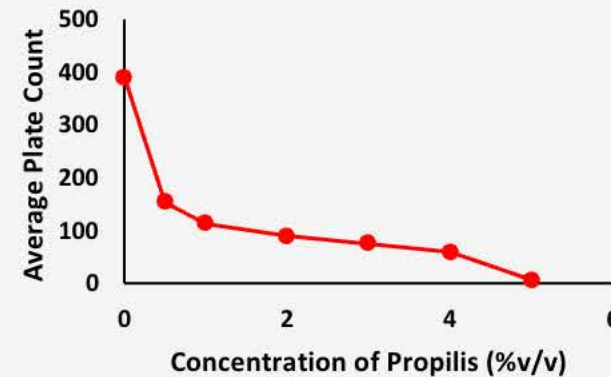
## Results

For our first experiment we found that cinnamon and propolis were most effective at reducing bacterial growth.

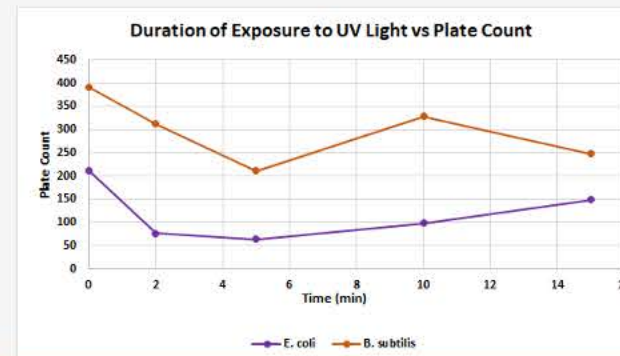


For our second experiment we tested different dilutions of propolis and water to create a bacteria reducing spray for the birds

## Effect of Increasing Concentration of Propolis on the Plate Count of Peanuts



For our final experiment we tested the effectiveness of a UV light at decreasing bacterial count



## Analysis and Interpretation

From our experiments we found that each investigation can be used to inhibit and decrease bacterial growth at bird feeders. We decided that cinnamon could be added to mixed seeds, propolis would be sprayed over the food in the feeder to create a seal preventing the entry of harmful pathogens and the UV light could be placed in the apex of a roof over the feeder to shine on the food for 15mins 4 times daily. The apex roof would also prevent excess moisture contaminating the food.

## Conclusion

In conclusion we believe that the experiments carried out proved sufficient in solving the issue at hand. We feel that we carried out fair tests and that our results are accurate due to using a number of available substances and methods and due to the fact that we used both a gram-positive and negative bacteria cultures. The gram-positive and gram-negative bacteria cultures have different thickness of cell walls and are more and less affected by different substances, this is why we used both. In future experiments we would like to test the effectiveness of rice husks at absorbing moisture from the food, however as rice husks have an extremely high fibre content they can become difficult to digest so we would need to treat them with enzymes beforehand to decrease fibre and increase protein