

Abstract:

Natural remedies are very common when dealing with infections and other bacteria but we really wanted to find out that if commonly used natural remedies, specifically garlic, turmeric, ginger, and salt water were introduced into the environment of k-12 E. coli how effective would they be in killing the k-12 E. coli and preventing growth?

In order to see this we first needed to research how to acquire the E. coli and eventually we found Carolina Biological, who connected us with their Canadian supplier Merlan Scientific. Once we received the bacteria we experienced several failed attempts at growing the E. coli due to firstly incredibly high temperatures inside of the incubator, pouring the agar too thin and lastly the agar not being nutritious enough. Once we acquired a higher quality of agar we were able to successfully grow the 3 dishes of E. coli and we also poured 15 more dishes for the experiment.

Prior to conducting the experiment we first had to make 5 different substances that would allow the natural remedies to be tested. The first remedy was garlic, and we made the test substance by juicing 2 tablespoons of garlic using cheesecloth then adding the garlic itself and the juice into a bottle along with 2 tablespoons of water. We did the same thing for ginger however with turmeric and salt we simply combined 2 tablespoons of salt or turmeric with 2 tablespoons of water and we then mixed them in their individual bottles until they were dissolved. Lastly for our control we used basic distilled water. We also cut out 50 coffee filter circles with a diameter of 5 cm as they would be used in place of filter paper for the experiment.

Once the E. coli had grown we took it out of the incubator and we proceeded to inoculate it onto the Petri dishes, and after it was inoculated we then closed the lid. We would then dip the coffee filters inside of the test liquid using tweezers and we would proceed to drip off any excess before we placed it inside of the Petri dish. We put 3 coffee filters per Petri dish and we used 3 Petri dishes per substance. This method is commonly known as the disc diffusion antibiotic sensitivity testing however we adapted some of the components of the test to match our circumstances. We then incubated them for 24 hours at 37 degrees upside down to prevent water from condensation to drip and contaminate the agar. Afterwards we took the dishes out and we measured the zone of inhibition for each substance. The area of the zone of inhibition included both the coffee filter and any surrounding area that had no bacterial growth.

Once we wrote down all of the data and we examined it and the obvious best natural remedy was garlic, which had nearly double the zone of inhibition of the other remedies. All of the results were quite similar and there were no outliers. Ginger and turmeric were able to create small zones of inhibition but they were not large enough to be deemed effective. Salt created absolutely no zone of inhibition but was as effective as ginger and turmeric because unlike turmeric and ginger allowed for smaller and fewer colonies than they did but it had no zone of inhibition.

In conclusion garlic is the most effective natural remedy in killing and preventing E. coli growth as it created the largest zone of inhibition and had the smallest and least amount of colonies inside its Petri dishes and the rest of the remedies despite creating slight zones of inhibition did not do enough to be deemed effective. We would like to thank the British Columbia Children's Hospital Research Institute for providing us with nutrient agar and other supplies as well as allowing us to use their incubators while the schools were turned off and we would also like to thank Mr. Stephenson for providing us with supplies and excellent advice and help. We could not have done it without the help and support of those individuals.