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SCI 1010-1: The Sciences

The Effect of Listerine Mouthwash on *Escherichia Coli*

Introduction:

Mouthwash may have many benefits for teeth and the mouth overall, including stronger/healthier teeth, destroying plaque, preventing cavities, and killing various species of bacteria. Mouthwash is usually used right after brushing teeth and before bed.

For our experiment, Cool Mint Listerine was tested on *Escherichia coli.* The Cool Mint Listerine mouthwash was mixed with *E. coli* for 20 second intervals up to 100 seconds (Tables 1 and 2). The kind of questions that were trying to be answered in our experiment were how the Cool Mint Listerine Mouthwash would interact with the *E. Coli* bacteria, how long it would take for the Mouthwash to work, and how much time would be needed to kill most/all of the *E. Coli* bacteria. What our hypothesis was for our experiment was to see if Cool Mint Listerine is an effective antimicrobial on bacteria exposed for 1.5 minutes with the independent variable being the *E. coli* bacteria growth and the Cool Mint Listerine mouthwash and the dependent variable being time (seconds).

Materials & Methods:

Our Plate 1 and Plate 2 Plates were divided into 3 sections for each of them with a total of six sections for the 0, 20, 40, 60, 80, and 100 second timepoints (Tables 1 and 2). An inoculating loop was first dipped into the 3 drop mouthwash and then dipped into the small tube of *E. Coli* that were then held in there for a certain amount of seconds each as previously mentioned where we then took it out and spread it all around on a certain particular section of our plate each time as also previously mentioned. Along with the method that was used for our two plates (Tables 1 and 2), a control plate was also used as well with an antibiotic section (+) and a water section (-) where we did pretty much the same kind of method as our other 2 plates by exposing some of the Mouthwash to an antibiotic (+) and water (-) and then rubbed each of them in the corresponding positive and negative sections of our Control Plate. What was then done with the plates after swabbing all of them was by then putting them in an incubator in the lab and letting it sit there for a week to see the amount of bacterial growth that happened during that time. When it came to the amount of bacterial culture/volume growth that were in each of our plates and the kind of media that the bacteria were grown in, the type of media that the bacteria was grown in were three different plates with the amount of bacterial culture that were grown in each of them which did not vary too greatly with Plates 1 and 2 having pretty much bacterial growth everywhere on the plate with Plate 1 having slightly less bacterial growth than that of Plate 2 (Tables 1 and 2) and also our Control Plate having significantly less bacterial growth on the Positive side with significantly more on the Negative side.

Results:

The + Control Plate had pretty much no bacterial growth at all on it except for one huge colony on it while for the - Control Plate, there was much more growth with one column of dots and with growth also spread around the rest of it as well. The bacterial growth for Plate 1 at 0, 20, and 40 seconds of exposure were all equal amounts (Table 1), while for Plate 2, which was for our last three exposures of 60, 80, and 100 seconds for our other three sections (Table 2), there were unequal amounts of bacterial growth with the 60 and 80 second exposure sections being the same amount of growth equally with the 100 second exposure section having slightly less bacterial growth than the 60 and 80 second exposure sections (Table 2).

Discussion:

The results in our experiment do not support our hypothesis, because Listerine Mouthwash did not kill *E. coli* as time went by. If the experiment were to be repeated again, we could swab our mouth before Listerine and then swab our mouth after using Listerine as well and see how much bacteria there would be by rubbing it around on our three plates and then compare the results and it will end up supporting our hypothesis, and we also said that despite that, there could possibly not be *E. Coli* in our mouth. Something else that we could also do as well if we were to repeat our experiment again would be to just swab our mouths and see how much bacterial growth there could be of *E. coli* and compare those results and see if that could also possibly support our hypothesis as well.

Table 1. The amount of *E. Coli* bacterial growth when exposed to Cool Mint Listerine Mouthwash for 0, 20, and 40 seconds for plate 1.

Plate 1:

Time (Seconds)	Growth
0	+++
20	+++
40	+++

Table 2. The amount of *E. Coli* bacterial growth when exposed to Cool Mint Listerine Mouthwash for 60, 80, and 100 seconds for plate 2.

Plate 2:

Time (Seconds)	Growth
60	+++
80	+++
100	++