



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

Name(s) Jamison G. Celio	Project Number J1701
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Project Title How Much Time of Exposure to Ultraviolet Rays Will Kill E. coli?

<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project was to determine how long Escherichia Coli needed to be exposed to ultraviolet radiation to kill it.</p> <p>Methods/Materials I used nutrient agar petri dishes, incubator, and UV lights and a syringe to place 0.1 ml of E. coli onto the nutrient agar dishes. Then I placed a UV lamp 6 inches above each petri dish (at separate times). I used five time frames of exposure: 15 seconds, 30 seconds, 1 minute, 5 minutes, and 15 minutes. Then I did three procedures for each time frame, a total 15 experiments. After the exposure times, I put all 15 of the agar plates upside-down in an incubator for 24 hours. I took them out, took a few pictures, then put them in a cardboard box.</p> <p>Results The result of my experiments supported my hypothesis that the longer the E. coli was exposed to the ultraviolet radiation, the less E. coli would survive.</p> <p>Conclusions/Discussion In conclusion, the UV radiation killed most of the E. coli in 15 minutes of exposure time. The UV radiation has barely affected the E. coli within the 15, 30 and 60 seconds of time exposure though. I believe the UV radiation was not effective at these times because the ultraviolet germicidal lamp I used in my experiment was not very powerful and the wavelengths emitted were not able to quickly break down the DNA in the E. coli. The light breaks the bacteria down by initiating a reaction between 2 molecules of thymine. The cell tries to keep up with the damage, but if radiation is strong or if cell is exposed for too long, the cell dies. In this case, I believe that the radiation was not efficient at causing the reaction.</p>
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Summary Statement I showed that the longer E. Coli was exposed to UV light the more bacteria it killed.

Help Received I would like to thank Mr. Don Scott who has helped me organize this project and edit my papers. I thank my parents who have helped me with my experiment and help me buy supplies. I express gratitude to Mr. Brad Mason, the chemistry and biology teacher of Golden Sierra High School for letting me borrow his
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