

CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s)	Project Number
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Project Title	
Preventing Major Viral Outbreaks: The Effect of Ultraviolet Radiation on Coliphage T4r	
on Computage 14r	
Abstract	
Objectives/Goals My objective was to learn which wavelength of UV radiation (253 nm, 365 nm)	and J U nm) had the
greatest effect on Coliphage T4r.	and y o min) had the
Methods/Materials	
Coliphage T4r, E. coli B, Micropipettes, hundreds of disposable mitropipette the soy tryptone broth, LB agar, agarose, an incubator, a temperature-controlled with dishes, 100 mm petri dishes, a camera, an oscilloscope two germicidal balbs, a	ater bath. 35 mm petri
dishes, 100 mm petri dishes, a camera, an oscilloscope two germicidal balbs, a	365 nm LED, a 390 nm
LED, Si photodiode, PCS software tool, UV ChiphEraser-20, Sanon document camera Results	
The 253 nm UV radiation started inactivating the virus when it was expected to	at least 700 microjoules
per cm ² . To inactivate at least 99 percent of the virus, it needed to be exposed microjoules per cm ² . The plates containing virus exposed to the UV/LEDs has plaque count. Finally, the percent of remaining plaque for the plates in the muradiation, versus the radiant exposure, fit to a power curve with an R ² greater	to greater than 150,000
plague count. Finally, the percent of remaining plague for the plates in the mu	tiple trials of 253 nm UV
radiation, versus the radiant exposure, fit to a power curve with a R^2 greater	than 0.96.
Conclusions/Discussion The data supports my hypothesis by indicating the ultraviolet radiation effectively inactivates Coliphage	
T4r with a wavelength of 253 nm because it is the closest wavelength to the get	rmicidal point (264 nm)
where the thymine bonds within the virus DNA is damaged the most by absorb	ing its maximum energy.
The data supports my hypothesis by indicating that ultraviolet radiation effectively inactivates Coliphage T4r with a wavelength of 253 nm because it is the closest wavelength to the germicidal point (264 nm) where the thymine bonds within the virus DNA is damaged the most by absorbing its maximum energy. The data helped obtain my objective by proving 253 nmUV radiation greatly inactivated the virus while the 365 and 390 nm UV radiation had little to no effect. My project proves that at 150,000 microjoules per cm ² , 253 nm UV radiation kills more than 99 percent of Coliphage T4r.	
cm^2, 253 nm UV radiation kills more than 99 percent of Coliphage T4r.	
Summary Statement	
Using E coli D as an indicator, I found the point at which an exposure of UV ra Coliphage T4:	adiation began inactivating
Help Received	
Borrowed micropipettes from science teacher; went to Ask-a-Scientist night to	get ideas for project.
loaned/purchased equipment from parents	