



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

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<b>Project Title</b>  <b>The Effects of Microwave Radiation on Life and Organic Material</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> The question being tested in my project was what effects does microwave radiation have on different organic materials and life. One objective and goal of the experiment were to view and compare and contrast certain properties of organic materials when microwaved to that of its non-microwaved counterparts. Another objective was to view the changes that microwave radiation could cause to living things, in my experiment the living thing was bacteria.</p> <p><b>Methods</b> I conducted three different experiments. I first microwaved orange juice for increasing intervals of time to see if microwaves could cause a change to the orange juice's nutrient values. I measured vitamin C(ascorbic acid) in the orange juice after it was microwaved by using pH paper. My second experiment involved activating yeast. I first mixed yeast with sugar and warm water, gave it ten minutes, and then viewed the growth or change in height. The other samples and tests involved microwaving the yeast for increasing intervals of time before mixing it with the water and sugar and again viewing change in height. To start the last experiment on bacteria I swabbed the side of a kitchen sink and applied it to one-half of a Petri dish. To measure the changes caused by microwaves, I then microwaved more swabs from the same location for increasing intervals of time before applying it to another half of a Petri dish. After 5 days, I counted the number of colonies in each sample and put them into size categories of big, medium, and small.</p> <p><b>Results</b> The results of my experiment are as follows. The orange juice experiment yielded no new data, as the pH level of all the samples was ultimately three. The yeast experiment showed that the microwaved samples had less change in height than the controlled(non-microwaved) sample. The bacteria experiment showed that there were less large colonies in the microwaved samples, but more small and medium colonies in the longer microwaved samples.</p> <p><b>Conclusions</b> The results imply very different ideas. The orange juice experiment's results showed that microwave radiation does not change nutrient values, specifically vitamin C or ascorbic acid. However, the bacteria and yeast experiment show that microwave radiation causes deterioration to both life and organic materials.</p>	
<b>Summary Statement</b>  My project is about the effects that microwave radiation have on life and organic materials.	
<b>Help Received</b>  While my experiments were done by myself, I'd like to mention my dad who gave me a hand in decorating my board.	