



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> <b>Joshua J. Hwang</b>	<b>Project Number</b> <b>J1609</b>
<b>Project Title</b> <b>The Antibacterial Effects of Onions and Shallots on E. coli DH5 Alpha</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this experiment is to study the antibacterial effects of onions and shallots on E.coli DH 5 alpha and to determine which herb has the greatest level of inhibition on the bacteria specimen alone or when mixed with shallots.</p> <p><b>Methods/Materials</b> A freshly grown overnight culture of E.coli DH5 alpha was mixed with red onion, yellow onion, white onion or shallot alone at 10%, 50% and 100% concentration. E.coli DH5 alpha was also mixed with 1:1 mixture of the different types of onion and shallot at 50% concentration. The level of inhibition of the onions or shallot alone and as a mixture on E.coli was compared using a colony counting essay.</p> <p><b>Results</b> The experiments showed that the shallot had the strongest level of inhibition, followed by white onion, yellow onion and red onion. White onion and shallots had strong levels of inhibition at 50% and 100% of concentration. At 10% concentration, the growth was similar to the E.coli control for all treated samples. At 50% concentration, it did show an increased level of inhibition but the exact level of inhibition varies between trials. At 100% concentration of onions alone, 50% or 100% shallot alone and at 1;1 mixture of onion and shallot at 50% concentration, the antibacterial inhibition was 100%.</p> <p><b>Conclusions/Discussion</b> The experiment concludes that onions and shallot have antibacterial effects with shallot being the most effective agent, followed by white onion, yellow onion and red onion. Both onions and shallot are part of the Allium family. They are similar but unique in regards to the varying amount of chemical composition within the herb itself. Therefore, the antibacterial levels are different among the different herbs or a combination of onions and shallots. These data suggested that combination of herbs can be used as a treatment for food-borne diseases caused by E. coli or other bacteria pathogens.</p>	
<b>Summary Statement</b> My project tests the antibacterial activity of onions and shallots on E.coli DH5 Alpha.	
<b>Help Received</b> ProSci Inc. provided access to the facility and the needed supplies. My mentor, Dr. Xin Wang, helped grow the E.coli culture, gave advice on the experimental design. Elaine Gillum, helped in editing and refining the paper, gave advice on the project and Science Fair itself.	