



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

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| <b>Name(s)</b><br><b>Emily O. Htway</b>   | <b>Project Number</b><br><b>S1111</b> |
| <b>Project Title</b><br><b>Microbial Biodegradation of Used Motor Oil on Concrete Surfaces</b>  |                                       |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>The objective of my project was to investigate the ability of <i>Pseudomonas aeruginosa</i> to biodegrade used motor oil on concrete surfaces.</p> <p><b>Methods/Materials</b><br/>Used motor oil was collected from the Conejo 76 union station on T.O. Blvd and analyzed for composition using infrared spectroscopy. <i>Pseudomonas aeruginosa</i>, cultured in tryptic soy broth, and used oil dried on six 6x6 inch concrete pavers were used for a pilot study. 128 concrete pavers with dried used motor oil, as well as <i>Pseudomonas aeruginosa</i> culture, were used in the experimental phase (independent samples t-test). Modified EPA Method 1664, Revision A used to quantify oil and grease content in simulated rainwater runoff samples.</p> <p><b>Results</b><br/>The mean PPM of oil and grease content in water for the Control [No Exposure to <i>P. aeruginosa</i>] samples [M = 205.36, SD = 168.75, n = 49] was higher than that for the Cases [48 hrs. Exposure to <i>P. aeruginosa</i>] samples [M = 201.90, SD = 160.64, n = 42]. Due to humidity error, 39 samples were lost and results are not statistically significant, however, the use of <i>P. aeruginosa</i> did show a positive result.</p> <p><b>Conclusions/Discussion</b><br/><i>P. aeruginosa</i> has shown to have positive environmental implications for removal of unwanted automobile fluids. The small difference detected in the oil and grease in the water runoff will be amplified in a major metropolitan setting. Additionally, the visual oil stain and residue was lessened in the days following <i>P. aeruginosa</i> exposure. These findings may be of significant interest to environmental scientists.</p> |                                       |
| <b>Summary Statement</b><br>I investigated the ability of <i>Pseudomonas aeruginosa</i> to biodegrade used motor oil on concrete surfaces.  |                                       |
| <b>Help Received</b><br>I designed the project myself, my instructor helped me with editing my manuscript, my lead mentor oversaw my lab work and helped me with biostatistics, and lab technicians helped me in cell culture and chemistry equipment, including IR.  |                                       |