



# CALIFORNIA STATE SCIENCE FAIR 2017 PROJECT SUMMARY

<b>Name(s)</b> Clara Luisetti; Elsie Luisetti	<b>Project Number</b> <b>J1610</b>
<b>Project Title</b> <b>Is Water Wasted by Pre-Rinsing and Pre-Scrubbing Our Dishes?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> To determine whether a pre-rinse or pre-scrub helps to wash dishes in a dishwasher and test the effectiveness of various detergents.</p> <p><b>Methods/Materials</b> Twelve kitchenware samples were covered with a biofilm indicator, Glo Germ, and checked with ultraviolet (UV) light to ensure the surface was coated in biofilm. The dishes were divided into three sets containing 3 plates and 1 plastic container. Set A had nothing done to it. Set B was rinsed under water for 1 second. Set C was scrubbed for 1 second under water. The sets were run through a dishwasher with water only. Pictures were taken of all samples under an UV light before and after each procedure. The amount of biofilm remaining on the kitchenware after the dishwasher cycle was recorded. We repeated this process three more times and each time inserted a different dishwashing detergent.</p> <p><b>Results</b> To determine if a pre-rinse or pre-scrub was more effective in cleaning kitchenware, we averaged all of the results from Set A, B and C for all four experiments. The more biofilm that remained on the dishes, the dirtier they were. The least amount of biofilm remained when kitchenware was pre-scrubbed prior to a dishwasher cycle, averaging 20% of the biofilm remaining. The second closest was doing nothing prior to washing the kitchenware, with 24% of biofilm remaining. The kitchenware with the most biofilm was the pre-rinse set, averaging 44% of biofilm remaining. To determine if any detergents produced better results, we averaged our results for all conditions for each experiment. We used a different detergent each time. Experiment A-water: 35% of the biofilm remained on the kitchenware. Experiment D-Bright Green: 33% of the biofilm remained. Experiment B-Kirkland Tablets: 29% of the biofilm remained. Experiment C-Cascade Complete: the cleanest dishes with 21% of biofilm remaining.</p> <p><b>Conclusions/Discussion</b> Pre-scrubbing is 4% more effective than doing nothing to your dishes prior to running them in the dishwasher. We doubt that a 4% increase in cleanliness warrants the water wasted in the pre-scrubbing process. Cascade Complete produced the best results by 8%. We suggest that you scrape food off your plate, place your dishes directly into the dishwasher, and use a Cascade Complete Dishwasher Pac for the most effective and water conscious clean.</p>	
<b>Summary Statement</b> This project analyzes the effects of a pre-rinse, a pre-scrub, or doing nothing at all on different types of dishware and the effectiveness of different dishwasher detergents.	
<b>Help Received</b> Our mom helped us buy the products and take pictures to create photo displays of our project.	