



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

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<b>Project Title</b>  <b>The Effect of Adsorption Abilities for Dehydrated Carbon and Activated Carbon Made from Different Food Waste</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> Access to a clean water is a pressing issue that we face worldwide. According to WHO (World Health Organization) and UNICEF (United Nations International Children's Emergency Fund), about 2.1 billion people which is more than a quarter of the population, do not have access to an improved water source worldwide. In light of the Flint lead water crisis and other reports with indications that our water may not be as clean as we think, even developed countries are seeking for an environmentally friendly and cost effective method. Both developing and modernized countries are in need for water filtration systems that are cost effective. Removal of hard metal is one of the essential parts of the water filtration. Conventional methods used in removal of heavy metals are expensive and some substances used are toxic themselves such as aluminum oxide, cellulose, and silica.</p> <p><b>Methods</b> In this experiment, the effect of adsorption of lead (Pb), copper (Cu), and iron (Fe), and TDS, (dependent variable) are compared among dehydrated, carbon, activated carbon driven from banana, orange, and potato peels (independent variable) to determine which properties are the most effective approach to purify the water. Polluted water samples were created by dried lead paint, corroded water pipes, and iron vitamins. A filtration made with pebbles, coarse sand, and fine sand was tested to determine if pre-filtration would enhance the filtration of each type of properties.</p> <p><b>Results</b> The experiment result showed that banana activated carbon adsorbed the most hard metals, followed by dehydrated banana, carbon banana, and rest of activated carbon. However the TDS increased for all carbons and dehydrated potato peel and for the ones that decreased, the percentage decrease were not in line with the hard metal adsorption percentage.</p> <p><b>Conclusions</b> This results indicated that the hard metal adsorption depends on the form of the peel such that more surface area would adsorb more hard metals and at the same time, the types of peels also affect the adsorption abilities. If the peels contain negatively charged ions or specific properties such as carboxylic acid, its adsorption level alone increases as compared to surface areas of the peels. Dehydrated, carbon, and activated carbon peels and water formed suspension and colloid, thereby increasing the TDS level.</p>	
<b>Summary Statement</b>  My project is to find the effect of hard metal adsorption abilities for dehydrated, carbon, and activated carbon made from different food waste to purify water so that environmentally friendly water purification methods can be achieved.	
<b>Help Received</b>  Santa Margarita Plumbing Inc provided me with the corroded pipes and Dunn Edwards Painting Inc provided me with the metal cans. My father started and extinguished the fire pit.	