



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> Margaret Yoo	<b>Project Number</b> <b>S0917</b>
<b>Project Title</b> <b>Phase III: The Removal of Ethylene Bromide / Dibromochloropropane: Saving the Future from Yesterday</b>	
<b>Objectives/Goals</b> The objective of my experiment was to determine an economical and efficient method of EDB/DBCP removal in an acute situation of EDB/DBCP contamination by analyzing the chemical or physical removal of EDB/DBCP through the use of different adsorbents. The efficiency of each adsorbent in three different matrices of water, groundwater, treated wastewater, and surface water, was analyzed.	
<b>Abstract</b> <b>Methods/Materials</b> To prepare the 6-point calibration standard, the 0.5µg/mL intermediate solution was first created by adding 2.5µL of the 200µg/mL EDB/DBCP stock solution into a volumetric flask with 1mL of methanol. Different concentrations of the intermediate solution were used to create the 5, 10, 25, 50, 100, and 150ppt calibration standard. Water from various sources with different organic content was spiked with the EDB/DBCP stock solution to create a concentration of 100ppt. 2g of Bio-Rex 5, coconut carbon, Amborsorb 563, and Filtrasorb 600 were manually packed in separate 6mL cartridges. The efficiency of each adsorbent was determined through the filtration of three water samples representing the three different matrices of water using a vacuum pump manifold. The Gas Chromatograph/Mass Spectrometer was used for the determination of the remaining EDB/DBCP in the filtered water sample. A total of 48 samples were tested.	
<b>Results</b> The City of Westminster water, Santa Ana River water, and Mesa Consolidated Water District water experimental groups that represented groundwater, surface water, and colored or treated wastewater filtered with coconut carbon had no remaining EDB/DBCP after filtration. The experimental group Santa Ana River water treated with Filtrasorb 600 had the least amount of EDB/DBCP removed after filtration.	
<b>Conclusions/Discussion</b> The level of organic content in the water does not have an effect on the removal of EDB/DBCP for experimental groups that represented different levels of organic content did not affect the efficiency of the coconut carbon adsorbent. EDB/DBCP can damage the respiratory system, nervous system, kidney, liver, and heart and can cause cancer and infertility. Therefore, if our water supplies are contaminated by EDB/DBCP, then the affected water should be filtered using the coconut carbon for the ensured purification of the water.	
<b>Summary Statement</b> I determined that adsorbents can reduce the amount of EDB/DBCP in the water to the maximum contamination level goal of 0.00ppt, and the type of water, whether groundwater, treated wastewater, or surface water, does not influence the effect.	
<b>Help Received</b> I received training on the Gas Chromatograph/Mass Spectrometer from supervising chemist Lee J. Yoo. Lab work for the detection and removal of EDB/DBCP was done in the inorganic laboratory of	