



# CALIFORNIA STATE SCIENCE FAIR

## 2015 PROJECT SUMMARY

<b>Name(s)</b> <b>Tanshi Jain</b>	<b>Project Number</b> <b>J1011</b>
<b>Project Title</b> <b>A Healthier Filter: The Effect of Different Natural Materials on Purity of Water</b>	
<div><div><b>Objectives/Goals</b> The present day world faces an extremely serious threat. Nearly 750 million people worldwide lack access to clean drinking water, and 82% of these live in rural areas. Diarrhea is the fourth leading cause of death in children, most of which are water related. My project aims at comparing the efficiencies of simple water filters made using readily available natural materials like charcoal, terracotta, tea, coffee, rice husk, and wood for removing physical, chemical, and biological impurities from water.</div><div><b>Methods/Materials</b> Six identical filters were created using 2-liter soda bottles with a layer of sand and gravel in each. In five of these filters, another filter layer of the material being tested was added between the sand and gravel layers. Different samples of water were run through the filters, and the filtered water was tested for pH, turbidity, nitrates, phosphates, and presence of coliform bacteria. The water samples tested included distilled water for control, lake water, and lake water mixed with cow manure and liquid fertilizer. Two trials were conducted for each sample.</div><div><b>Results</b> The terracotta filter with tea gave the best turbidity results of 0 JTU for lake water and 10 JTU for cow manure water. The nitrate levels in all tested water samples remained at 5 ppm for all filters. Similarly, the phosphate level in distilled and lake water remained at 1 ppm for all filters. However, for cow manure lake water, the terracotta-tea filter produced the best average reading of 1.5 ppm. pH values remained fairly consistent at drinkable levels for all filters. For cow manure water, pH was 8 for all filters except terracotta-tea and charcoal, which had a pH of 7.5. Coliform test for lake water was negative for all terracotta filters and positive for all others. For lake water with cow manure, the results were the same.</div><div><b>Conclusions/Discussion</b> Terracotta filters with organic materials were more effective in filtering water than the others. They removed coliform bacteria from lake water as well as lake water to which cow manure had been added. Furthermore, terracotta with tea proved to be the best filter of all. The experiment proved that organic materials added to terracotta improve its filtration capacity. People living in rural areas can use these natural cheap materials, which are usually thrown away as waste, to get clean drinking water.</div></div>	
<b>Summary Statement</b> My project aims at designing a small-scale, homemade water filter using natural materials.	
<b>Help Received</b> Mrs. Nguyen provided guidance and feedback.	