



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Elizabeth S. Koo	Project Number J1419
Project Title Humic Acid or Fulvic Acid: Which Organic Acid Can Suspend the Growth of E. coli?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to learn which organic acid; humic acid or fulvic acid could suspend the growth of E. Coli. I think Humic Acid will suspend the growth of E. Coli since it has an anti-bacterial and viral efficacy.</p> <p>Methods/Materials I made my own homemade incubator to cultivate bacteria under the supervision of Dr. James Pusavat. I put on latex gloves before cultivating anything. I cultivated E. Coli having it bought under the supervision of Dr. James Pusavat. I used three solutions with E. Coli, distilled water, humic acid (2% concentration fulvic acid), and fulvic acid (2% concentration). I repeated each cultivation two times. For results, I randomly chosen three 1/2 inch areas on the agar plates, and counted the colonies. Then, I added up the three colonies of each solution.</p> <p>Results I added the three randomly selected colonies on all solutions and it was: A1 (1st Experiment of Distilled water on E. Coli) - Approximately 57 colonies A2 (2nd Experiment of Distilled water on E. Coli)- Approximately 55 colonies B1 (1st Experiment of Humic acid on E. Coli) - Approximately 6 colonies B2 (2nd Experiment of Humic acid on E. Coli)- Approximately 3 colonies C1 (1st Experiment of Fulvic acid on E. Coli)- Approximately 70 colonies C2 (2nd Experiment of Fulvic acid on E. Coli) - Approximately 62 colonies Humic acid has the least amount of growth in E. coli. This shows that humic acid is the best compared to all of them.</p> <p>Conclusions/Discussion My conclusion is that humic acid can suspend the growth of E. Coli because it can bind with protein part of the microbes. It then causes it to malfunction. However, fulvic acid had stimulated the growth of E. Coli because it is a chelator (detoxifier). It brings macronutrients and micronutrients to the E. Coli. They are both needed for supplementing a healthy human body.</p>	
Summary Statement I'm seeing which organic acid, humic acid or fulvic acid can suspend the growth of E. Coli.	
Help Received Cultivation of E. Coli at home under the supervision of Dr. James Pusavat, Mom helped with board	