



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Jessica J. Wu-Woods</b>	<b>Project Number</b>  31630
<b>Project Title</b> <b>Comparison of Three Methods to Rapidly Detect E. coli in Water</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Fecal contamination of drinking and recreational water is a serious problem. This contamination is determined by measuring the presence of coliform bacteria, such as Escherichia coli. Current established methods to detect these bacteria take 18-48 hours, therefore a reliable rapid test is needed. My project has focused on evaluating three methods to rapidly test for E. coli in water.</p> <p><b>Methods/Materials</b> Laboratory reagents, PCR machine, DNA gel box, antibody based lateral flow strips, metabolite based lateral flow strips. Bacterial strains. There were three strains of bacteria used in this experiment.</p> <p><b>Results</b> In the first experiment, a dilution series was tested in order to confirm that the metabolite strips worked correctly. It was concluded that these strips could be used to detect different concentrations of ligand. In the next experiment we tested the idea that a small change in ligand concentration would cause a visible change on the test lines. This produced a positive result. The last experiment was the most important where we tested different E. coli concentrations. The experiment included all three rapid detection methods. Both the metabolite-based strips and the PCR-based method could detect low concentrations of bacteria.</p> <p><b>Conclusions/Discussion</b> PCR was the most sensitive and best for detecting E. coli based on this data. However the metabolite strip show promise as a quick and expensive alternative to the PCR. The antibody strips failed to detect E. coli except at very high concentrations.</p>	
<b>Summary Statement</b> Determining the best method to rapidly test for E. coli in water.	
<b>Help Received</b> I used lab equipment under the supervision of Dr. Woods at Inscent, inc.	