



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

<b>Name(s)</b> <b>James M. McCabe, III</b>	<b>Project Number</b> <b>J1121</b>
<b>Project Title</b> <b>The Effects of Macronutrients Recycled from Food Waste Products on the Growth of Lactuca sativa and Raphanus sativus</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> As our population continues to grow, so does our demand for food. Farmers have relied upon manufactured fertilizers to increase crop yields. These fertilizers have many harmful effects. I hypothesized that food waste products known to be sources of primary macronutrients could positively effect plant growth in an eco-friendly and sustainable way.</p> <p><b>Methods/Materials</b> In this experiment, five treatments were used to evaluate the growth rates of Romaine Lettuce (<i>Lactuca sativa</i>) and French Breakfast Radish (<i>Raphanus sativus</i>) plants. Initially, all the lettuce plants were similar in size and health. All the radish seeds were from the same package. Weekly, I embedded the soil of fifteen lettuce and twenty radish plants separately with dried tea grounds from boiled tea bags, pureed cantaloupe rinds, pureed banana peels, and a mixture of all three previously mentioned supplements. The final group, my control, received nothing additional embedded in the soil. Every seven days, I measured the height of the lettuce leaves and counted the number of radish and lettuce leaves. On day 28, the end of the experiment, radish root lengths were also recorded.</p> <p><b>Results</b> By day 28, all lettuce and radish plants receiving supplements had more leaves than the control groups. The tea group of lettuce plants had the highest average increase in number of leaves. Tea and cantaloupe lettuce plants' average heights were taller than the control. Additionally, the radishes with the mix had the longest roots.</p> <p><b>Conclusions/Discussion</b> This experiment provided useful information regarding the usage of recycled food waste products on plant growth. Overall, my results supported my hypothesis. My research explained that tea grounds, cantaloupe rinds, and banana peels are respectively rich in nitrogen (N), phosphorus (P), and potassium (K). These nutrients are referred to as macronutrients and are vital for plant development. I learned recycling food wastes is one of the sustainable ways in which to increase plant growth.</p>	
<b>Summary Statement</b> My experiment examined whether food waste products can be recycled and used to positively effect plant growth.	
<b>Help Received</b> A nursery manager provided guidance on plant selection; my mom helped with registration, editing, and cutting materials for the board, and my siblings helped with writing down measurements and filling pots with soil.	