



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Noorhan Z. Amani	Project Number J1901
Project Title Biochar: A Rediscovered Soil Amendment and Its Effects on Plant Growth	
Objectives/Goals A safe, sustainable, and environment-friendly soil additive is a demand of the time. Biochar is one such soil amendment which is a finely grained charcoal made by pyrolysis, the process of heating biomass with limited or no oxygen. The purpose of this project was to evaluate the effect of different concentrations of biochar on plant growth and soil quality and compare its effectiveness with regular fertilizer.	
Abstract Methods/Materials Soil containing different concentrations of biochar were used to compare their effect on plant growth over three, four week long period. For each trial seven flower pots were filled as follows: #1: Nutrient poor sandy loam soil #2: Sandy loam mixed with fertilizer #3: Sandy loam mixed with 10% Biochar #4: Sandy loam mixed with 25% Biochar #5: Sandy loam mixed with 50% Biochar #6: Sandy loam mixed with acid and 50% Biochar #7: Sandy loam mixed with fertilizer and 50% Biochar 20 radish seeds were planted in each pot. After germination the seedlings were thinned out leaving five plants in each pot. The height, biomass and root length of the plants were recorded at the end of the four week period. Soil from each pot was tested for soil bulk density, water retention capacity, and pH.	
Results The results showed that there is a positive relationship between plant growth (height and biomass) and concentration of biochar in the soil. Plant growth was enhanced as the concentration of biochar was increased and plants grew better in soil with the highest concentration of biochar compared to soil containing only fertilizer. It was also found that biochar enhanced soil quality by reducing soil bulk density and increasing soil water retention capacity and pH. Overall, the use of biochar had a positive influence on plant growth in all the samples, the exception being acidic soil sample where it failed to improve plant growth. The pH of all the soil samples increased due to biochar.	
Conclusions/Discussion A significant improvement in growth (both height and biomass) is seen in plants as the concentration of biochar increases in soil. It was also found that biochar application reduces soil bulk density, increases soil water retention capacity, and increases soil pH. Findings from this project show that biochar offers promise to be an essential soil amendment in both the home garden and the farm in the future.	
Summary Statement Effect of different concentration of biochar on plant growth and soil quality compared to fertilizer.	
Help Received Science teacher provided pH meter and weighing scale.	