



# CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

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<b>Project Title</b> <b>Sugar Levels in Drought Tolerant Biofuel Plants</b>	
<b>Objectives/Goals</b> The goal of my project was to determine if the sugar levels, and thus the biofuel viability, of a biomass plant called switchgrass would be affected by drought conditions. This determines its potential for growth and usage in drought-stricken areas like California and other places around the globe. <b>Abstract</b> <b>Methods/Materials</b> Five pots of switchgrass were grown under the recommended water conditions (0.25 cup of water) for a week. After they germinated, two of the pots were changed to drought conditions of 0.125 cups of water every other day and two pots to 0.125 cups daily. The plants were watered and measured thus for three weeks. Using the same amount of leaves by weight, a liquid sample was created from each pot and the dissolved sugar content was measured with a refractometer. <b>Results</b> For the control group switchgrass, I measured an average growth rate of 8.3mm per week. In the medium water group, there was a growth of 10.9mm per week. For the low water group, the growth was 5.7mm per week. This data was mirrored in the sugar levels; the control had a Brix measurement of 1.7, the medium water was at 1.8, and the low water was at 1.1. These data points show how water levels affect sugar in switchgrass. <b>Conclusions/Discussion</b> The data enabled me to determine the viability of switchgrass as a biofuel in drought conditions. The low water plants had the lowest average growth and sugar levels, while the medium water plants had the highest, illustrating the direct relationship between the water and sugar. This evidence suggests that medium water conditions had excellent growth for the amount of water given, so switchgrass would be a viable biofuel plant in places with restricted water. However, because the low water plants' sugar levels were so negatively affected, switchgrass would not be a candidate in areas of extreme drought for economical and environmental reasons.	
<b>Summary Statement</b> My experiment determined that heavy drought conditions, such as in California, negatively affected the sugar levels and biofuel viability in switchgrass plants.	
<b>Help Received</b> None. I completed all of my research and executed my experiment by myself.	