



# CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

<b>Name(s)</b> <b>Mohnish Alishala</b>	<b>Project Number</b> <b>J0501</b>
<b>Project Title</b> <b>Biodiesel: The Future Generation Fuel</b>	
<b>Abstract</b> <b>Objectives/Goals</b> There is a constant production of trash in the world and there isn't enough space to accommodate the amount. The objective was to find which type of organic waste produces the most lipid and then into biodiesel, and which reaction condition is more efficient in terms of biodiesel in comparison to the lipid amount. <b>Methods/Materials</b> This experiment utilized lab equipment at Menon Internationals, Inc. San Diego and four different types of waste. The amount of biomass, lipids, and biomass were recorded for the experiment. The fermentation part of this experiment was done using a microorganism and pH was adjusted daily to get optimal growth using citric acid as acid and potassium hydroxide as base. After, the fermentation was done in seven days, a filter cloth with 300-thread count was used to harvest the biomass. The biomass was dried using a Lyophilizer and grinded. Using a Soxhlet extraction apparatus, the oil was extracted using hexane as solvent. Hexane was removed using rotavapor. Finally, using transesterification reaction method the lipid was converted into biodiesel through five reaction conditions. <b>Results</b> Each waste had two flasks, which were combined to make more biodiesel. From this experiment, green waste created 1.59 # 1.88g of oil and 1.43 # 1.67g of biodiesel, brewery waste 2.76 # 3.12g of oil and 2.34 # 2.78g of biodiesel, bakery waste 10.05 # 11.03g of oil and 9.00 # 9.92g of biodiesel, and food waste 3.15 # 3.73g of oil and 2.82 # 3.23g of biodiesel. The average conversion rate for biodiesel was for condition 1 - 88.6%, condition 2 - 89.8%, condition 3 - 89.6%, condition 4 - 87.8%, and condition 5 - 89.5%. <b>Conclusions/Discussion</b> The hypothesis was very incorrect because the numbers never reached that high of an amount. Bakery waste had the most lipid and biodiesel yield. However, the other types of waste didn't do well. Green waste produced the least, then brewery waste, and the second best was the food waste. The highest percentage was around 22-23% while it was estimated that the highest would be 40%. For the estimation of bakery waste it was 30%, which was the most accurate estimation of all of them. Reaction condition 2,3 and 5 had the best conversion rates however reaction condition took half the time in comparison to the other conditions. But, if the fermentation conditions are fully optimized there is a possibility of getting hypothesized lipid and biodiesel amounts.	
<b>Summary Statement</b> This project tests which of the four types of waste and five reaction conditions produces the most biodiesel.	
<b>Help Received</b> My father helped experimentation and edited the paper and he was also my mentor. Melissa Lee helped preparing the flasks and recording the pH numbers. Elaine Gillum helped refine the idea and helped in editing the paper.	