CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
35174

Project Title
My New Friend

Abstract

Objectives/Goals
Determine if bioplastic made from vegetables and milk can resist higher temperatures like petroleum-based plastic then it would be a useful plastic material to make food containers, protective shields for tools, and it maybe use on 3D printers.

Methods/Materials
Starch from potatoes, yams, and parsnips was extracted. Bioplastic was made heating starch, water, vinegar, and glycerin at different concentrations (concentrated glycerin, 10% glycerin solution and 1% glycerin solution). Also casein plastic was obtained using milk heated at 95 degrees Celsius and using different amounts of vinegar (20mL, 10mL, and 2mL). The approximate melting point for each bioplastic and the time to dissolve the bioplastics on boiling water were determinate using plastic #4 and #5 like controls.

Results
The bioplastic with the highest melting point was the bioplastic made from potato starch and 1% glycerin solution at 90 degrees Celsius. The bioplastics made with potato starch and yam starch using concentrated glycerin had the lowest melting point at 52 degrees Celsius for both. The melting point for controls were higher than the bioplastics with plastic #4 at 120 degrees Celsius and plastic #5 at 160 degrees Celsius. The bioplastic made from yam starch using concentrated glycerin dissolved fastest than the other bioplastics at 0.40 minutes. The controls didn't dissolve.

Conclusions/Discussion
The bioplastic that I obtained didn't resist high temperature to use for whatever I wanted like 3D printers, food containers, and protective shields for tools. Even though I didn't get the results I was expecting, I'm still thinking that bioplastics have a brilliant future because they are made from renewable sources. With the approximate technology it will produce bioplastic that would substitute almost all the petroleum-based plastics.

Summary Statement
The comparison of the resistance to high temperature between bioplastic and petroleum-based plastic.

Help Received
My mother supervised me not to be burned with the hot boiling water and took the pictures.