Property Testing of Polymers With Different Fat Content

Fraley, Max (School: Elko High School)

Production and use of fossil fuels have negative impacts to the environment but provide the primary ingredient to making plastics. Plastics are made from chains of molecules called polymers. Creating an environmentally friendly polymer is a lot simpler than you think. The purpose of this experiment is to evaluate the physical properties of polymers created from milk. The protein in milk called casein is a type of polymer that can be made into a plastic. This experiment tested the stiffness, elasticity and stretchiness of plastics created from four types of milk with varying fat content; whole, 2%, 1%, and 0%. The hypothesis was that fat content will provide extra molecules for the casein to attach making the polymer chain stronger. Results of the physical properties testing returned the opposite, disproving the hypothesis. The higher fat content correlates with increased flexibility and a decrease in ridgedness. In conclusion, the small variation of fat yielded plastics with drastically different properties that could serve as a replacement for a variety of fossil fuel derived polymers.

Awards Won: