Green Synthesis of the Biodegradable Polymers

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Plastics have been a vital asset for humanity but their harmful effects have not been resolved. This project is about a greener solution. Since the petroleum based plastics cannot bio-degrade, they last forever, while some do break into smaller pieces, called micro plastics that leach toxicants to pollute earth and even human and animal food supply. Many industries have worked to find solutions for this problem and have come up with magnificent ideas, but they are far more expensive then what this project proposes. The first method used in this project was to make plastic with complete organic materials, which were 15 grams cornstarch, 14.7 ml gelatin, 120 ml of water, 15 ml glycerin (for flexibility), edible colors and most importantly 7.5 ml cellulose for strength so that it could have properties same as properties of synthetic polythene bags. Usually PLA, PHA, or PBS is used for strength, which are not only difficult to obtain but are also extremely expensive. The plastics made by this project had lignin and cellulose which approximately had the same properties. The second method used in the project was the use of 39.4 ml gelatin, 236 ml water, 9.8 ml glycerol. This plastic was stronger and soluble as well as flexible and dissolved in water in 7 days, depending on the composition of the ingredients. Moreover, it could become the favorite food for animals. These bio-plastics depending on their thickness do take some time to degrade, but the maximum time for this new plastic is 4 weeks after that it disappears. These gelatin based plastics are durable, can hold weight, they are flexible and can be molded in any shape. Initially, these could get industrialized by establishing a small scale cottage industry with existing plastic making machinery.

Awards Won:
Arizona State University: Arizona State University Intel ISEF Scholarship