

## **Grant Yowell**

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*Go Green with BioPlastics*

The purpose of this research was to create a bio-plastic using a plant-based starch, to make a biodegradable airsoft BB. The researcher believes plastics may be made from corn, potato, and broccoli; all containing amylose. The quality of the plastics will be tested for flammability, effect of heat, softening temperature, and ability to be molded into airsoft BB's. Corn oil, corn syrup, and glycerin plastics were made mixing water (43%), cornstarch (43%), and oil, syrup, or glycerin (control) at 14% composition. The mixture was heated in a microwave for 30 seconds, poured into molds, and cured at room temperature. The non-corn based materials were mixed with 71% water, 18% potato or broccoli starch, 6% vinegar, and 6% glycerin composition. They were then heated on stovetop, poured into molds, and cured at room temperature. The potato starch made the clearest, smoothest BB's, but the broccoli never gelled, possibly not containing enough amylose. Glycerin burned the longest (average 53.32 seconds), 4/5 potato starch samples did not ignite, and raw potato did not ignite at all. Corn oil did not soften at 110°C in the hot oil bath, whereas the rest softened at 99°C. All samples, except broccoli, showed no change after one hour at 175°F. They gradually became harder as the oven was increased to 200°F and 225°F for one hour each. This research shows potato starch (in pure form with no contaminants to hinder formation) to have the highest quality, forming the smoothest BB's, and not easily ignited.