The Effect of Pectin Levels on Fruit-Based Superabsorbent Polymers

Thompson, Annalise (School: Niceville High School)

Plants need water to grow, and yet many areas that grow our crops are suffering from drought. Increasing the ability of soil to hold more moisture for a longer time could benefit drought stricken areas. Many common soil amendments, such as sodium polyacrylate, are made from fossil fuels, use acids in their manufacture, are not biodegradable, and build up in the soil. One possible alternative is to use biodegradable plant based superabsorbent polymers to hold moisture in the soil. This project tested the hypothesis that "If a superabsorbent polymer is made from orange and avocado peels, another superabsorbent polymer is are from banana and avocado peels, and another is made from apple and avocado peels, and these polymers are compared based upon water absorption ability, soil moisture retention, and effect on plant growth, then the orange / avocado peel superabsorbent polymer will be superior because orange peels have a higher percentage of pectin." This experiment created plant based superabsorbent polymers with different pectin levels and tested their ability to absorb water, their ability to hold moisture in soil, and their ability to provide water to plants in drought conditions. All amendments improved soil water retention. In the plant and soil only runs, orange and apple polymers performed best and statistically the same. Orange polymer absorbency skewed to higher retention than apple or banana though there was no statistical difference between the amendments. The hypothesis was not supported, however a larger sample size would aid analysis by narrowing the confidence intervals.