

Mitigating Plastic Pollution in Agriculture through Biodegradable Mulch Films

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Plastic mulch films are currently used in the agricultural industry to aid crop growth by enhancing water retention and suppressing weed growth. These films can have adverse effects on the local environment due to fragmenting through physical, biological, and chemical means throughout the product's lifetime, leaving behind microplastics. One way to mitigate this problem is by replacing the petroleum-based, non-biodegradable plastic films currently in use with biodegradable bioplastic films that may benefit soil and plant health. One such biodegradable bioplastic that could be used in this application is polyhydroxyalkanoate (PHA), a polymer readily made and degraded by many species of bacteria. The focus of this study on PHA is to determine the effects of biodegradation on plant health. In this study, three pots each of soybeans with PHA or Vialflex films, and two each with PHA powder, or no additives, were planted in a climate-controlled growth chamber. Ongoing monitoring of plant health parameters is being performed, including measuring plant height and timing of life cycle development milestones. One each of the PHA and Vialflex films is taken from a pot every thirty days to monitor their relative degradation rates, measure changes in their physical and mechanical properties, and observe microbial growth on the surface of the films.

Keywords: Biodegradation, Climate Change, Greenhouse Gases, Polyhydroxyalkanoates

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