

IVa11-010

Application of thermoplatic starch films as a substrate for controlled release of NPK fertilizers

Rodrigues, J.S.(1); De Freitas, A.S.M.(2); Franco, R.(1); Ferreira, M.(1); (1) UFSCar; (2) UNIFESP;

The search for biodegradable, functional materials and those derived from renewable sources, such as natural polymers, is receiving increasing attention in the literature. Starch is a biopolymer, very abundant in nature, easy to obtain and low cost of production, which allows a wide range of modifications, aiming at the most diverse applications. The plasticization of starch allows the production of thermoplastic starch (TPS), a multifunctional bioplastic with high biodegradability. TPS can be added with fertilizers, such as nitrogen, phosphorus and potassium (NPK) in its formulation, allowing a slower release of the fertilizer, and consequently a lower loss by leaching among other processes. In this project, thermoplastic starch films added with 0, 10, 15 and 20% NPK fertilizer (10-10-10) were prepared by casting. The films were characterized by Fourier Transform Infrared Spectroscopy (FTIR), wettability and Ultraviolet Visible Spectroscopy (UV-Vis). With the films obtained, the monitoring of soil leaching and the controlled release of the fertilizer in water was carried out. The results obtained so far showed that the films were obtained with good homogeneity and plasticity, presenting a uniform composition. The FTIR analyzes revealed bands compatible with the literature for the components used in the formulation. The wettability analyzes showed contact angles close to 65° for the control, and values ?? close to 36-38° for samples with different concentrations of NPK, indicating an increase in wettability with the introduction of fertilizer into the film. Leaching and controlled release studies are ongoing and show promising results.