

Development of a Novel Biodegradable Plastic Film with *Passiflora edulis*' Byproduct

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Plastics are responsible for several damages to the environment. They, annually, cause more than one million birds' deaths and other 100 thousand marine mammals' deaths. On the other hand, passion fruits' agriculture residue also can affect negatively in nature. The processing of this fruit generates 70% of residues that becomes waste and corresponds to 586.6t of residues per year only in Brazil. This organic waste accumulated pollutes the soil, water and even emits greenhouse gases. Thus, the aim of my project was to propose the development of a biodegradable plastic film (BPF) using passion fruit residue as raw material. I produced a passion fruit peel's flour (PPF) with this residue. Then, I elaborated different filmogenic solutions by casting method with the PPF. I performed the tensile strength, moisture, solubility and thickness tests in the BPF. Analysis of Variance was used to analyze the significance of parameters at 95% of confidence. All elaborated films presented a thickness of less than 1 mm. These results were according to the norm D882 from American Society for Testing and Materials (ASTM). I observed that the best film formulation contained only PPF. This film presented the best performance at tensile strength and moisture analysis. I developed seedling packaging with the produced plastics that does not need to be removed at planting time. It can be produced 1m² of BPF with 8.12g of PPF. So, the aim of my project was successfully achieved. The present research shows important economic, social and environmental relevance. Since it stimulates the use of agricultural byproducts and it promotes the reduction of plastic wastes. Finally, it is possible to develop a strong and resistant biodegradable plastic film, which is 129,5% cheaper than similar products.

Awards Won:

Fourth Award of \$500