

MSE-10: Processing and Characterization of Bio-Composites Using Food Nutrient Additives

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Problem Statement:

Can waste products from food manufacturing industries be used as composite additives in typical polymer processing techniques in an effort to reduce their environmental impact?

Approach:

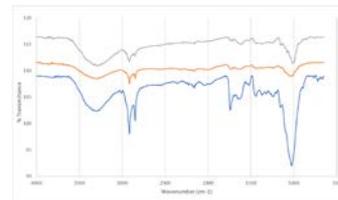
Electrospinning and Characterization:

- Electrospun 10% Gelatin and 8% Food Waste in 9:1 Acetic Acid: Water Solution.
- Characterized electrospun samples *via* SEM and UV Spectrometry.
- Characterized Food Waste Samples *via* FTIR and TLC.

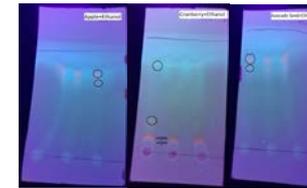
Discussion & Conclusions:

- FTIR spectrum and TLC results for cranberry food waste indicated that carbon double bonds were present, which are associated with anthocyanins, a potent antioxidant.
- Electrospun gelatin and apple powder had the largest average fiber diameter and a flatter geometry compared to fibers spun using avocado or cranberry.
- Release rate of methyl orange particles from gelatin-food waste matrix was relatively uniform for samples made with different food waste additives.

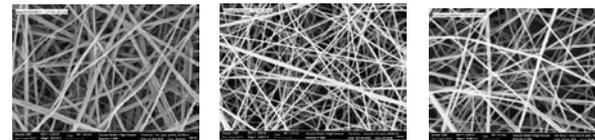
Results:



FTIR Spectra of Food Waste Samples



TLC of Food Waste Samples in Ethanol



SEM Micrographs of Gelatin/Food Waste Composites

- FTIR – Confirmed functional groups present in food waste.
- TLC – Showed quantity of available compounds in ethanol solution.
- SEM – Showed difference in fiber morphologies for different food waste additives.
- UV-Spec – Calculated release rate of particles from fibers with food waste additives.

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