Contribution ID: **44** Type: **Poster**

Modification of Biopolymers from Geobacillus sp. strain EP1 for 3D printing Biofertilizer Encapsulation

Tuesday, May 14, 2024 3:45 PM (35 minutes)

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Sustainable production of biofertilizers offers an environmentally friendly alternative to chemical fertilizers, mitigating runoff and reducing industrial production. Here, we propose a method utilizing a consortium of microbes directly placed in soil, facilitated by hydrophobic, heat-resistant, and biodegradable capsules. Previous research highlights the thermophilic bacterium Geobacillus sp. strain WSUCF1's capacity to sustainably produce exopolysaccharides (EPSs), rich in glucomannan and mannan, with high thermal stability and low crystallinity. An adapted version of strain WSUCF1, the Geobacillus sp. strain EP1, tailored for growth on corn stover, yields abundant biopolymers. By elucidating the structure and bonds of these biopolymers, sustainable methods for enhancing crystallinity and hydrophobicity can be explored. These modified biopolymers show promise as 3D printing materials for biofertilizer capsules, offering innovative solutions for sustainable agriculture.
Keywords: Biopolymer, Biofertilizer, Exopolysaccharides, Sustainability

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Session Classification: Poster Session

Track Classification: Biology