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Using of Chia Seed (Salvia hispanica) Mucilage and a Polyol Mixture as Bio-based Film Material for Packaging

A new high-strength, low-permeability edible biofilm made from chia seed byproduct offers a sustainable and environmentally friendly plastic alternative for food and pharmaceutical packaging.

Researchers at Purdue University have developed a new edible biofilm using chia seed mucilage (CSM) and a polyol mixture for pharmaceutical and food packaging applications. The CSM extraction and yield is improved by using a technology consisting of ultrasonication, temperature and vacuum filtration. There remains an unmet need to create environmentally friendly plastic materials for preserving food and drugs. Currently, 72% of produced plastics are not recycled, 40% are discarded into landfills, and 32% are left in natural habitats. Purdue researchers have optimized a biofilm with a CSM, sorbitol, and glycerol that exhibits high tensile strength of 2.01 N/mm^2, low water permeability of 1.73*10e-9 g*s*Pa/m, and high elongation at break of 31.73%. In addition, the new biofilm is highly soluble and biodegradable. Raman scattering was used to verify a high number of hydrogen bonds in the biofilm, including shifts from 854 to 872 cm^-1 and 1061 to 1076 cm^-1 for beta-COO modes, indicating promise that the material will allow oxygen transfer when used as a food or drug coating.

Advantages:

-Edible

-High-Strength

-Excellent Plasticity

-Promising Hydrogen Bonding

-Sustainable

-Environmentally Friendly

-Low Water Permeability

Technology ID

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Category

Chemicals & Advanced Materials/Green & Bio-Based Chemistry

Pharmaceuticals/Pharmaceutical Packaging & Delivery Systems

GreenTech/Sustainable Packaging Materials

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Potential Applications:

-Edible Pharmaceutical and Food Packaging

-Biofilms

-Materials Research

Technology Validation:

The composition of the new biofilm has been characterized in lab by tensile testing, Raman spectroscopy, elasticity/stretchability, and water permeability testing.

Recent Publication:

"Development of chia seed (Salvia hispanica) mucilage films plasticized with polyol mixtures: Mechanical and barrier properties"

International Journal of Biological Macromolecules

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Intellectual Property:

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