THE EFFECT OF ETHYLENE GLYCOL: CITRIC ACID CONCENTRATION AS PLASTICIZER IN CARBOXYMETHYL CELLULOSE (CMC) BIOPLASTIC

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ABSTRACT

THE EFFECT OF CITRIC ACID: ETHYLENE GLYCOL CONCENTRATION AS PLASTICIZER ON CARBOXYMETHYL CELLULOSE (CMC) BIOPLASTIC

Nowadays, the creation of biodegradable polymers for industrial and commercial uses is crucial due to the negative environmental effects of synthetic plastics. Environmental contamination in the land, water, and air has been brought on by the rise in plastic trash, the majority of which is made from petroleum plastics. In order to create biodegradable bioplastics, renewable sources like cellulose and deep eutectic solvent (DES) are added to bioplastics. Commonly, bioplastics would become brittle with any cellulose. Utilizing DES is crucial for improving material flexibility and ensuring durability. The objective of this study is to prepare bioplastics made of carboxymethyl cellulose (CMC) with different concentrations of DES, citric acid, and ethylene glycol that act as plasticizers. Furthermore, the characteristics of CMC-DES bioplastic were analyzed in terms of physical and mechanical properties. The samples were examined for various parameters such as Fourier Transform Infrared (FT-IR), thickness tensile properties, bioplastic degradability test, moisture content, and solubility content. The findings demonstrated that CMC-DES 1% is best suited for food packaging because it exhibits low moisture content, water absorption, and water solubility. This bioplastic film of CMC-DES 3% has excellent properties, including great elasticity and flexibility at 0.3719 MPa. Furthermore, compared to traditional plastics, CMC-DES bioplastics can deteriorate significantly more quickly. As a result, because CMC bioplastic is affordable, biodegradable, and environmentally safe, its usage in package production may be expanded globally. Thus, this study will contribute to the development of bioplastics in the packaging industry.

TABLE OF CONTENTS