EFFECT OF VARYING ANTHOCYANIN CONCENTRATION EXTRACTED FROM PURPLE CABBAGE ON STARCH-PECTIN-DES BIOPLASTICS AND ITS POTENTIAL AS A pH INDICATOR

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ABSTRACT

EFFECT OF VARYING ANTHOCYANIN CONCENTRATION EXTRACTED FROM PURPLE CABBAGE ON STARCH-PECTIN-DES BIOPLASTICS AND ITS POTENTIAL AS A pH INDICATOR

Bioplastic indicator films usually show a poor mechanical property with use of synthetic dye, necessitating the optimization of anthocyanin concentration as natural dye to develop an intelligent packaging material. This study explores the effect of varying anthocyanin concentration on starch-pectin based bioplastic films incorporating Deep Eutectic Solvent (DES) composed of choline chloride and citric acid. Three different concentration of anthocyanin extract from purple cabbage were added to the starch-pectin (1:2) mixture after it had been plasticised with DES. The films were characterized through FTIR spectroscopy to identify functional groups, UV-Visible spectroscopy for anthocyanin absorbance behaviour, and mechanical tests including thickness, tensile strength, Young's modulus, water vapor permeability (WVP), and responsiveness to pH (pH 2–10) and ammonia vapor. As the anthocyanin concentration increased from 3 to 9%, the stress of the biofilm decreased while the strain and thickness of the film increased. While FTIR data verified the existence of functional groups associated with DES and anthocyanin. The mechanical strength and barrier qualities were both affected by an increase within anthocyanin concentration, according to tensile and WVP tests. The colour shift under pH or ammonia exposure was less obvious at increased anthocyanin contents, most likely because of pigment saturation or interactions with the DES. As conclusion, the bioplastic films, BP03 showed a promising bioplastic film with the most suitable balance of mechanical strength and barrier effectiveness for packaging use.

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