SYNTHESIS OF BIOFILMS FROM *MARANTA ARUNDINACEA* FIBRE AND PLASTICIZER FOR FOOD PACKAGING

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ABSTRACT

SYNTHESIS OF BIOFILMS FROM *MARANTA ARUNDINACEA* FIBRE AND PLASTICIZER FOR FOOD PACKAGING

The great potential of *Maranta Arundinacea* as fiber loading in the preparation of bioplastic was investigated. The properties of TPAS/AF composite films with the presence of glycerol were evaluated. In this study, the bioplastic was successfully synthesized from arrowroot starch solution and its fibre. The fibre was treated with 3 % sodium hydroxide solution. The starch powder was produced by means of mechanical grinder. The new mechanical properties of bioplastic were enhanced using 30% glycerol and different percentage of fibre loading (i.e, 5%, 10%, 15% and 20%). The chemical compounds of the fibre and bioplastic were characterized using the Fourier-Transform Infrared (FTIR) analysis. The spectra show the presence hydroxyl (-OH) groups at 3600-3000 cm^{-1} carbonyl group at 1600 cm^{-1} and aromatic groups of C-C stretching which are significant to the TPAS/AF composite films. Meanwhile, the morphological structures of TPAS/AF composite films were evaluated using Scanning Electron Microscopy analysis and optical microscope analysis. The images revealed the homogenous distribution of the fibre. The addition of fibre has increased the water content in TPAS/AF composite films from 9.6% to 26.2%. Besides, the solubility and water absorption of TPAS/AF composite films have decreased upon the addition of fibre in the composite films. It is beneficial for food packaging as it can extend the shelf-life of the food. The TPAS/AF composite films were further analyzed using its mechanical properties. TPAS/AF15 composite film has illustrated the highest tensile strength and Young's modulus. Meanwhile, its elongation at break has decreased, causing the composite films to have become harder. The biodegradability test was conducted using compost soil at constant temperature, moisture and pH. At 14 days, the bioplastic completely degraded. The addition of fibre loading affected the degradation rate of the bioplastic. Hence, the *Maranta Arundinacea* fibre was found to be a good candidate as green fibre for development of stronger and environmentally friendly bioplastic is suitable for food packaging.

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