Characterization of Thermoplastic Starch/Lignin Composites Using ^{1}H NMR Spectroscopy

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Abstract. Gradual depletion of petroleum resources and huge amounts of plastic waste are two global factors making researchers concentrate on developing new biodegradable plastics made from renewable resources. Great attention is focused on thermoplastic starch-based materials as potential alternatives to conventional plastics. In order to improve the water resistance of these materials, hydrophilic thermoplastic starch is often blended and/or reinforced with other biodegradable polymers which are hydrophobic. One such promising polymer is lignin, a by-product of the pulp and paper industry. In this study, two sets of thermoplastic starch samples reinforced with lignin were characterized from the standpoint of molecular mobility using ^{1}H NMR. The results obtained from the studied samples confirm that increasing the content of hydrophobic lignin in TPS composites reduces moisture absorption from the ambient air.