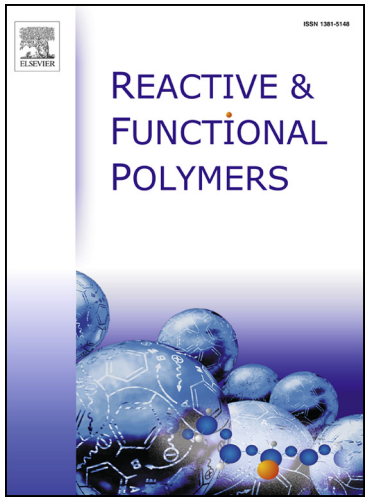

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Renewable antioxidant properties of suspensible chitosan-polypyrrole composites

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Abstract

Conductive polymers have the ability to capture radicals and have become in focus for antioxidant applications of food packaging or biomedical applications. Unfortunately, the conducting polymers such as polypyrrole are difficult to suspense in solution after chemical or electrochemical polymerization. Chitosan, as a natural polymer from chitin, can be dissolved in diluted acetic acid solutions. In the present study, composites suspensible in diluted acetic acid solutions have been produced by the chemical polymerization of pyrrole in chitosan solution using ammonium persulfate (APS) as the oxidant. FTIR and UV-Vis measurements did identify an attachment of polypyrrole to chitosan.

In order to optimize the activity and stability of the composites, the ratios of APS : polypyrrole : chitosan were analyzed. The chitosan-polypyrrole composites were formed as membranes (coatings); impedance measurements indicated their conductivity to be in the range of 10^{-3}-10^{-7} S cm^{-1}. The antioxidant (radical scavenger activity) properties were determined by the di(phenyl)-(2,4,6-trinitrophenyl)iminoazanium (DPPH) assay. The radical scavenger activity of the composites was found renewable by means of electrochemical cycling.