



ETHOXYLATED-QUATERNIZED HYDROXYETHYL CELLULOSE: RAW MATERIAL FOR CASTING FILMS AND AS A REAGENT FOR SYNTHESIZING BIO-BASED POLYURETHANES WITH FILM-FORMING CAPABILITIES

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In this study, transparent, hydrophilic films with thermal stability up to 200 °C, containing or not glycerol (a plasticizer) and ZnO nanoparticles (aiming at antiviral properties), were formed from aqueous solutions of ethoxylated-quaternized hydroxyethyl cellulose (HECeq, $M_w \cong 500,000$ g/mol). The HECeq films exhibited tensile strength, Young's modulus, and elongation at break of approximately 13 MPa, 23 MPa, and 47%, respectively, varying to higher or lower values depending on the presence of ZnO and/or glycerol, as well as their respective concentrations. Their moisture retention properties can help create an ideal healing environment, making them suitable for applications such as wound dressings. Their solubility in water can enable their use as incorporants of fertilizers, gradually dissolving in the soil to release their content in a controlled manner. To reduce the hydrophilicity of the films and evaluate changes in other properties, HECeq was used as a polyol in the synthesis of bio-based polyurethanes, resulting in the concomitant formation of films (PUHECeq), with or without incorporation of ZnO nanoparticles. Ricinoleic acid triglyceride, the primary component of castor oil, was used as an additional source of hydroxyl groups and also to disperse the reagents. The PUHECeq films exhibited reduced hydrophilicity, and regarding their tensile properties, they showed lower strength and higher elongation at break, compared to HECeq films, in addition to increased thermal stability up to 300 °C. The properties evaluated so far indicate applications such as packaging, coating in personal care products, and protective layers for flexible displays. Evaluation of other properties is ongoing, including antiviral action.

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