

The use of cellulose nanocrystals from *Acacia farnesiana* wood as reinforcement materials on acrylic hydrogels.

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In this study, cellulose nanocrystals (CNCs) were isolated from *Acacia farnesiana* wood through acid hydrolysis and employed as reinforcement in poly(acrylic acid-co-acrylamide) (AAc/AAm) hydrogels synthesized in solution via in situ free radical photopolymerization. The nanomaterials were characterized by atomic force microscopy, dynamic light scattering (DLS), and residual surface charge analysis. At the same time, the nanohydrogels were examined using infrared spectroscopy, scanning electron microscopy, swelling kinetics, and Young's modulus. The results showed that the swelling capacity depended on the crosslinking agent and CNC concentration, as well as the chemical and morphological properties of the CNCs, rather than their source. Moreover, CNC-reinforced hydrogels exhibited a lower swelling degree compared to hydrogels without CNCs. The Young's modulus increased with CNC incorporation and was influenced by their concentration and role as crosslinking agents.

Keywords: Cellulose nanocrystals, *Acacia farnesiana*, Acrylic hydrogels

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