Tapioca Cellulose Based Copper Nanoparticles For Chemoselective *N*-Alkylation

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ABSTRACT

Biomaterials as a support for catalysts are of prime importance. Tapioca root which is an abundant biopolymer source was used to synthesize cellulose supported bio-heterogeneous poly(hydroxamic acid) copper nanoparticles (**CuN@PHA**) and was characterized by Fourier transform infrared spectroscopy (FTIR), ultraviolet–visible spectroscopy (UV-Vis), field emission scanning electron microscopy (FESEM), X-ray photoelectron spectroscopy (XPS), inductively coupled plasma atomic emission spectroscopy (ICP-AES), transmission electron microscopy (TEM) analyses. The tapioca cellulose supported **CuN@PHA** (50 mol ppm) effectively catalyzed *N*-alkylation reaction of aliphatic amines with *α*,*β*-unsaturated compounds to give the corresponding alkylated products. High yields up to 95% were achieved for the converted products. The reusability of the cellulose supported nanoparticles was found to be excellent with no significant reduction of its catalytic activity over several cycles. The catalyst showed high catalytic activity having turnover number (TON) 18000 and turnover frequency (TOF) 2250 h^{-1}.

Keywords: Copper Nanoperticles; N-Alkylation; Poly(hydroxamic acid); Poly(methyl acrylate); Tapioca Cellulose; α,β-Unsaturated Compounds

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