Catalytic performance and antimicrobial activity of Mg(OH)2/MgO colloidal nanoparticles in alkyd resin nanocomposite derived from palm oil

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ABSTRACT

Colloidal Mg(OH)2/MgO nanoparticles were successfully produced in glycerol medium in the presence of hydrazine and subsequently was characterized by XRD. The as-prepared colloidal suspension in glycerol was used for the glycerolysis reaction with palm oil succeeded by polyesterification reaction with phthalic anhydride to prepare the palm oil-based alkyd resin nanocomposite where the Mg(OH)2/MgO nanoparticles catalysed the reactions. The well-dispersion of Mg(OH)2/MgO nanoparticles in the reaction mixture formed a stable suspension which effectively elevated the rate of reaction of both alcoholysis and polyesterification as compared to conventional NaOH catalysed reactions. The optimum reaction condition of the catalysts was observed at 0.04 wt% of Mg(OH)2/MgO. Alkyd resin nanocomposite formation was verified through FTIR, 13C NMR and 1H NMR. The presence of the Mg(OH)2/MgO nanoparticles in the resin matrix significantly improved the antimicrobial activity as evidenced by Kirby–Bauer Method. Thereby, the formulation of Mg(OH)2/MgO nanoparticles in glycerol medium was proved to be an effective route as compared to traditional NaOH homogeneous base catalyzed system.

KEYWORDS

Colloidal nanoparticles; Palm oil; Magnesium hydroxide/oxide; Alkyd resin; Antimicrobial activity

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