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The immobilization anti-tuberculosis drugs loaded -car-MA-INH/nano hydroxyapatite nanocomposites for osteoarticular tuberculosis treatment

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Tuberculosis synovitis as often as possible introduces as a monoarthritis of weight-bearing joints, for example, the hip, knee, or lower leg. Early detection with a synovial biopsy permits incite anti-tuberculosis (anti-TB) treatment and considerably enhance the possibility of safeguarding of joint structure and capacity. Beginning treatment ordinarily incorporates mix treatment with four anti-TB drugs such as isoniazid, rifampin, pyrazinamide, and ethambutol. In addition, biocompatible polymers and bio-ceramic materials have been realized to be vital to fabricate drug delivery and bone regenerations that offer high drug loading and sustained release with remarkable in vivo bioavailability. In the present work, multi-drug delivery system was developed with the combination Rifampicin and Isoniazid anti-TB drugs. Initially, Isoniazid drug was tagged with -carrageenan grafted maleic anhydride (-Car-MA-INH) and then it was cross linked with nano hydroxyapatite (NHAP) via electrostatic interaction. Rifampicin drug was loaded on -Car-MA-INH/NHAP/RF through ionic gelation technique. The chemical modification and interaction of drug to the nanocomposites was characterised by Fourier transform infrared spectroscopy (FT-IR). The size and surface charge of the nanocomposites was measured by a zetasizer analysis. The crystalline nature and surface morphology was identified using X-ray diffraction patterns (XRD), scanning electron microscopy (SEM), and transmission electron microscopy (TEM). In-vitro cell viability and cell adhesion experiments showed that composites lower the cytotoxicity effect against fibroblast cells (L929) and higher cell adhesion against osteoblast likes cell (MG63). Since, the bio-ceramic nano drug delivery systems could be potential scaffold materials for application for osteoarticular tuberculosis treatment.

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