

Development of a biocompatible nanodelivery system for tuberculosis drugs based on isoniazid-Mg/Al layered double hydroxide

Abstract

The primary challenge in finding a treatment for tuberculosis (TB) is patient non-compliance to treatment due to long treatment duration, high dosing frequency, and adverse effects of anti-TB drugs. This study reports on the development of a nanodelivery system that intercalates the anti-TB drug isoniazid into Mg/Al layered double hydroxides (LDHs). Isoniazid was found to be released in a sustained manner from the novel nanodelivery system in humans in simulated phosphate buffer solutions at pH 4.8 and pH 7.4. The nanodelivery formulation was highly biocompatible compared to free isoniazid against human normal lung and 3T3 mouse fibroblast cells. The formulation was active against Mycobacterium tuberculosis and gram-positive bacteria and gram-negative bacteria. Thus results show significant promise for the further study of these nanocomposites for the treatment of TB.

Keyword: Tuberculosis; Isoniazid; Mg/Al LDH; Nanodelivery system