

Preparation of zinc layered hydroxides-cinnamaldehyde nanocomposites and its physico-chemical study

ABSTRACT

Cinnamaldehyde (CINN) is an organic guest anion, the main constituent of cinnamon oil was intercalated into zinc layered hydroxides (ZLHs) by ion exchange method. CINN has been reported can killed mosquito larvae. The powder X-Ray diffraction (PXRD) indicates a successful intercalation of CINN into the interlayer galleries of ZLHs matrix when 1.0 g of ZnO with 0.08M of CINN was used forming zinc layered hydroxides-cinnamaldehyde (ZCINN) exhibiting basal spacing expansion, 21.2Å. Fourier transform infrared (FTIR) results supported and confirmed the intercalation of CINN as both ZnO and CINN functional groups appeared in ZCINN spectrum. The thermal stability property of the ZCINN was enhanced as compared to the anion, CINN. Field emission scanning electron microscopy (FESEM) image of ZnO showed a nonuniform granular-like structure transforming into flaky structure with various sizes after intercalation of CINN took place. These results indicate that it is possible to design and develop the nanocomposites containing larvicide for further investigations.

Keyword: Layered hydroxides; Intercalation; Cinnamaldehyde; Nanocomposites