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Natural Turmeric encapsulated Layered Double Hydroxides as Anti-microbial Nanohybrids

AnojaMegalathan, ManjulaM.Weerasekera, AyomiDilhara and NilwalaKottegoda

University of Sri Jayawardenepura, Sri Lanka

Sri Lanka Institute of Nanotechnology, Sri Lanka

Turmeric (*Curcuma longa*) has been long recognized for its anti-inflammatory properties against a wide variety of conditions. However, its practical applications have been limited due to the instability under thermal and UV radiation. There had been only few attempts to stabilize turmeric. Therefore, this study focuses on exploring the potential of nanotechnology based approaches to stabilize the natural turmeric and to evaluate the antimicrobial activity of the resulting nanohybrids. In this study, natural turmeric has been encapsulated into nano layers present in Mg-Al-Layered double hydroxides (LDHs) using a simple co-precipitation method. The suggested method avoids any isolation of active compounds, i.e. curcumin from natural turmeric. The LDHs selectively encapsulate curcumin during the synthesis process. Powder X-ray diffraction (PXRD) and Fourier transform infrared (FTIR) characterization confirmed the successful synthesis and encapsulation of curcumin into LDH. Thermogravimetric data and UV stability data confirmed the stabilization of the curcumin molecules within the LDH layers. Drug release characteristics of the nanohybrid was quantitatively monitored under different pH (3 & 5) conditions using UV-Visible absorption spectroscopy. Finally, the antimicrobial activity of turmeric-LDH nanohybrid was tested against three bacterial species including *Staphylococcus aureus* (ATCC 25923), *Escherichia coli* (ATCC 25922), *Pseudomonas aeruginosa* (ATCC 25853) and two fungal species such as *Candida albicans* (ATCC 10231) and *Candida dubliniensis* (clinical isolate) using agar well diffusion method. The results show that the drug release of turmeric encapsulated LDH was a slow process, suggesting that the intercalated nanohybrid can be used as an efficient drug formulation.

Biography

Anoja Megalathan has completed her under graduate degree at the age of 24 from Institute of Chemistry, Ceylon, Sri Lanka. She has a business start up on natural and healthy beverage company named 'Aqua Sizzle' and also worked as research scientist at Midaya Ceramics, Sri Lanka; research intern at the national University of Sri Jayawardenepura, Sri Lanka.

ajonamegalathan@gmail.com

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