HALLOYSITE CLAY NANOTUBES AS CARRIERS FOR SUSTAINED DRUG DELIVERY

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One way to utilize the high functionality and stability of bio-related materials is to create hybrids consisting of materials of biological origin and inorganic materials. Halloysite, a polymorph of Kaolinite, with predominantly hollow tubular structure in the submicron range [1-3] is an economically viable raw material that can be mined as a raw mineral. Halloysite nanotubes (HNTs) are efficient nano-containers capable of entrapping a number of active agents [2] within the inner lumen, followed by their retention and slow release [3]. Halloysite is a green environmentally friendly material available in commercial quantities. The lumen of the halloysite tube accomodates globular protein diameters, allowing their entrapment while retaining their activity for use in biocatalysis. In this work a combination of high resolution imaging techniques such as TEM, SEM and SFM have been employed to elucidate the structure. We have also investigated their viscoelastic properties and performed cytotoxicity assays utilizing neoplastic cell lines. The results indicate that halloysite nanotubes were readly uptaken by neoplastic cells and exhibit a high level of biocompatibility [4]. To confirm their possible biomedical use as therapeutic nanocarriers we successfully encapsulated bioactive compounds and studied their anti-neoplastic effect into model cancer cell lines. Preliminary in vivo study will be also highlighted.

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Keywords: halloysite clay nanotubes, nanocarriers, cancer