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Synthesis and characterization of undecyl-chitosan nano-bioconjugate: A potential anti-bacterial, anti-biofilm and anti-cancerous agent

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Bioconjugated nanomaterials offer innumerable opportunities to advance both nanobiotechnology and biomedical technology. The goal of bioconjugate chemistry is to develop simple and efficient methods for chemical bonding of biomolecules with other molecules. Both chitosan and unsaturated fatty acid derivatives are described in the literature for their interesting bioactive properties, including anti-cancer activity. Among various forms of chitosan-derivatives, fatty acid-chitosans are increasingly being prepared to have the variety of shapes and sizes with enormous applications. Considering the above fact, we have synthesized the undec-10-enoic acid functionalized chitosan-based undecyl-chitosan (U-CS) nano-bioconjugate with the use of DCC as a coupling agent. The U-CS conjugate formed was confirmed by FTIR, 1H-NMR and further characterized by TGA, XRD, SEM and TEM analysis. Further, we have evaluated the *in-vitro* anti-bacterial, and anti-cancer potential of U-CS nano-bioconjugate against human pathogenic bacterial strains (*E. coli* and *L. monocytogene*) and human cancer cell lines (HeLa, MDA-MB-231 and Hep3B). The results of our study clearly revealed that U-CS nano-bioconjugate showed enhance anti-bacterial, anti-biofilm as well as anti-cancer efficacy as compared to the pure and free form of the chitosan.

Biography

K. Laskar received his M.Sc degree (2011) with the gold medal from Aligarh Muslim University, India. In 2016, he has completed his PhD under the supervision of Prof. A. Rauf on the topic 'Synthesis and Spectral Studies of New Fatty Acid Derivatives' from the same institute. Currently, he is working as National Post-Doctoral Fellow, DST-SERB (Mentor name: Dr. Utpal Bora) at Tezpur University, India. He has published 04 papers and a review article in reputed journals (*Carbohy. Polym., 2017, 166, 14-23, Eur. J.* Med. Chem., 2016, 122, 72-78.etc). His research interest is centered on the synthesis of new fatty acid derivatives of biological interest, Heterocyclic chemistry, Nano-chemistry, Catalysis and Green chemistry..

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