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| Title: | Effect of benzyl isothiocyanate encapsulated biocompatible nanoemulsion prepared via ultrasonication on microbial strains and breast cancer cell line MDA MB 231 |
| Authors: | Kumar, Rajendra (/jspui/browse?type=author&value=Kumar%2C+Rajendra) |
| Keywords: | Nanoemulsion Sonochemical Antimicrobial MDA MB 231 Biocompatible |
| Issue Date: | 2020 |
| Publisher: | Elsevier B.V. |
| Citation: | Colloids and Surfaces A: Physicochemical and Engineering Aspects, 596 |
| Abstract: | <p>Benzyl Isothiocyanate (BITC), a nutraceutical belonging to the mustard family exhibits excellent antitumor and antimicrobial properties. Despite its prodigious potential, the lacuna in the practical application is due to hydrophobicity, high volatility, receded bioavailability, and acute odor. Owing to the entrenched advantages of the nanostructured colloidal systems, a new rhamnolipid based nanoemulsion was synthesized employing the heating-stirring-sonication method using GRAS ingredients to overcome the shortcomings of BITC. The nanoemulsion has been optimized to exhibit good long-term stability in a salt solution (50–200 mM) and at different pH conditions. The physicochemical properties were assessed using DLS, TEM, UV–vis and FTIR spectroscopy. Hemolysis and biocompatibility studies validated the bio-safety of the engineered nano-wagon. The system demonstrated high entrapment efficiency along with a sustained release. MTT assay performed indicated increased cytotoxicity of BITC NEm against MDA MB 231 breast cancer cells as compared to BITC alone. Qualitative and quantitative cell uptake studies performed using confocal spectroscopy and flow cytometry, respectively, validated that BITC was completely encapsulated in the nanocarrier and the formulation acted as an efficient and compatible carrier. Furthermore, the antibacterial assay of BITC loaded nanoemulsion showed promising results against strains of E. coli and S. aureus proving it to be a safe alternative for overcoming the pressure of resistant strains.</p> |
| Description: | Only IISERM authors are available in the record. |
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