Document details - Tecoma stans flower extract assisted biogenic synthesis of functional Ag-Talc nanostructures for antimicrobial applications

Bioresource Technology Reports

Volume 7, September 2019, Article number 100298

Tecoma stans flower extract assisted biogenic synthesis of functional Ag-Talc nanostructures for antimicrobial applications(Article)

Hariram, M., Vivekanandhan, S., Ganesan, V., Muthuramkumar, S., Rodriguez-uribe, A., Mohanty, A.K., Misra, M.

[a]Sustainable Materials and Nanotechnology Lab, Department of Physics, V.H.N.S.N. College (Autonomous), Virudhunagar, Tamil Nadu 626001, India
[b]Department of Botany, V.H.N.S.N. College (Autonomous), Virudhunagar, Tamil Nadu 626001, India
[c]Bioproducts Discovery and Development Centre, Department of Plant Agriculture, Crop Science Building, University of Guelph, Guelph, ON N1G 2W1, Canada

View additional affiliations

Abstract

Silver based functional nanomaterials receive increasing importance with the application potential for antimicrobial products. Among the various synthesis processes, plant extract mediated biosynthesis of functional nanostructures receives great attention due to their greener approach. In this perspective, the present investigation deals with the effective functionalization of talc with silver nanoparticles by employing Tecoma stans flower extract as the reducing/capping agent. The Ag-Talc nanostructure formation was confirmed using UV–Vis spectroscopy (characteristic peak at 440 nm) and X-ray diffraction (XRD) analysis (FCC Ag peak at 38°) with the crystallite size of ~57 nm. SEM-EDX analysis ensured the silver content of 0.52 wt% in talc. TEM images reveal the mean diameter of the Ag nanoparticles, which were found 50–60 nm. The synthesized Ag functionalized talc exhibits good antimicrobial activity against Staphylococcus aureus and Escherichia coli with the inhibition zone of 24 mm and 16 mm respectively.

Author keywords

Antimicrobial activity | Bioreduction | Flower extract | Silver nanoparticles | Talc

Indexed keywords

Engineering controlled terms: Biochemistry | Crystallite size | Escherichia coli | Metal nanoparticles | Plant extracts | Silver metallography | Talc | X ray diffraction analysis

Engineering uncontrolled terms: Anti-microbial activity | Antimicrobial products | Bio reductions | Characteristic peaks | Flower extracts | Functional Nano materials | Functional nanostructures | Nanostructure formation

Engineering main heading: Silver nanoparticles

EMTREE drug terms: antiinfective agent | flower extract | silver nanoparticle | talc | Tecoma stans extract | unclassified drug

EMTREE medical terms: antimicrobial activity | Article | controlled study | drug synthesis | Escherichia coli | flower | nonhuman | priority journal | scanning electron microscopy | Staphylococcus aureus | Tecoma stans | ultraviolet visible spectroscopy | X ray diffraction

Chemicals and CAS Registry Numbers:

talc, 14807-96-6

ISSN: 2589014X
DOI: 10.1016/j.biteb.2019.100298
Source Type: Journal
Document Type: Article
Original language: English
Publisher: Elsevier Ltd

Vivekanandhan, S.; Sustainable Materials and Nanotechnology Lab, Department of Physics, V.H.N.S.N. College (Autonomous), Virudhunagar, Tamil Nadu, India;