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Phytofabrication of silver nanoparticles using indigenous medicinal plants and analysis of their antimicrobial property

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In the present study silver nanoparticles were biosynthesized using indigenous medicinal plants of the Northeast India and their antibacterial property were investigated. Plants used for the study were *Houttuynia cordata, Solanum khasianum, Fleminga vestita, Rhododendron spp., Centellia asiatica, Xanthoxylum armatum, Zingiber spp., Curcuma ceasia* and *Curcuma augustifolia.* The anti-oxidant and antibacterial property of the methanolic and hydromethanolic extracts of these plants were analysed in 96 microtiter plate using DPPH scavenging assay and p-iodonitro- tetrazolium violet dye, respectively. Phytofabrication of silver nitrate solution (1mM) was carried out using these plant extracts by subjecting to magnetic stirrer (45°C) upto 24-72 hrs. The silver nanoparticles formation was initiated after 5 minutes to 2hrs of the reaction. The formation and stability of the reduced silver nanoparticles in the colloidal solution were monitored by UV–vis. spectrophotometer analysis. The initial antibacterial properties analysis was done with silver nitrate as control with agar gel diffusion tests. To determine the antibacterial property of the synthesized nanoparticles microbroth was done in 96 microtiter plate against *E. coli (ATCC 25922), Salmonella Typhimurium (49416), Listeria monocytogenes (Laboratory isolate) and Staphylococcus aureus (ATCC 25923).* The optical density of the plate was read at 490 nm ((MultiscanGo) at an interval of 1 hr, upto 8 hrs. Antibiofilm assay was also conducted using MTT dye. The surface Plasmon resonance of the synthesized nanoparticles ranged from 420-480 nm. An effective antibacterial property was observed from the phytofabricated silver nanoparticles (1 mg/ml) better than their initial plant extracts (200 mg/ml) alone. Further characterization with transmission electron microscopy (TEM), scanning electron microscope (SEM), energy dispersive system EDS and atomic absorption spectrophotometer (AAS) will be done. Further studies are needed to fully characterize the toxicity and the antibacterial activity of these particles.

Biography

Raj Kumari Sanjukta is currently serving as Scientist, Agricultural Research Services (ARS), Indian Council of Agricultural Research (ICAR) Research Complex for North Eastern Hill Region, Umiam, Meghalaya, India. She is engaged in research that focuses on i) development of diagnostic assays for pathogens characterization and ii) explores novel anti-microbial. Prior to this, she worked at Institute of Animal Health & Veterinary Biologicals, Bangalore, as scientist in charge, on research and development involved in diagnosis and characterization of infectious diseases of national importance. Presently she is focusing on characterizing antibiotic resistance prevalent in food borne pathogens and further exploring nanoparticles based antibacterial, through her doctoral research.

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Pt/NiO/MWCNTs Composite based room temperature hydrogen gas sensor

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In the present work, hydrogen gas sensor of modest sensitivity utilizing functionalized multiwalled carbon nanotubes partially decorated with nickel oxide nanoparticles (F-MWCNTs/NiO) has been fabricated. To improve the sensitivity and electrical response of this sensor, the platinum (Pt) nanoparticles have been sputtered on F-MWCNTs/NiO thin film. This sensing material was characterized by Raman spectroscopy, X-ray diffraction (XRD) and scanning electron microscopy (SEM). The F-MWCNTs/NiO/Pt sensor shows low recovery time and good repeatability when exposed to 0.05% concentration of H_2 gas at the room temperature. To the best of our knowledge, such low concentration of H_2 gas detection is reported for the first time using F-MWCNTs/NiO/Pt hybrid nanostructure at room temperature.

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