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Greener synthesis of gold nanoparticles (AuNPs-SL) using sophorolipid and its antimicrobial activity

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Sophorolipids (SL), a glycolipid class of microbial bio-surfactants have been used for greener and environment compatible synthesis of gold nanoparticles (AuNPs) in this study. Various parameters like concentration of SL, pH and temperature were optimized for synthesis of nanoparticles. Initially, SL was used as reducing and capping agent for the synthesis of gold nanoparticles from chloroauric acid under different conditions. Since the synthesis procedure required several hours and poly-dispersity of these nanoparticles was very high, therefore protocol was modified by adding sodium borohydride as reducing agent to address issues. Characterizations of sophorolipid mediated gold nanoparticles (AuNPs-SL) were performed using UV-visible spectroscopy, dynamic light scattering (DLS), FTIR and transmission electron microscopy (TEM). Capping of SL onto the AuNPs was confirmed by FTIR and TEM micrograph. Further, AuNPs-SL was checked for antimicrobial activity against bacteria such as Gram negative *Vibrio cholerae*, Gram positive *Staphylococcus aureus* and fungi *Candida albicans*. The standard dilution method was used to determine the minimum inhibitory concentration (MIC) and viability was checked by XTT assay. AuNPs-SL was found to be effective against all these microbes as MICs. Earlier reports suggest that, SL either does not show activity or requires very high concentration against Gram negative bacteria. Contrary to this, we found AuNPs-SL was very potent in killing *V. cholerae* also. Thus, this study helps in greener ecofriendly synthesis of nano-sized particles with potential antimicrobial properties for both Gram negative and Gram positive bacterium which are of great interest in the development of newer therapeutic drugs.

Biography

Sristy Shikha is currently pursuing her PhD under the guidance of Dr. Mani Shankar Bhattacharyya at Institute of Microbial Technology (IMTECH), Chandigarh, India. After completing her MSc in Marine Biotechnology from Annamalai University, she joined IMTECH for PhD. Her PhD work is focused on synthesis of various types of nanoparticles, conjugation of drug/enzyme to enhance activity as compared to their unconjugated counterpart and developing their applications. Part of her work has been published in Microbial Cell Factories and some are in communication.

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