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Extracellular generation of silver nanoparticles using *Fusarium solani* MH005062

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The mechanism of biological generation of silver nanoparticles (SNP) is still not fully understood with most studies merely providing detailed information describing the mechanism by which fungi reduce AgNO_3 into SNP. In our work, we demonstrate that proteins are mainly involved in the myco-generation of SNP. Fifty-three and 27 fungal isolates were obtained from *Padina* (brown algae) and *Avicennia marina* (leaves) marine samples and were assessed for SNP generation using fungal supernatants. Fifty out of 80 isolates were found to be positive for SNP generation. Due to the lack of researches discussing the exact mechanism by which *Fusarium solani* (an important plant pathogen) can generate SNP intra/extracellularly, it was selected in this study. *Fusarium solani* isolate was purified using single-spore isolation technique then molecularly identified by amplifying internal transcribed spacer (ITS), ITS1 and ITS2 sequences surrounding the 5.8S rRNA. The ITS sequence was deposited in the GenBank with an accession number: MH005062. Mycelia of *F. solani* MH005062 were challenged with different concentrations of AgNO_3 , extracellular proteins were estimated by Bradford assay and results confirmed that the observed silver reduction reaction is dependent upon proteins secreted by the fungus. Fungal filtrate of four-day cultures was treated with 1 mM AgNO_3 which resulted in SNP production as detected using UV-Vis spectroscopy, and characterized by TEM, HR-TEM and X-ray diffraction. Two particles forms were noted with an average size of 7.58 ± 0.27 and 30.5 ± 1.10 nm. SNP generation was optimized using different parameters. Here, we show that heat treatment eliminated SNP generation. Our findings support the hypothesis that extracellular proteins have a key role in SNP formation, although those proteins are yet to be identified.

Keywords: Extracellular proteins, fungal filtrate, *Fusarium solani*, marine samples, Silver nanoparticles.

Biography

Marwa R. Obiedallah is currently an assistant lecturer of Microbiology at Faculty of Science, University of Sohag, Egypt. She has MSc in mycotoxins (2011), and gained wide experience in fungal natural products and mycotoxins during her study. She was offered a scholarship from the Egyptian cultural affairs and missions sector for her PhD project at the at School of Biological Sciences, University of Reading, UK, where she had the opportunity to improve her skills and experience. She is a postgraduate member at the British Mycological Society (2017-2019). Her research interests now is focusing on nanotechnology, where she is paying attention for the mechanism by which fungal species can generate nanoparticles of their metal salts. She believes that he findings will direct future researches for proteome studies of promising fungal isolates.

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