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Antimicrobial potential of Trichoderma-fused silver nanoparticles against pathogenic bacterial and fungal strains**Abhishek Mathur¹, Bina Pani Gupta² and Vandana Shrivastava³**¹Environmental Biotech & Engineering Co., India²Himalayan University, India³I.T.S Dental College, India

The genus *Trichoderma* and its metabolites are meant for antimicrobial activity against the microbial strain and thus it is considered to be natural antimicrobial agents. Silver is also known as an antimicrobial agent and is utilized in several antimicrobials and medications. In the present investigation, the nanoparticles were prepared both of *Trichoderma* and Ag⁺ separately and further fused *Trichoderma* and Ag⁺ nanoparticles were also prepared. *Trichoderma harzianum* secretes secondary metabolites which act as a capping and reducing agent. The biosynthesized silver nanoparticles (AgNps) were characterized by UV-Vis spectroscopy and transmission electron microscopy (TEM). UV-Vis spectra of silver and *Trichoderma* nanoparticles showed absorption spectra at 450 nm and 430 nm, respectively while fused nanoparticles showed absorption spectra at 415 nm corresponding to the surface Plasmon resonance of silver nanoparticles. The size and morphology of the fused nanoparticles was determined by TEM, which shows the formation of spherical nanoparticles in the size range of 8-24 nm. The *Trichoderma*-fused silver nanoparticles were assessed against pathogenic microorganisms viz., *Staphylococcus aureus*, *Acinetobacter baumannii*, *Bacillus cereus*, *Escherichia coli*, *Salmonella Typhi* (PTCC 1609), *Pseudomonas aeruginosa*, *Aspergillus niger* and *Candida albicans*. The antimicrobial effect of silver nanoparticles against the pathogenic microorganisms was varied. Yet *Salmonella Typhi* followed by *Pseudomonas aeruginosa*, were more sensitive and *Acinetobacter baumannii* was relatively less sensitive. In addition, the antimicrobial effect of *Trichoderma*-fused silver nanoparticles is dependent not only on the chemical property (such as formation of free radical) but also depended on their shapes and sizes.

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