Silver nanoparticles (AgNPs) are notable antimicrobial agents. However, their productions via physical procedures generally consume high energy leading to elevation of manufacturing cost, while chemical approaches, which are more popular processes, usually generate toxic wastes. Thus, we here introduced a cost-effective and eco-friendly biosynthetic method for AgNP production by employing fungal filtrate of *Aspergillus niger* as a bio-reducing agent. By using UV-vis spectrophotometry, XRD, TEM, FESEM, and DLS analysis, the formation of spherical-shaped AgNPs with 1-50 nm metal core size and 20–150 nm hydrodynamic diameter was verified. Additionally, these biosynthesized AgNPs showed a promising antibacterial activity against *Escherichia coli* and *Staphylococcus aureus*. To further develop the AgNP usage, the catechol-based hypercrosslinked polymer (HCP) was used as a protective support to preserve the AgNPs. The encapsulation of AgNPs into the HCP was confirmed by EDX, FESEM, and TEM. The antibacterial evaluation of AgNP-encapsulated HCP (AgNP-HCP) indicated a great bactericidal activity of this material suggesting a potential use in disinfection treatments.

Reference: