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Enzymatic formation of gold nanoparticles by submerged culture of the basidiomycete *Lentinus edodes*

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Highlights

- *Lentinus edodes* can reduce Au(III) from $HAuCl_4$ to Au(0), forming nanoparticles
- Au(0) accumulated on the surface and within the hyphae as 5-50 nm nanospheres
- The fungal phenol oxidases were found to be involved in the Au reduction

A B S T R A C T

We report for the first time that the medicinal basidiomycete *Lentinus edodes* can reduce Au(III) from chloroauric acid ($HAuCl_4$) to elemental Au [Au(0)], forming nanoparticles. Several methods, including transmission electron microscopy, electron energy loss spectroscopy, X-ray fluorescence, and dynamic light scattering, were used to show that when the fungus was grown submerged, colloidal gold accumulated on the surface of and inside the mycelial hyphae as