Electronic Supplementary Material (ESI) for RSC Advances

Biomimetic Synthesis of Nanocrystalline Silver Sol using Cysteine: Stability Aspects and Antibacterial Activities

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Supporting Information

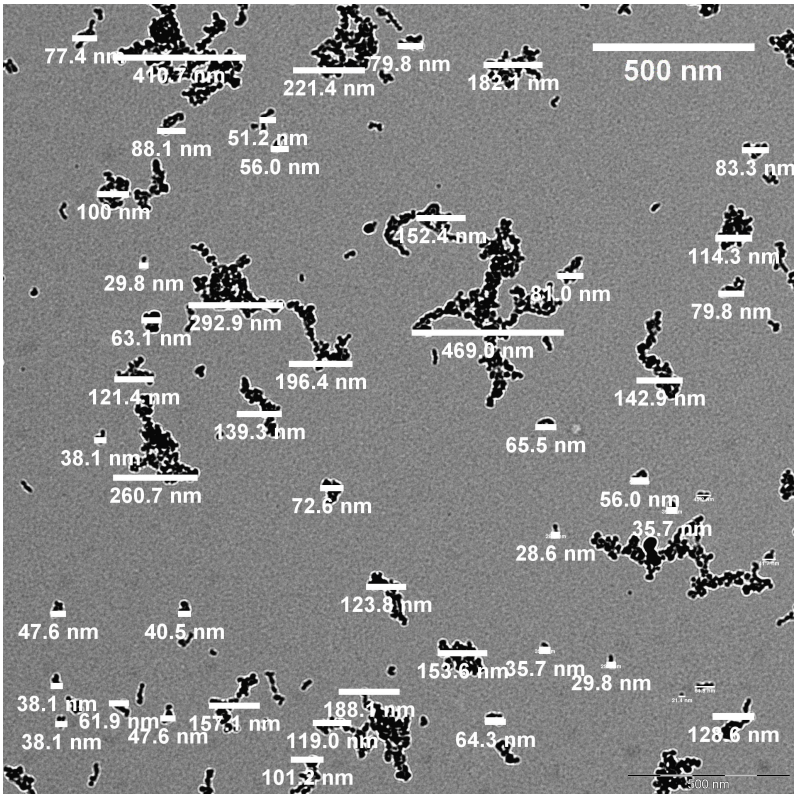

Fig. S1 Estimation of hydrodynamic diameters of the nanoparticles in sample C.

UV-Vis data (Supplementary information)

Table-SI OD data of bacterial cultures supplemented with different dose of Ag nanoparticles after overnight incubation.

Remarks	Ag (μg/ml)	OD	$OD/OD_{control}$
Control	0	1.16	1
	2.16	0.89	0.77
	3.24	0.22	0.19
MIC	4.32	-0.01 (Not reliable)*	-0.01

**Fluctuations observed at MIC*

MATERIAL METHODS

Methodogy adopted for Gravimetric estimation of yield

First empty polycarbonate tubes were weighed. Then a fixed volume of sample C (produced from 1mM $AgNO_3$ and 0.1mM of cysteine) was taken in those tubes and centrifuged using Beckman Optima^{TM} LE-80K ultracentrifuge at 30,000g for 30min at a time. The silver sol was washed several times with water and air dried. Finally, weight of the tubes along with silver nanoparticles was taken.

Methodogy adopted for atomic absorption spectroscopic (AAS) determination of yield

Sample C produced from 1mM $AgNO_3$ and 0.1mM of cysteine was centrifuged and the silver nanoparticles were separated by decantation of the liquid. 5ml of the discarded solution was diluted to 20ml and analyzed by AAS [Chemito AA 203].

Methodology adopted for determining MIC and MBC.

The bacteria cells are inoculated in nutrient broth and allowed to grow overnight at 37°C in an orbital shaker at 150rpm. At this stage, the culture exhibits an OD ~1. Plating of such culture with adequate dilution is done to determine the average number of cells. 50µl of such culture containing ~ 5x 10^8 colony forming units/ml of *E. coli* is inoculated in 5ml of the medium supplemented with various dose of Ag-nps ranging from 1.08-8.64 µg/ml. MIC value is determined by the lack of visual turbidity after overnight incubation at 37°C in an orbital shaker at 150rpm . Absence of growth, upon plating (after appropriate serial dilutions) followed by 24h of incubation at 37°C, of Ag supplemented bacteria inoculated broth, gives the minimum bactericidal concentration. It may be noted that the initial culture from which inoculum was obtained had a cell count of ~ 5x 10^8 colony forming units per ml for *E. coli.* Approximately similar inoculum was used for other bacteria tested. MIC values for different bacteria are indicated in the manuscript.

Comparative note on our MIC values with the existing literature

Some authors have reported inhibition of growth of *E.coli* by Ag-nps at concentration of 25µg/ml (Srivastava *et. al.*) or 60µg/ml (Gong et al). In another report Ag-nps at concentration, as high as 100µg/ml, could only exhibit delaying of bacterial growth due to the low colloidal stability of the silver sol (Sondi et al). In comparison, cysteine capped Ag-nps was able to inhibit bacterial growth at a concentration of 4.32µg/ml.

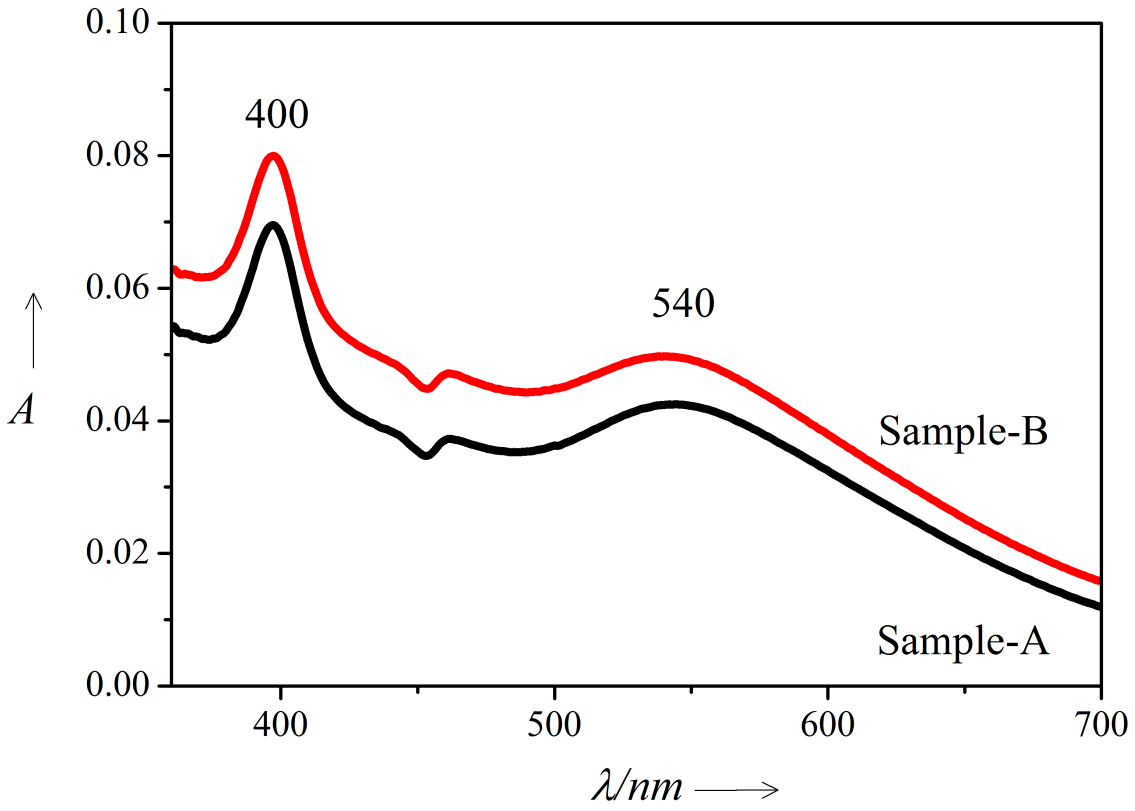

Fig. S2 UV-Vis spectra of sample A and B recorded after ageing.

References

S. Shrivastava, T. Bera, A. Roy, G. Singh, P. Ramachandrarao and D. Dash, *Nanotechnology*, 2007, **18,** 225103 (9pp).

P. Gong, H. Li, X. He, K. Wang, J. Hu, W. Tan, S. Zhang and X. Yang *Nanotechnology* 2007, **18**, 285604 (7pp).

I. Sondi and B. Salopek-Sondi, *Journal of Colloid and Interface Science*, 2004, **275**, 177-182.