Green one step morphosynthesis of silver nanoparticles and their antibacterial and anticancerous activities

Dipanwita Maity [a], Sutanuka Pattanayak [b], Md. Masud Rahaman Mollick [a], Dipak Rana [c], Dibyendu Mondal [a], Biplab Bhowmick [a], Sandeep Kumar Dash [d], Sourav Chattopadhyay [d], Balaram Das [d], Somenath Roy [d], Mukut Chakraborty [b,*], Dipankar Chattopadhyay [a,*]

[a] Department of Polymer Science and Technology, University College of Science and Technology, University of Calcutta, 92 A.P.C. Road, Kolkata-700009, India

[b] Department of Chemistry, West Bengal State University, Barasat, Kolkata-700126, India

[c] Department of Chemical and Biological Engineering, Industrial Membrane Research Institute, University of Ottawa, 161 Louis Pasteur St., Ottawa, ON, KIN 6N5, Canada

[d] Immunology and Microbiology Laboratory, Department of Human Physiology and Community Health, Vidyasagar University, Midnapore-721102, India

* Corresponding author at: Tel: +91-33-2350-1397, 6996, 6387, and 8386;

Fax:+91-033-2351-9755; *E-mails*: dipankar.chattopadhyay@gmail.com, mukutchem@yahoo.co.in

Supporting Information

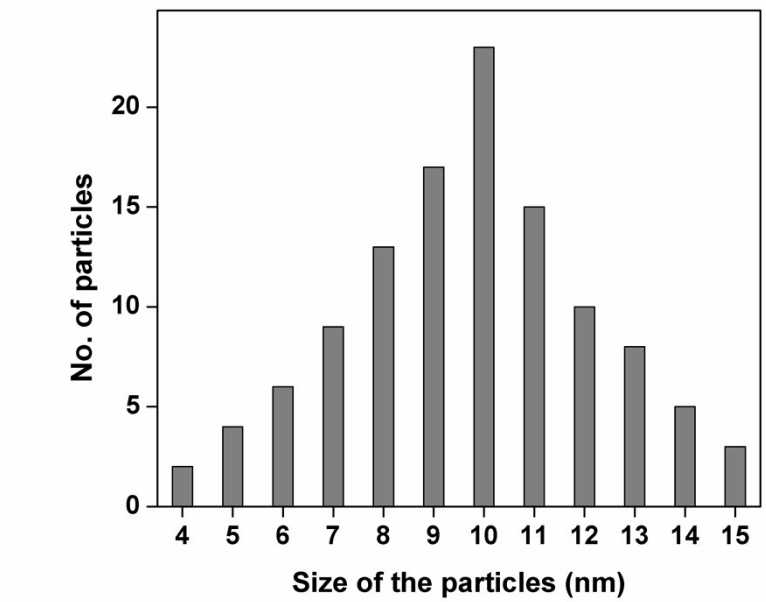

Fig. S1

Particle size distribution histogram is determined by counting nanoparticles.

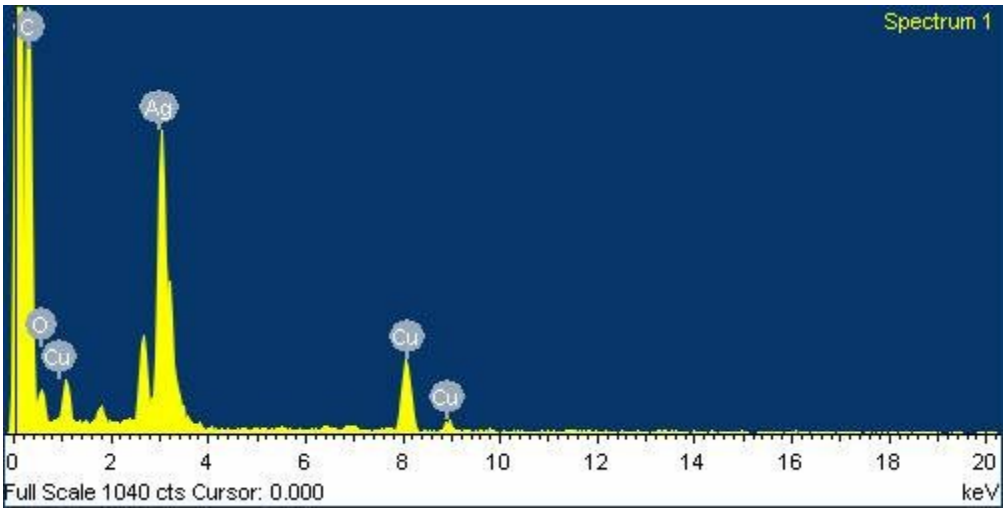

Fig. S2

Energy-dispersive spectroscopy (EDS) of AgNPs obtained at concentration of sodium cholate of 8 mM and AgNO3 concentration of 1 mM

Bacterial Strains	Particles	Results		
		MIC(µg/ml)	MBC(µg/ml)	DAD(mm)
E.coli (MC 4)	Ag NPs	64	128	50 µg/ml – 8.66±0.33* mm 100 µg/ml - 13.56±0.51* mm
S. aureus (MMC 20)	Ag NPs	32	64	100 µg/ml - 17.36±0.47 * mm 50 µg/ml – 9.53±0.48 * mm

Table 1.

Antibacterial activity of Ag NPs on multi drug resistant *E. coli* strain (MC 4) and multi drug resistant *S. aureus* strain (MMC 20). Here: MIC: Minimum inhibitory concentration; MBC: Minimum Bactericidal Concentration, and DAD: Disc agar diffusion.

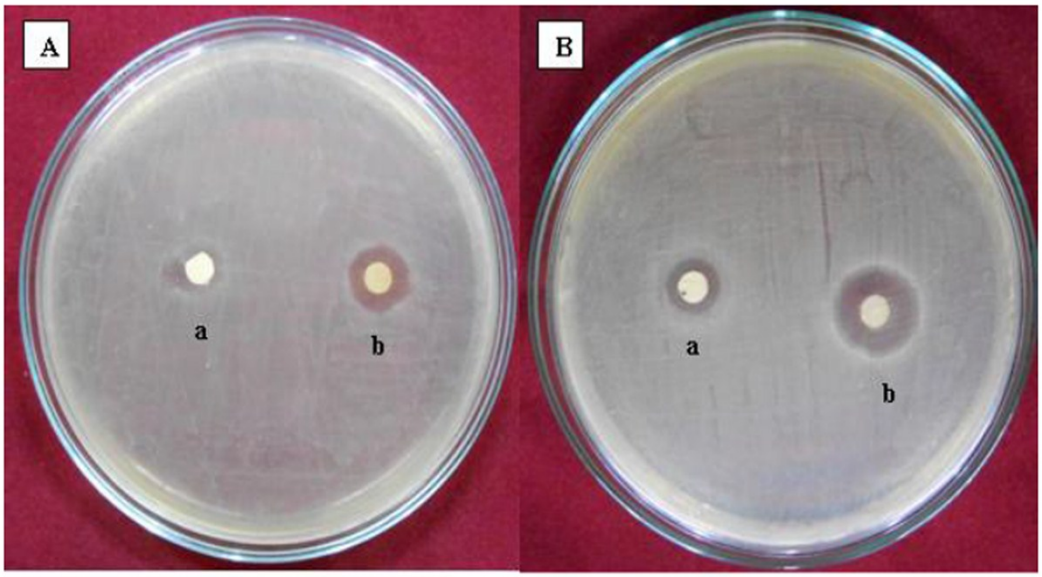

Fig. S3

Anti-microbial sensitivity pattern of Ag NPs by disc agar diffusion method. Here, **A**: Disc agar diffusion pattern of multi drug resistant *E.coli* strain and **B**: Disc agar diffusion pattern of multi drug resistant *S. aureus* strain. All strains were exposed to 50 (**a**) and 100 (**b**) µg Ag NPs containing disc and subsequently incubated for 24 hr at 37ºC. Inhibition zones were recorded by using zone scale.

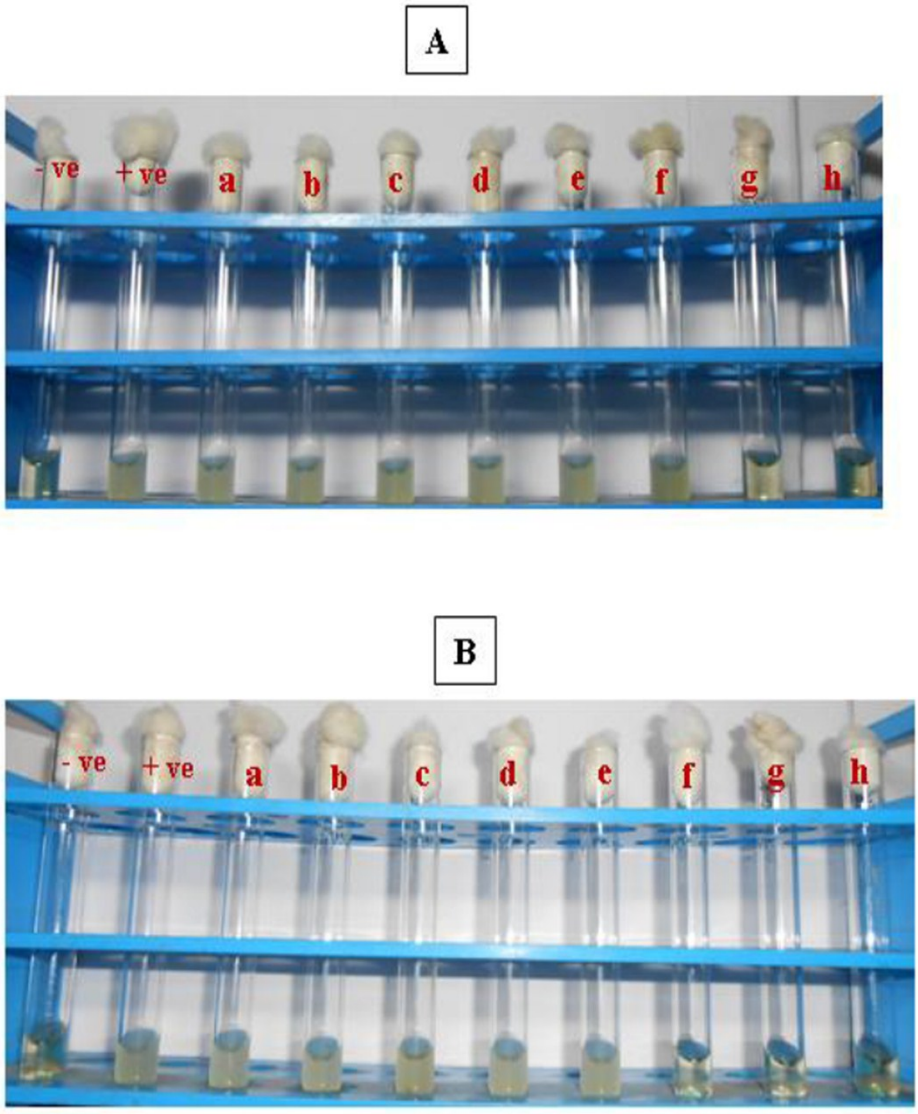

Fig. S4

Figure A. Determination of MIC value of Ag NPs for multi drug resistant E. coli strain. MIC of Ag NPs for MC 4 isolate was 64 µg/mL. Here, -ve : negative control, + ve : positive control, a : 1 µg/mL, b : 2 µg/mL, c: 4 µg/mL, d : 8 µg/mL, e: 16 µg/mL, f: 32 µg/mL, g: 64 µg/mL, h: 128 µg/mL.

Figure B. Determination of MIC value of Ag NPs for multi drug resistant S. aureus strain. MIC of Ag NPs for MMC 20 isolate was 32 µg/mL. Here, -ve : negative control, + ve : positive control, a : 1 µg/mL, b : 2 µg/mL, c: 4 µg/mL, d : 8 µg/mL, e: 16 µg/mL, f: 32 µg/mL, g: 64 µg/mL, h: 128 µg/mL.

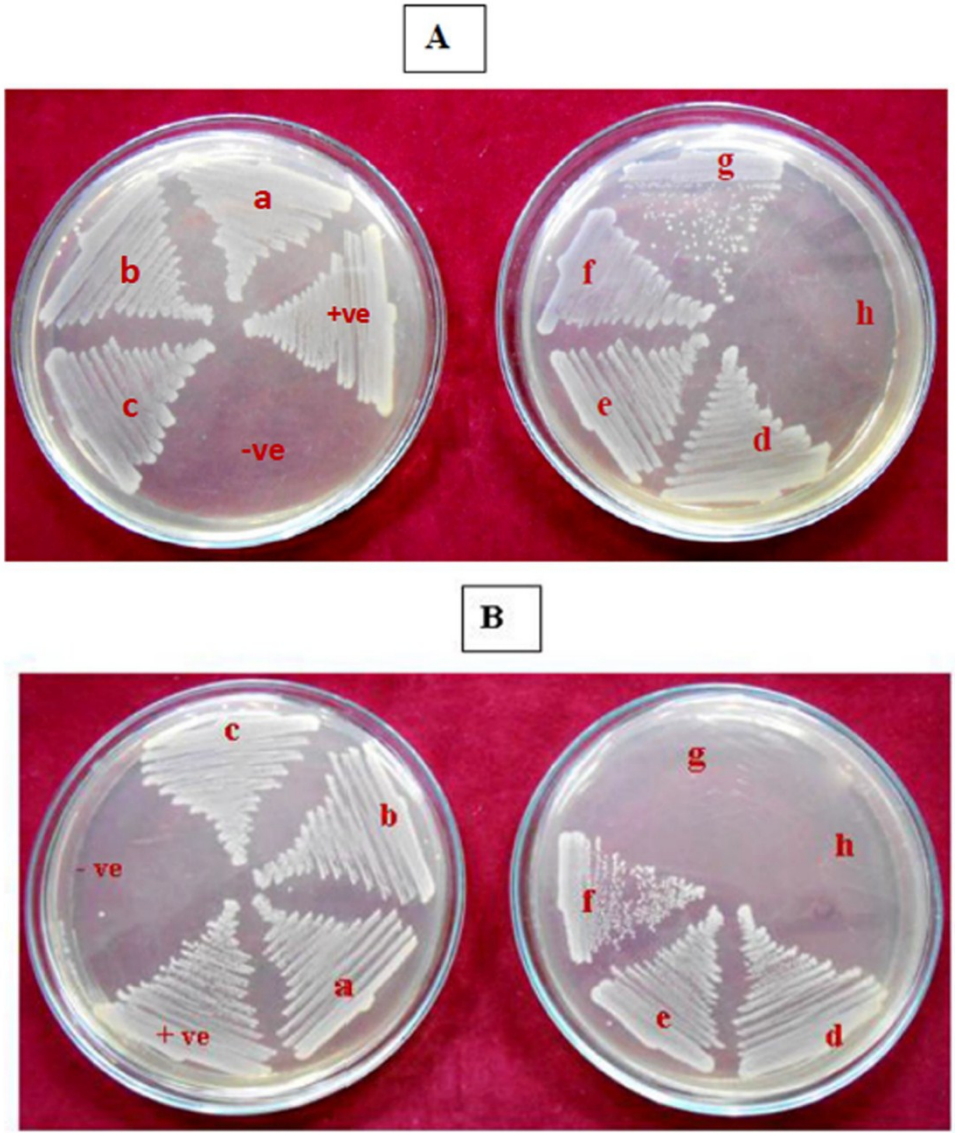

Fig. S5

Figure A. Determination of MBC value of Ag NPs for multi drug resistant *E. coli* strain. MBC of Ag NPs for MC 4 isolate was 128 µg/mL. Here, -ve : negative control, + ve : positive control, a : 1 µg/ mL, b : 2 µg/ mL, c: 4 µg/ mL, d : 8 µg/ mL, e: 16 µg/ mL, f: 32 µg/ mL, g: 64 µg/ mL, h: 128 µg/mL.

Figure B. Determination of MBC value of Ag NPs for multi drug resistant *S. aureus* strain. MBC of Ag NPs for MMC 20 isolate was 64 µg/mL. Here, -ve : negative control, + ve : positive control, a : 1 µg/ mL, b : 2 µg/ mL, c: 4 µg/ mL, d : 8 µg/ mL, e: 16 µg/ mL, f: 32 µg/ mL, g: 64 µg/ mL, h: 128 µg/mL.