Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Hybrid silver-gold nanoparticles suppress drug resistant polymicrobial biofilm formation and intracellular infection

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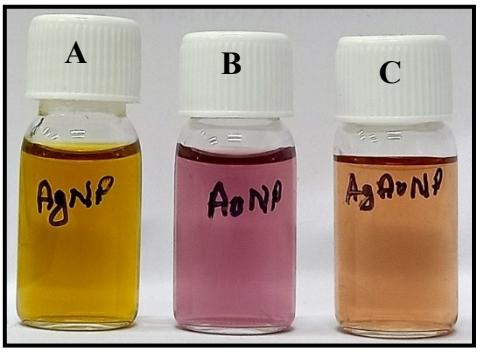
Supplementary Information

S1: Synthesis of gold and silver nanoparticles.

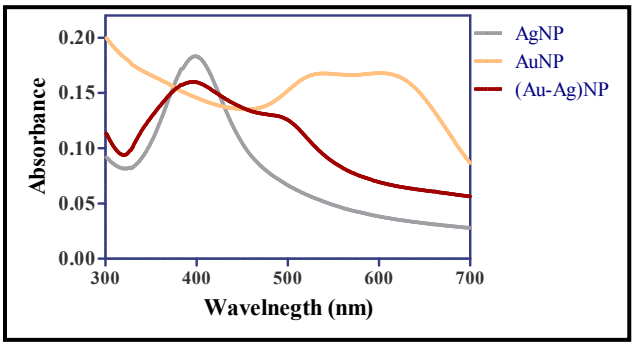
10ml of 1 mg/ml solution of $HAuCl_4$ or $AgNO_3$ was heated to 50°C. To this 10ml of 200 µg/ml solution of quercetin in 10 mM NaOH was added. Color change of solution occurred instantly to wine red for gold nanoparticles and brown for silver nanoparticles. The reaction was kept for 8 hours at RT with stirring to allow complete reduction.



S1: Showing color difference in (A) silver, (B) gold and (C) silver gold nanoparticles

S2: Synthesis of gold and silver nanoparticles.

UV visible spectrum of silver nanoparticle shows peak around 400nm and that of gold nanoparticles shows peak around 500nm. Similar peaks are observed as with bimetallic hybrid AgAu Nanoparticles as shown in figure below.

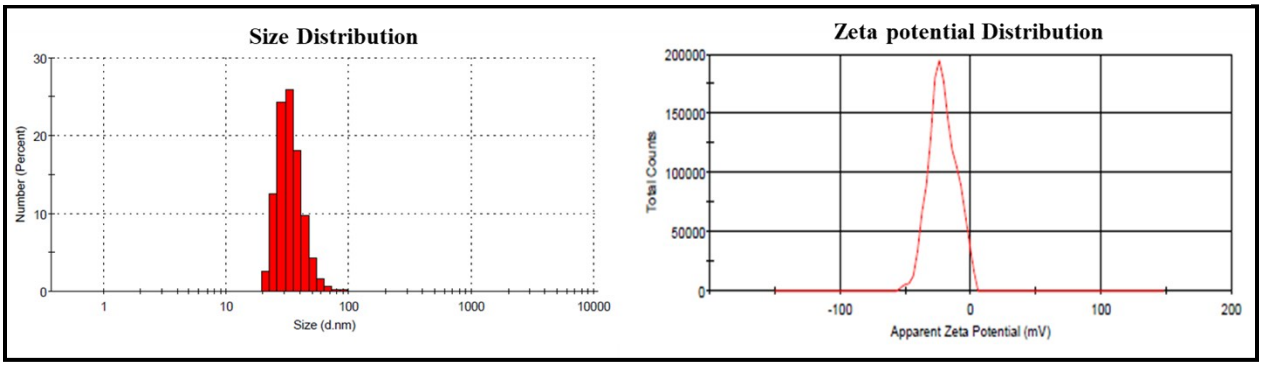


S2: UV spectra of Ag, Au and AgAu nanoparticles.

S3: Size distribution and zeta potential of bimetallic nanoparticles.

Representative data for showing hydrodynamic diameter by DLS and zeta potential of hybrid silver gold nanoparticles. Wide size distribution range was observed with average size of 40±10 nm.

S3: Size distribution and zeta potential of AgAu nanoparticles



S4: Comparison of MIC and MBC of hybrid nanoparticles with silver nanoparticles and gold nanoparticles.

Table below shows MIC and MBC of silver nanoparticles, gold nanoparticles and hybrid bimetallic nanoparticles against drug resistant bacteria, it is clearly evident from MIC/MBC values that hybrid silver gold nanoparticles have lower MIC/MBC as compared to silver alone. Gold nanoparticles, though did not show any antimicrobial effect, but when present in hybrid

Bacteria (ATCC)		MIC (µg/ml)			MBC (µg/ml)		
		AgNPs	AgNPs	AuAgNPs	AgNPs	AuNPs	AuAgNPs
G+	*Staphylococcus aureus* (25923)	100	>200	10	100	>200	20
	Methicillin Resistant S.aureus (43300)	100	>200	20	100	>200	20
	Vancomycin resistant Enterococci (51299)	100	>200	20	100	>200	40
G-	*Escheria coli* (25922)	25	>200	5	50	>200	10
	Pseudomonas aeruginosa (27853)	12.5	>200	5	25	>200	10
	Klebsiella pneumoniae K6 (700603)	100	>200	10	100	>200	20
Mix	*P. aeruginosa* + *S.aureus*	100	>200	20	100	>200	20

S4: MIC and MBC of Ag nanoparticles, Au nanoparticles and hybrid AgAu nanoparticles

nanoparticles enhanced the efficacy of silver nanoparticles.