

Supplementary Information

for

Green and Facile Synthesis of Pullulan-Stabilized Silver and Gold Nanoparticles for the Inhibition of Quorum Sensing

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Table S1. Medium components used in the production of Pullulan biopolymer (pH=6.5).

Component	Sucrose	(NH ₄) ₂ SO ₄	Yeast extract	K ₂ HPO ₄	MgSO ₄ ·7H ₂ O	NaCl	MnCl ₂
g/L	50	0.6	0.4	5	0.2	0.1	0.01

Table S2. The maximum pullulan production by *A. Pullulans* 201253.

Incubation Conditions	Amount of Polysaccharide Produced (g/L)	Amount Produced Pullulan (g/L)	Resulting Biomass Amount (g/L)
pH 7.5, 28°C, 200 rpm, 5% glucose, 1% yeast extract, 3 days of incubation time	42.8	32.89	17.89

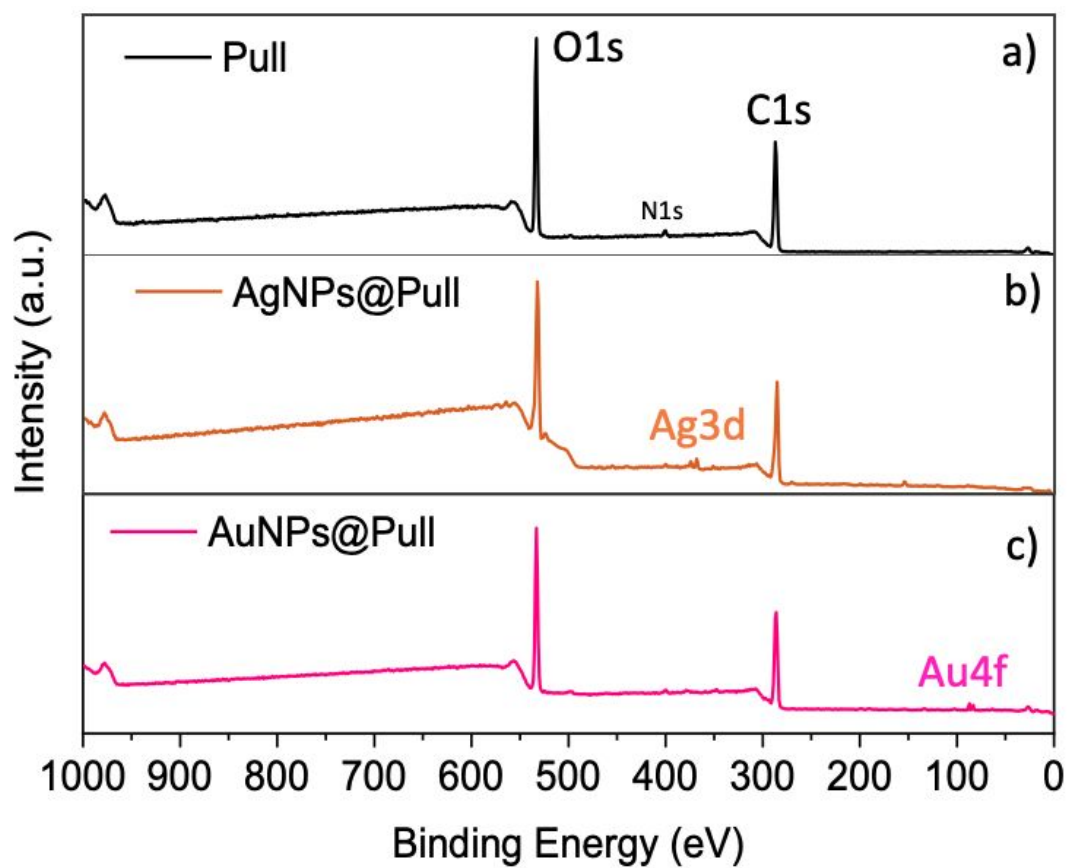


Figure S1. XPS survey wide scans of (a) Pull, (b) AgNPs@Pull and (c) AuNPs@Pull.

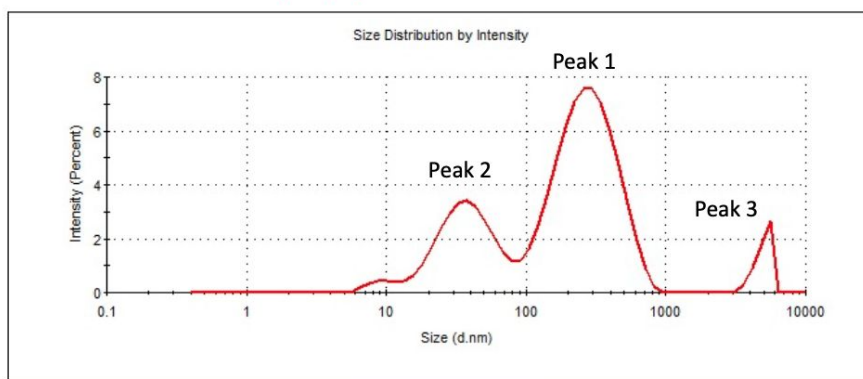
a)

Temperature (°C): 25,0
 Count Rate (kcps): 182,2
 Cell Description: Disposable sizing cuvette

Duration Used (s): 70
 Measurement Position (mm): 4,65
 Attenuator: 8

	Size (d.nm):	% Intensity:	St Dev (d.nm):
Z-Average (d.nm): 108,4	Peak 1: 289,9	66,4	139,6
Pdl: 0,824	Peak 2: 38,97	26,3	16,46
Intercept: 0,847	Peak 3: 4995	5,5	613,1

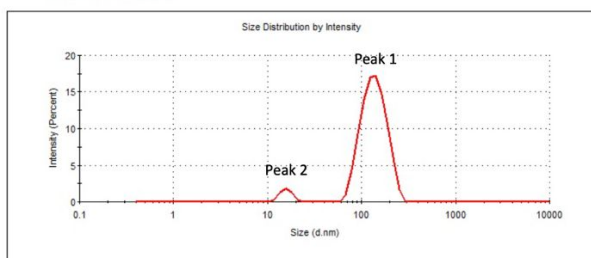
Result quality : Refer to quality report



b)

	Size (d.nm):	% Intensity:	St Dev (d.nm):
Z-Average (d.nm): 114,4	Peak 1: 139,7	95,0	40,61
Pdl: 0,255	Peak 2: 15,87	5,0	2,289
Intercept: 0,915	Peak 3: 0,000	0,0	0,000

Result quality : Good



c)

	Size (d.nm):	% Intensity:	St Dev (d.nm):
Z-Average (d.nm): 91,27	Peak 1: 134,8	88,3	54,16
Pdl: 0,272	Peak 2: 30,57	11,7	7,066
Intercept: 0,886	Peak 3: 0,000	0,0	0,000

Result quality : Good

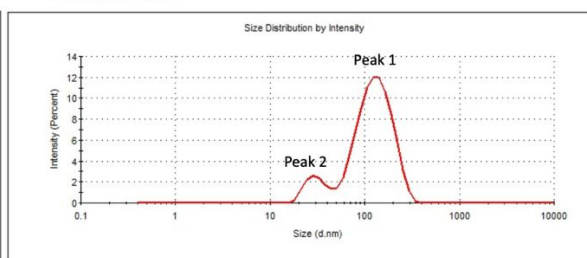


Figure S2. Particle size distributions by DLS in 0.1 mg/mL solution in DI water at 25 °C: (a) Pull, (b) AgNPs@Pull and (c) AuNPs@Pull.

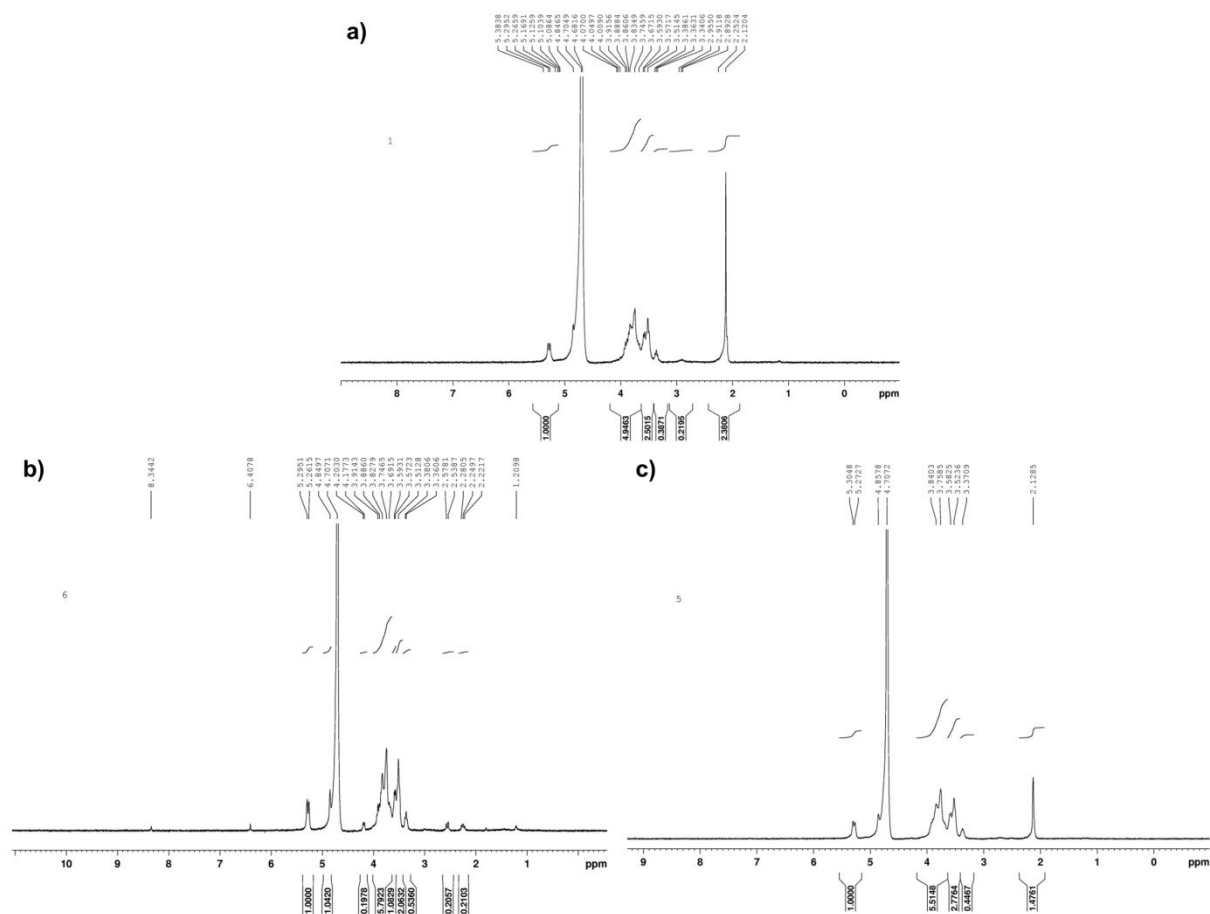


Figure S4. ¹H-NMR spectra of (a) Pull, (b) AgNPs@Pull and (c) AuNPs@Pull. The peak at around 2.2 ppm corresponds to acetone as internal standard.

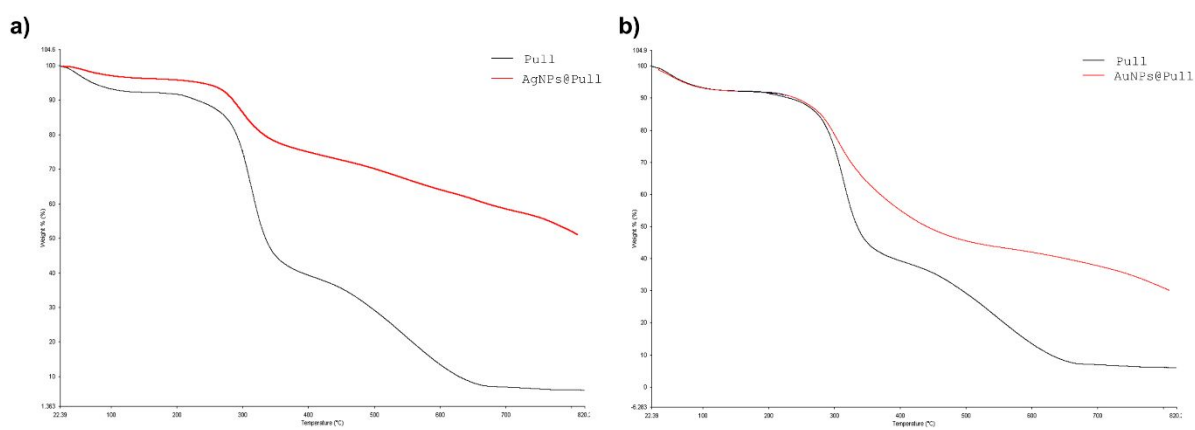


Figure S5. TGA graphs of (a) Pull and AgNPs@Pull and (b) Pull and AuNPs@Pull.

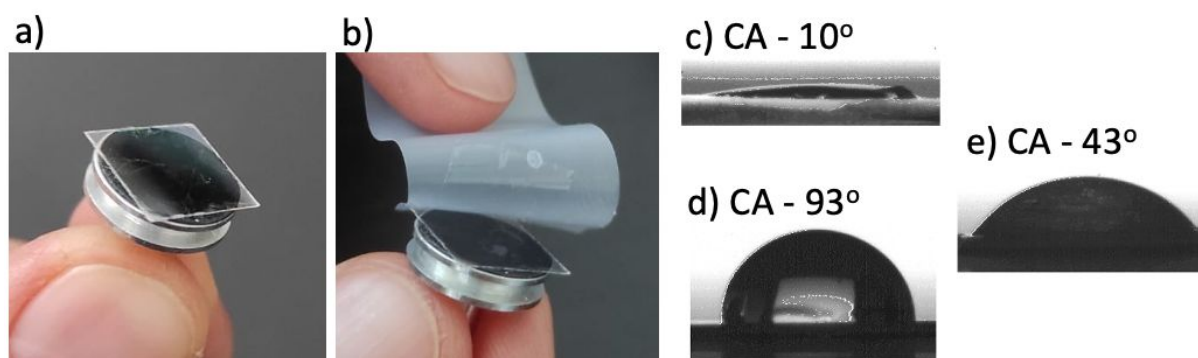


Figure S6. (a) Bulk mica surface on an SEM grid, (b) Preparation of fresh/clean mica surface by removing a flake of mica from the surface of bulk mica with the help of an adhesive tape, (c) Contact Angel (CA) of mica surface, (d) CA of ETFE surface, (e) CA of ETFE-g-PSSA (grafting degree: 54%).

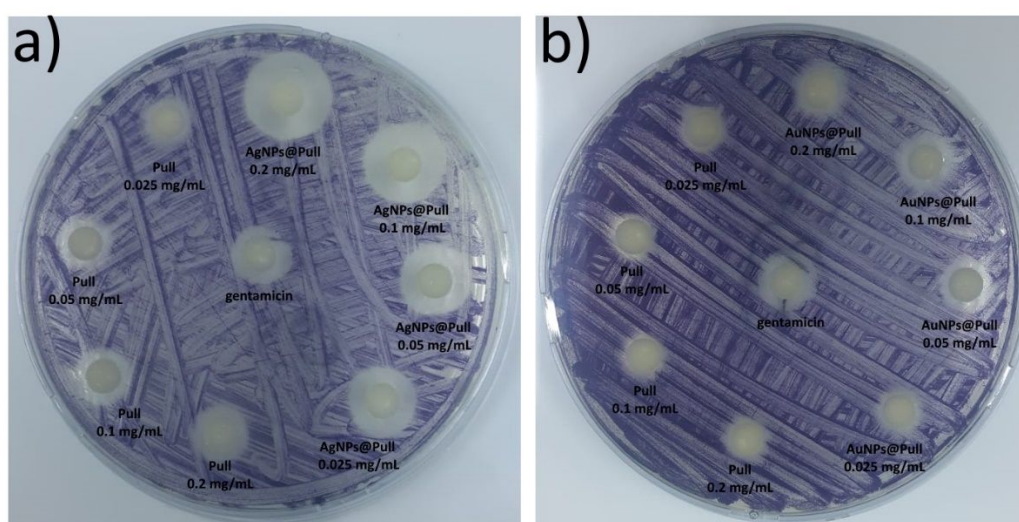


Figure S7. Petri plate images of anti-quorum sensing assay for (a) AgNPs@Pull and (b) AuNPs@Pull. Pristine Pull at four different concentrations (0.2, 0.1, 0.05 and 0.025 mg/mL) and commercial antibiotic gentamicin as control were applied along with NPs-decorated Pull (0.2, 0.1, 0.05 and 0.025 mg/mL). The disc diffusion test was carried out by dose dependent manner on bio-formation of violacein signal molecule (C6-HSL) inhibition against reporter strain as *C. violaceum* CV026. A typical photo of the petri plates for each nanoparticle was displayed.

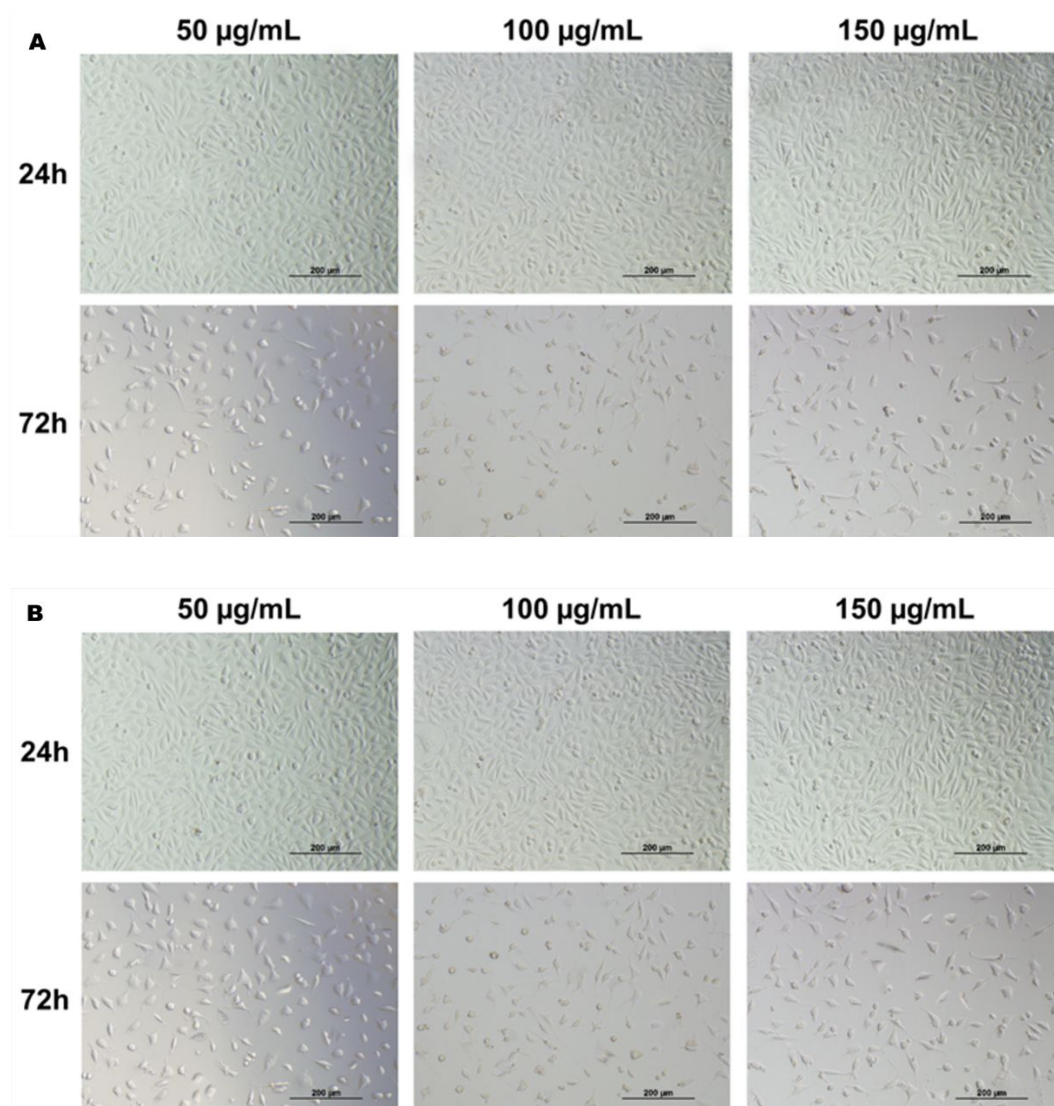


Figure S8. Live cell time-lapse imaging of L-929 cells exposed to AgNPs@Pull (A) and AuNPs@Pull (B). Fluorescence microscopy images at 24 and 72 h taken from L-929 cells exposed to 50, 100, 150 $\mu\text{g}/\text{mL}$ of 200 nm NPs. Microphotographs were taken with a Leica inverted fluorescent microscope.