

# Electronic Supplementary Information

## **A Portable SERS Sensor for Pyocyanin Detection in Simulated Wound Fluid and through Swab Sampling**

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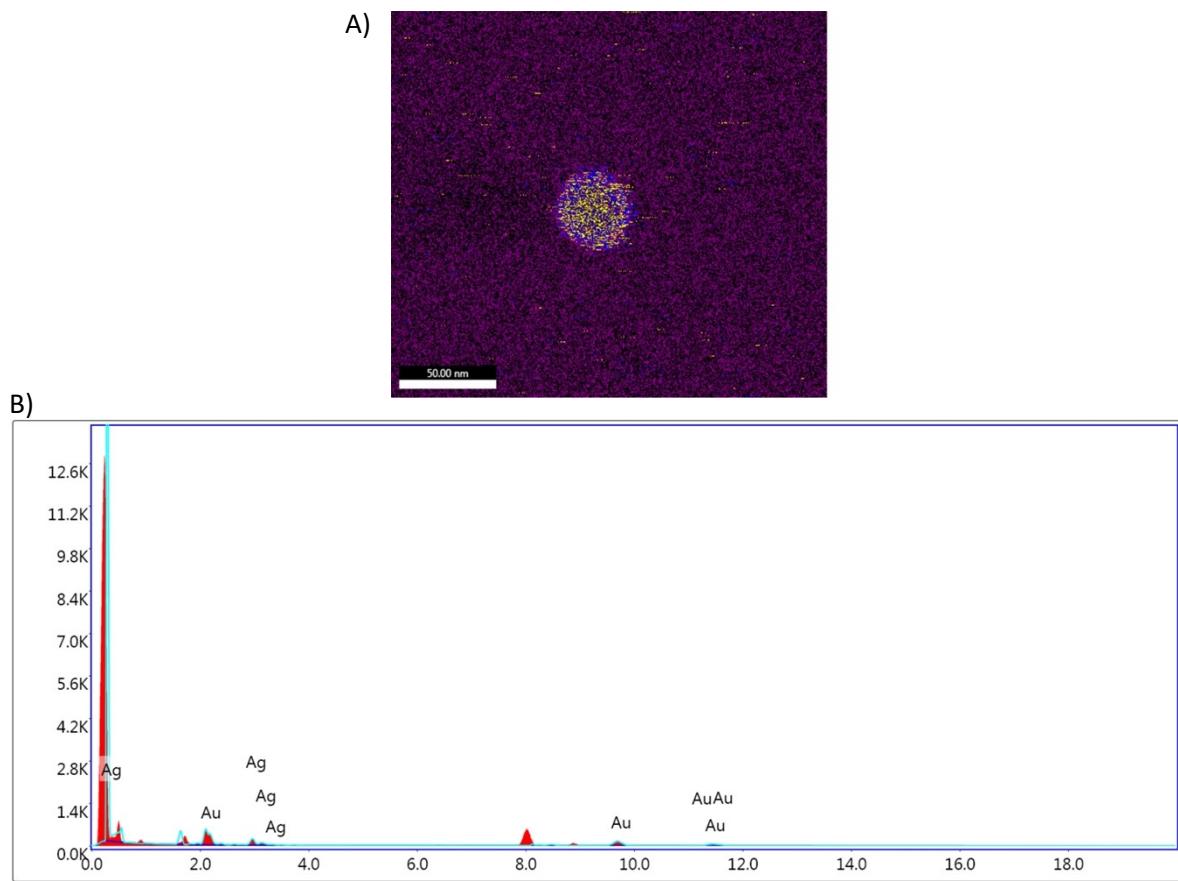


Figure S1 Elemental mapping of AgAuNP. A) Blue region represents Ag atoms and yellow regions represents Au atoms. B) Elemental composition of AgAuNP.

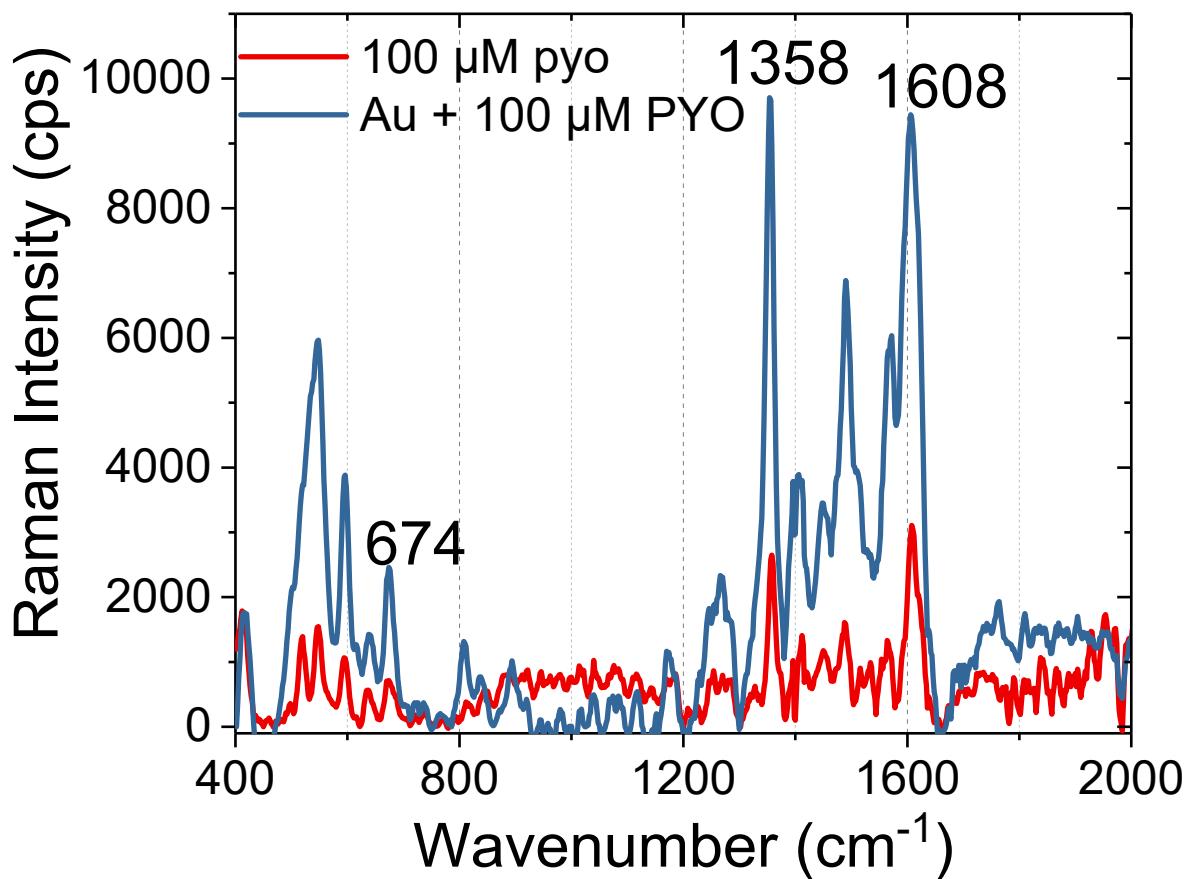


Figure S2. Raman spectra of 100  $\mu$ M PYO without (red) and with AuNP (blue) in 5% SWF.

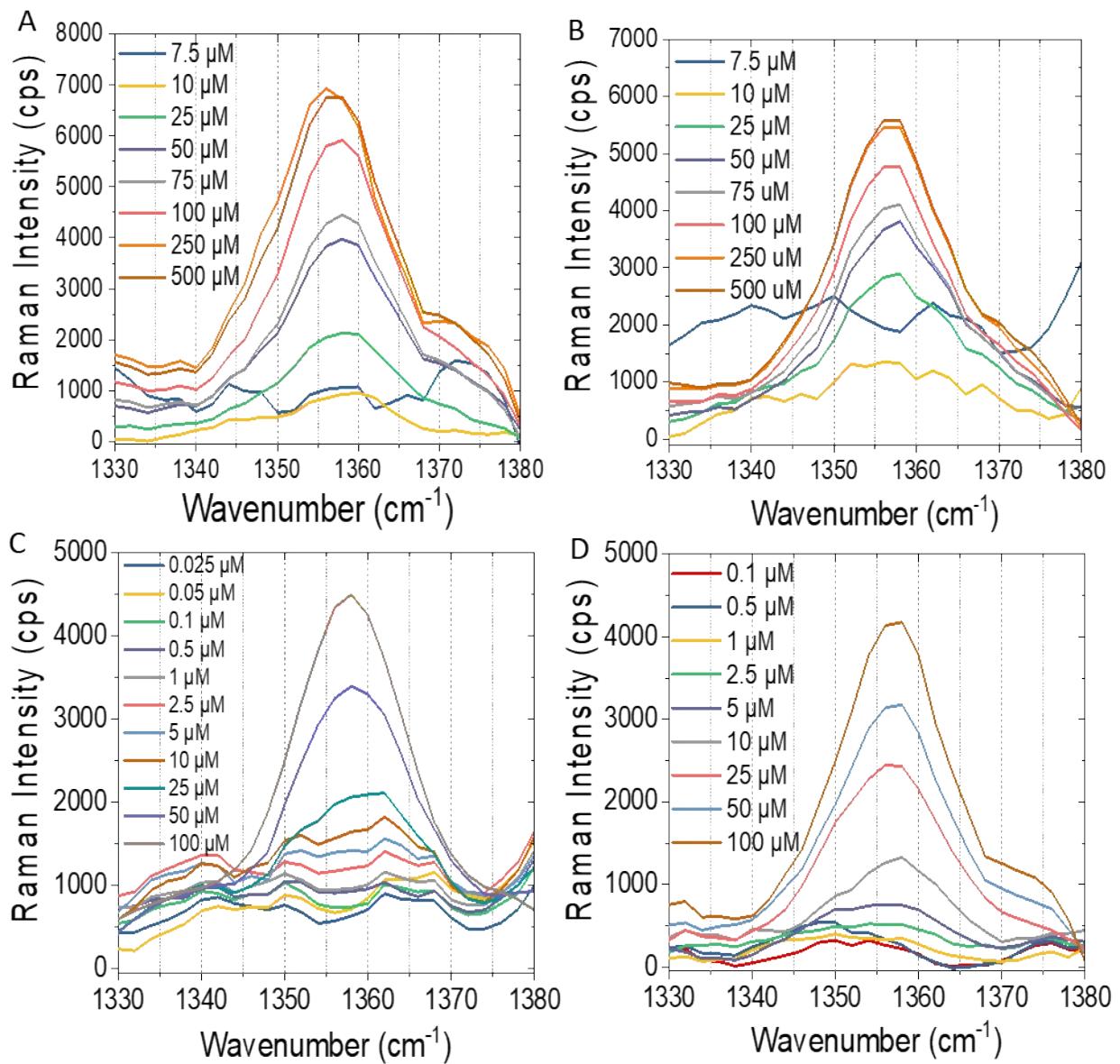


Figure S3. PYO Raman peak of 1358  $\text{cm}^{-1}$  varying concentrations enhanced by (A) AuNP in 5% SWF, (B) AuNP in 40% SWF, (C) AgAuNP in 5% SWF, and (D) AgNP in 5% SWF

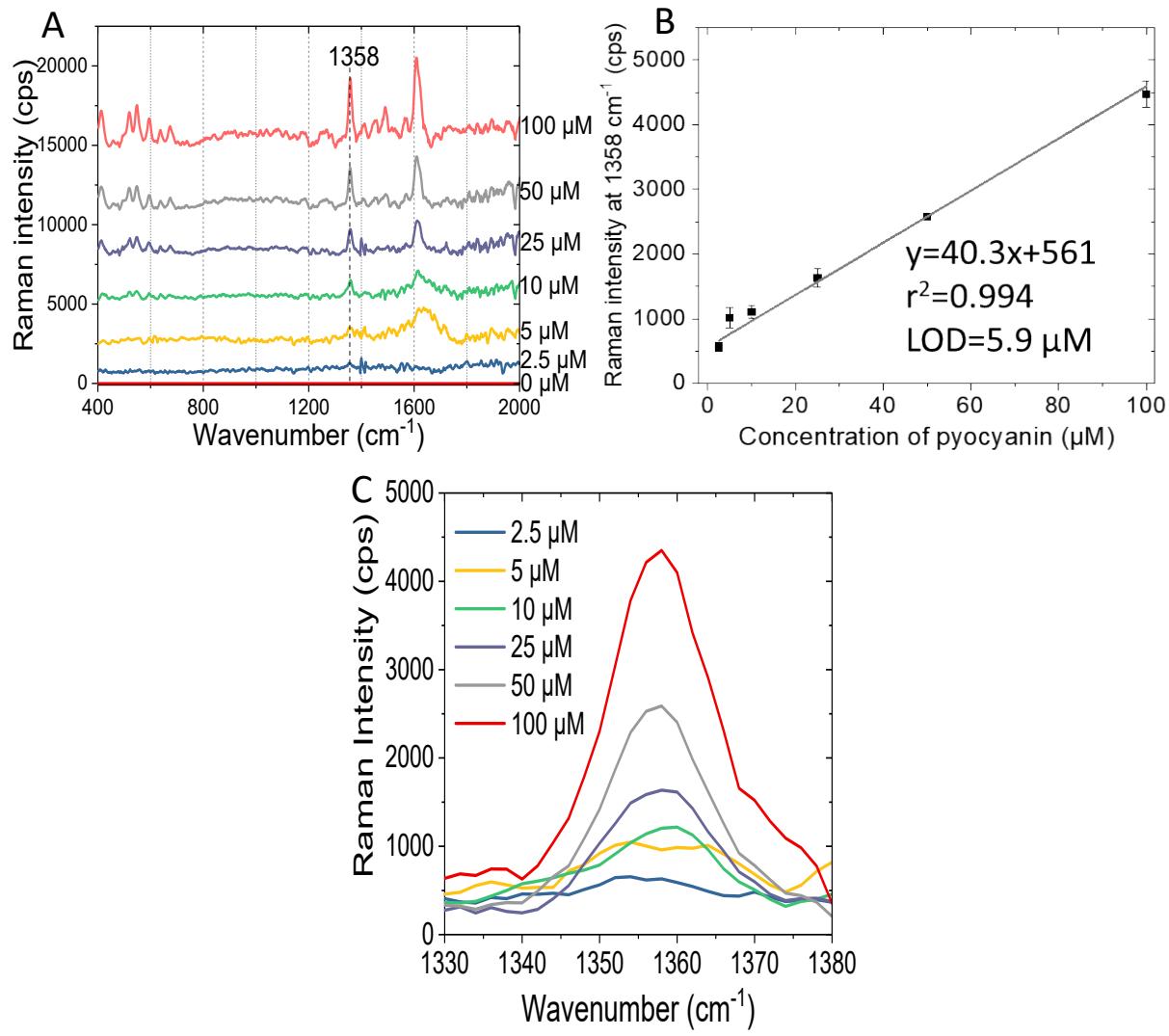


Figure S4. (A) 3 nM AgNP-enhanced Raman spectrum of PYO from 2.5  $\mu\text{M}$  to 100  $\mu\text{M}$  in 5% SWF. (B) linear calibration curve from 2.5 to 100  $\mu\text{M}$  (C) PYO Raman peak of 1358  $\text{cm}^{-1}$  varying concentrations enhanced by 3 nM AgNP in 5% SWF.

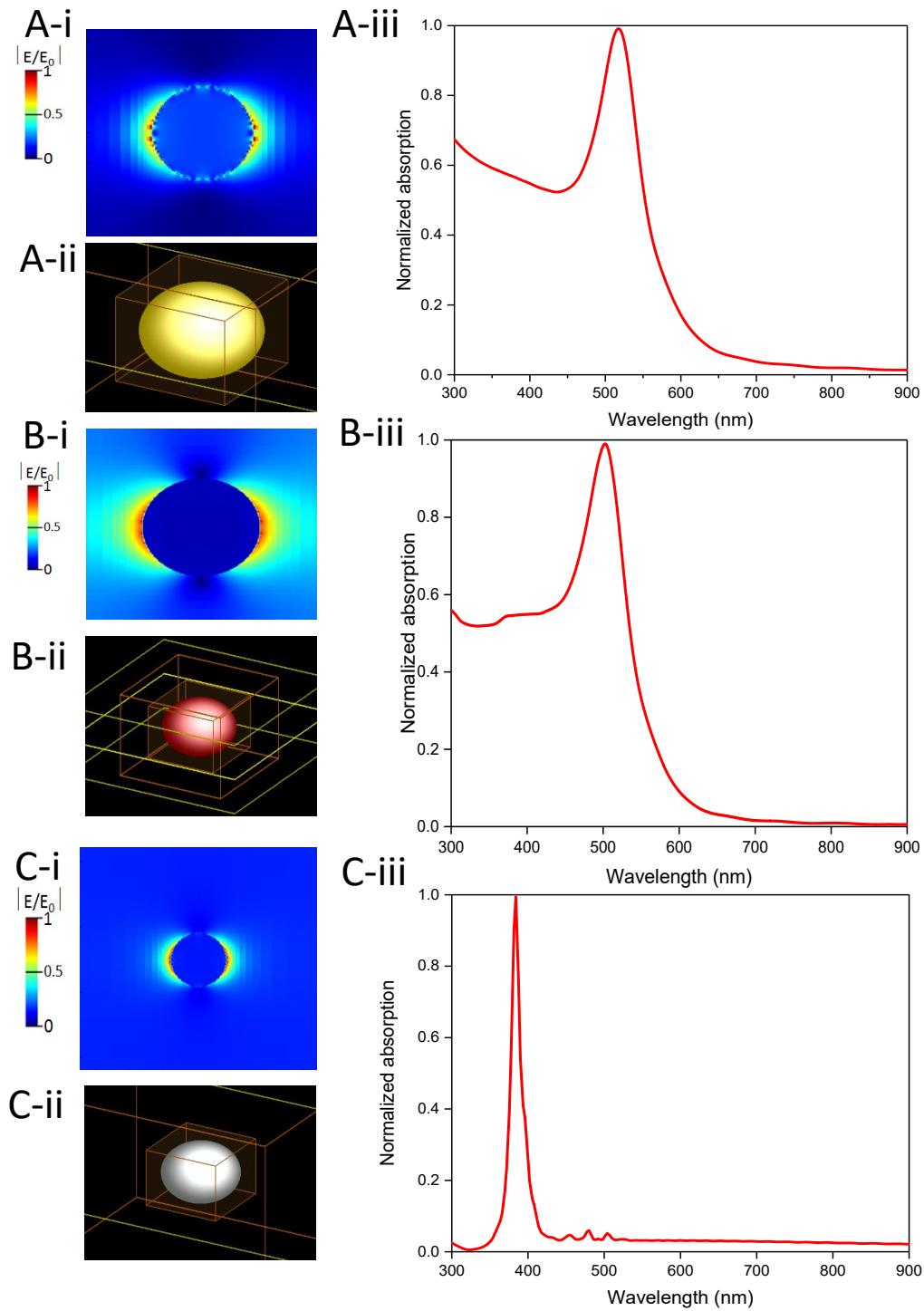


Figure S5. Simulation of the surface plasmonic resonance around (A) AuNP, (B) AgAuNP, and (C) AgNP in 5% SWF. (i) Model of the nanostructures used for simulation; (ii) Graphical representations of potential fluctuations of electrical field on the surface of respective metal NP (iii) Simulated absorption spectrum of the respective metal NP.

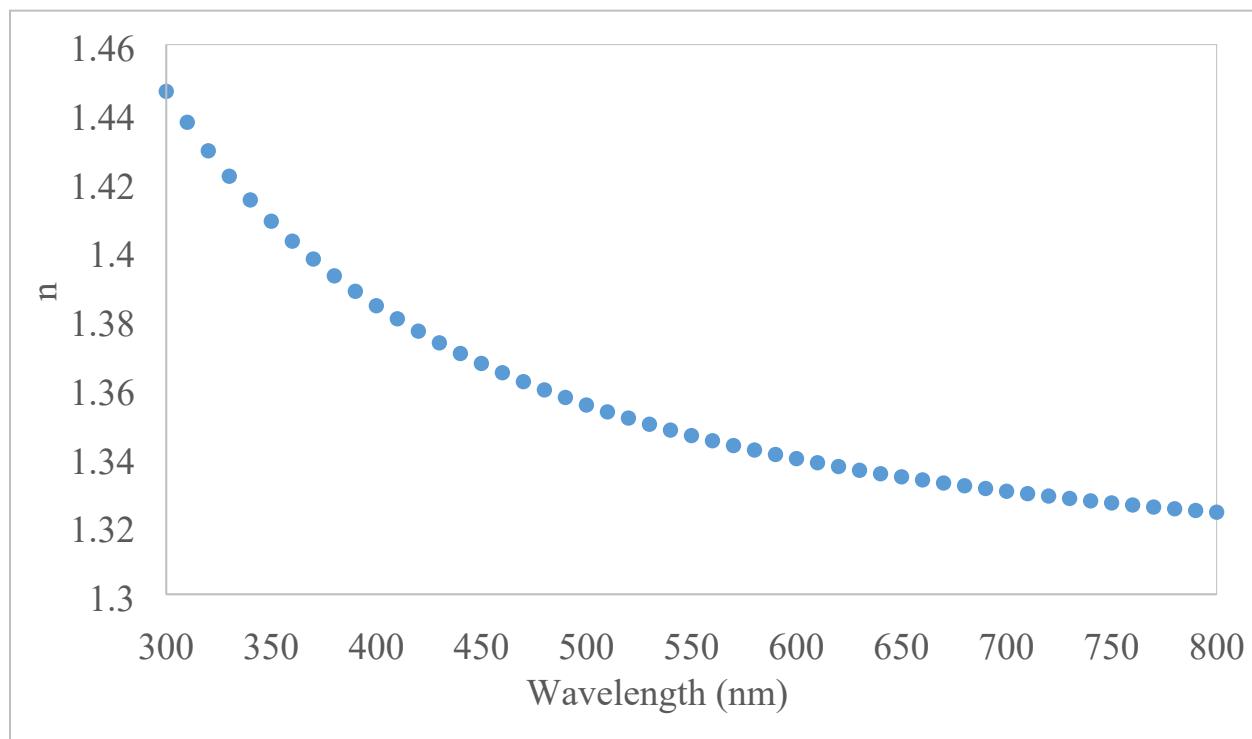


Figure S6. Refractive index of a 5% SWF solution.

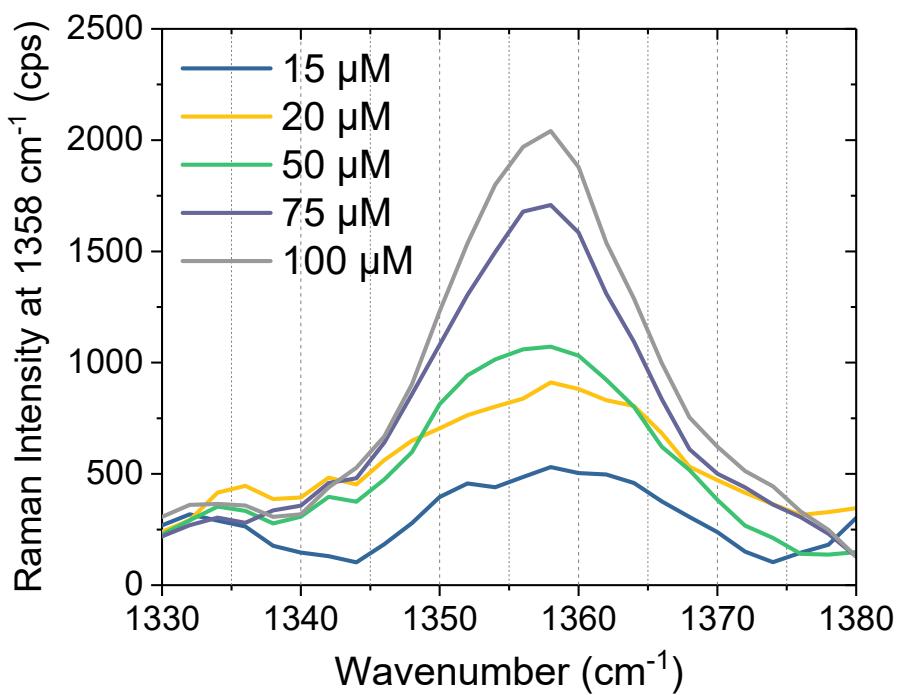
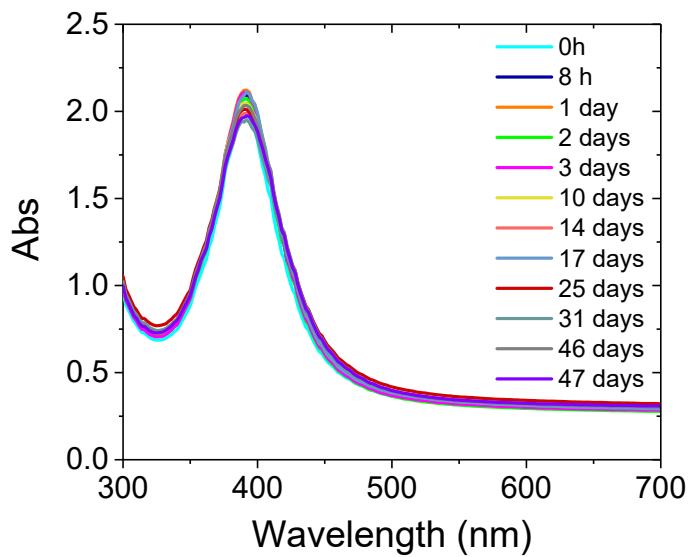


Figure S7. PYO Raman peak of  $1358\text{ cm}^{-1}$  varying concentrations enhanced by AgNP after swab collection and transfer.



**Figure S8.** Absorbance spectrum of AgNP over time.



Figure S9. Image of *P. Aeruginosa* colony ( $10^7$  CFU/ml) cultured in SWF/TSB.

## Sensitivity calculations of metal NP

Sensitivity may be expressed as power per unit area.

The surface area of a spherical NP may be expressed as  $4\pi r^2$

-For AuNP, peak absorbance power =  $0.22 \times 10^{-2}$  W

$$\text{Power per unit area for AuNP} = 0.22 \times 10^{-2} / (4\pi(7.5)^2) = 3.1 \times 10^{-6} \text{ W/nm}^2$$

-For AgAuNP, peak absorbance power = 0.132 W

$$\text{Power per unit area for AgAuNP} = 0.132 / (4\pi(14.65)^2) = 4.9 \times 10^{-5} \text{ W/nm}^2$$

-For AgNP, peak absorbance power = 0.51 W

$$\text{Power per unit area for AgNP} = 0.51 / (4\pi(4.1)^2) = 2.4 \times 10^{-3} \text{ W/nm}^2$$