Electronic Supplementary Material (ESI) for Analytical Methods.

Supplementary Information

A paper-based point-of-care device for the detection of cysteine using gold nanoparticles from the whole blood

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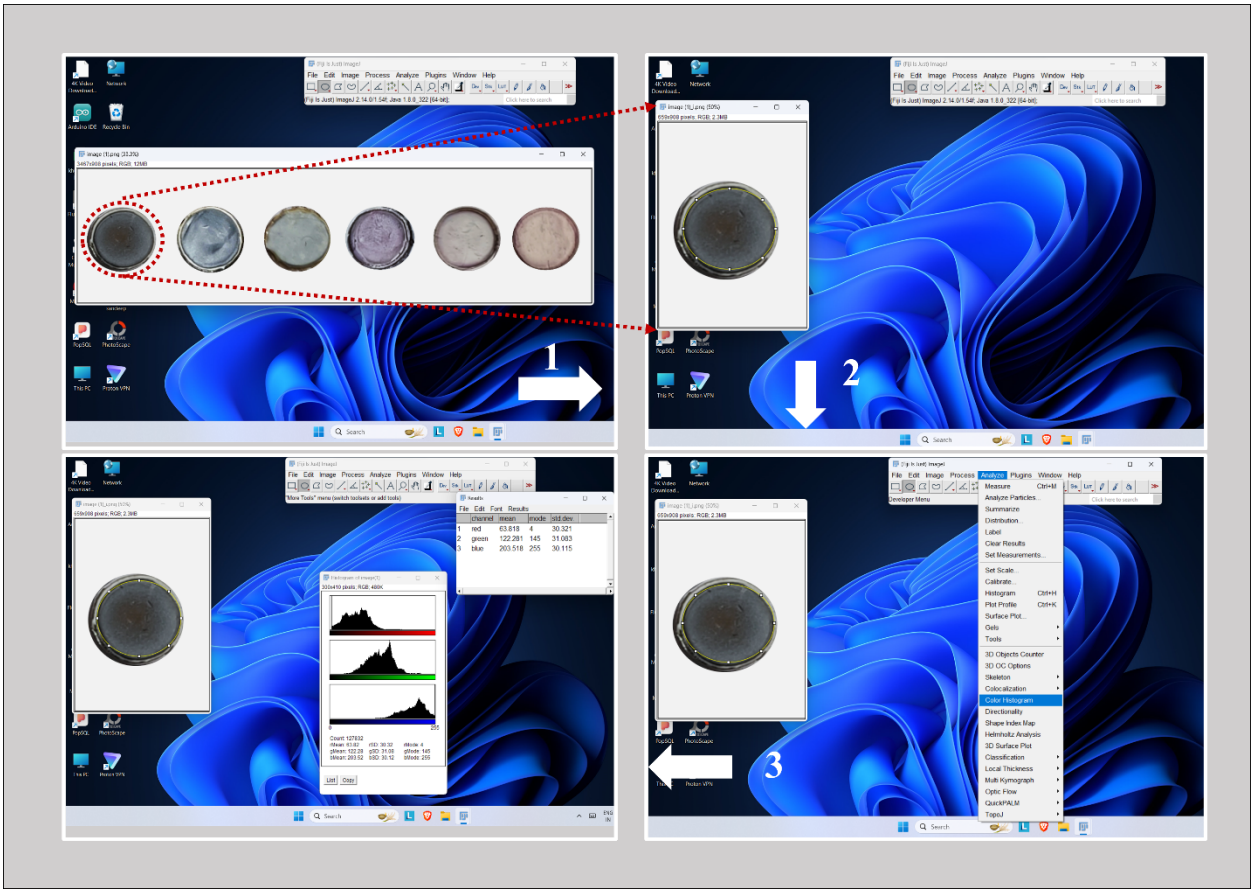


Fig. S1 Snapshots of the steps for the colorimetric analysis of smartphone images using Image J software perform the colorimetric analysis.

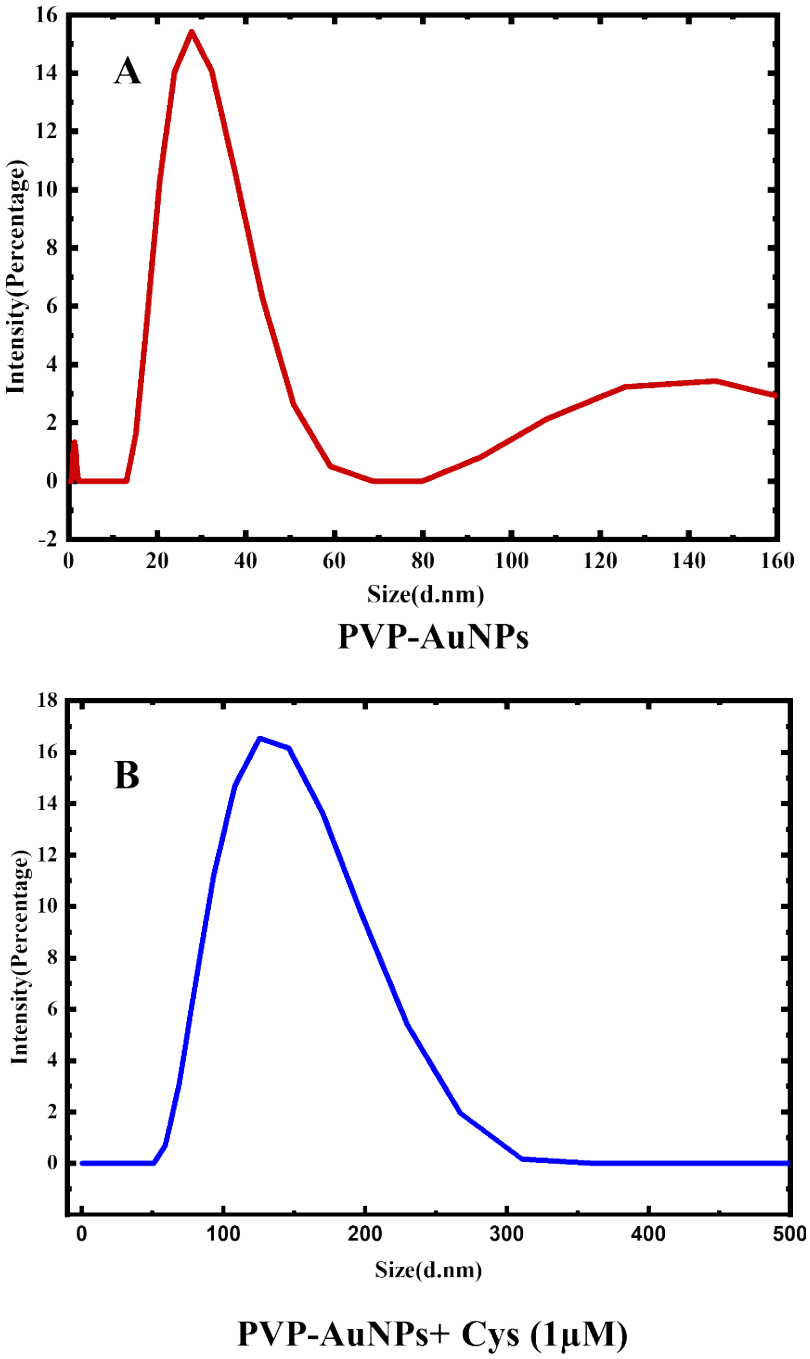
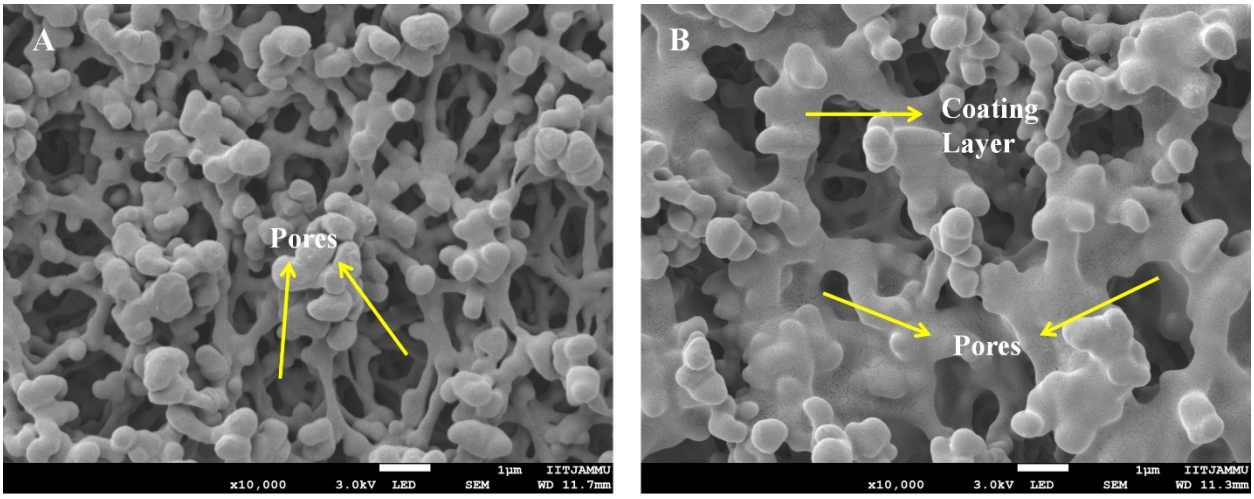


Fig. S2 Dynamic light scattering (DLS) of the synthesized (A) PVP-AuNPs and (B) PVP-AuNPs with 1µM Cysteine. It can be clearly observed that PVP-AuNPs show a small diameter of size nearly 31.76 nm as compared to Cys (1µM) which is 124.8nm in size conjugated with PVP-AuNPs.



Un-treated paper substrate **Pre-treated paper substrate**

Fig. S3 Field Emission Scanning Electron Microscopy (FE-SEM) images of (A) blank PES Paper substrate (B) Pre-treated PES paper modified with 1% PVA followed by 2% BSA solution showing evident coating over the paper fibers.

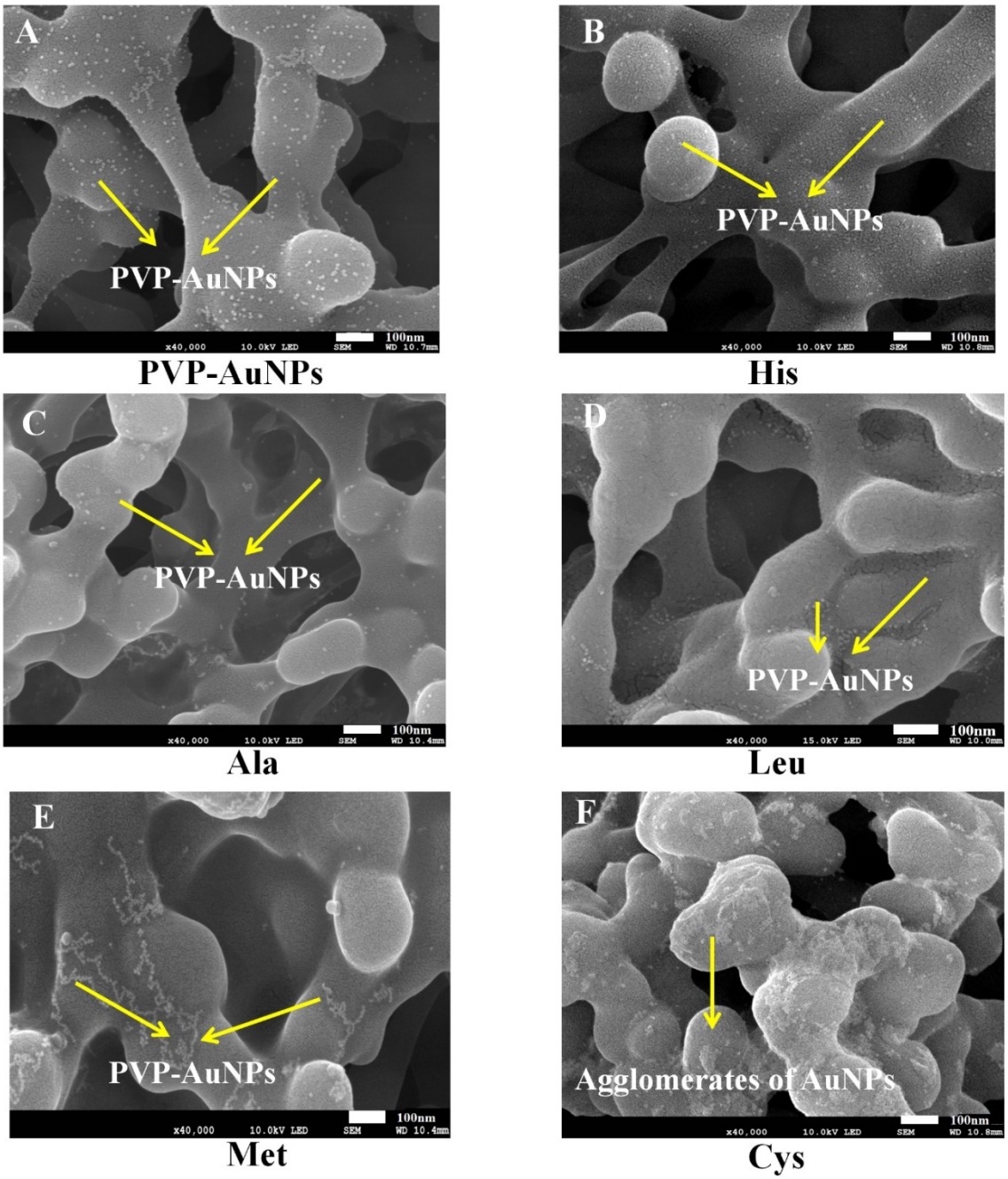


Fig. S4 FE-SEM images of (A) PVP-AuNPs deposited on the paper substrate. (B) His (C) Ala (D) Leu showing no reactivity with the PVP-AuNPs (E) Met shows PVP-AuNPs alignment due to thiol group however, no significant agglomeration was observed (F) The presence of Cys leads to agglomeration over the paper surface even at lower concentration of other amino acids thus indicating selectivity towards Cys.

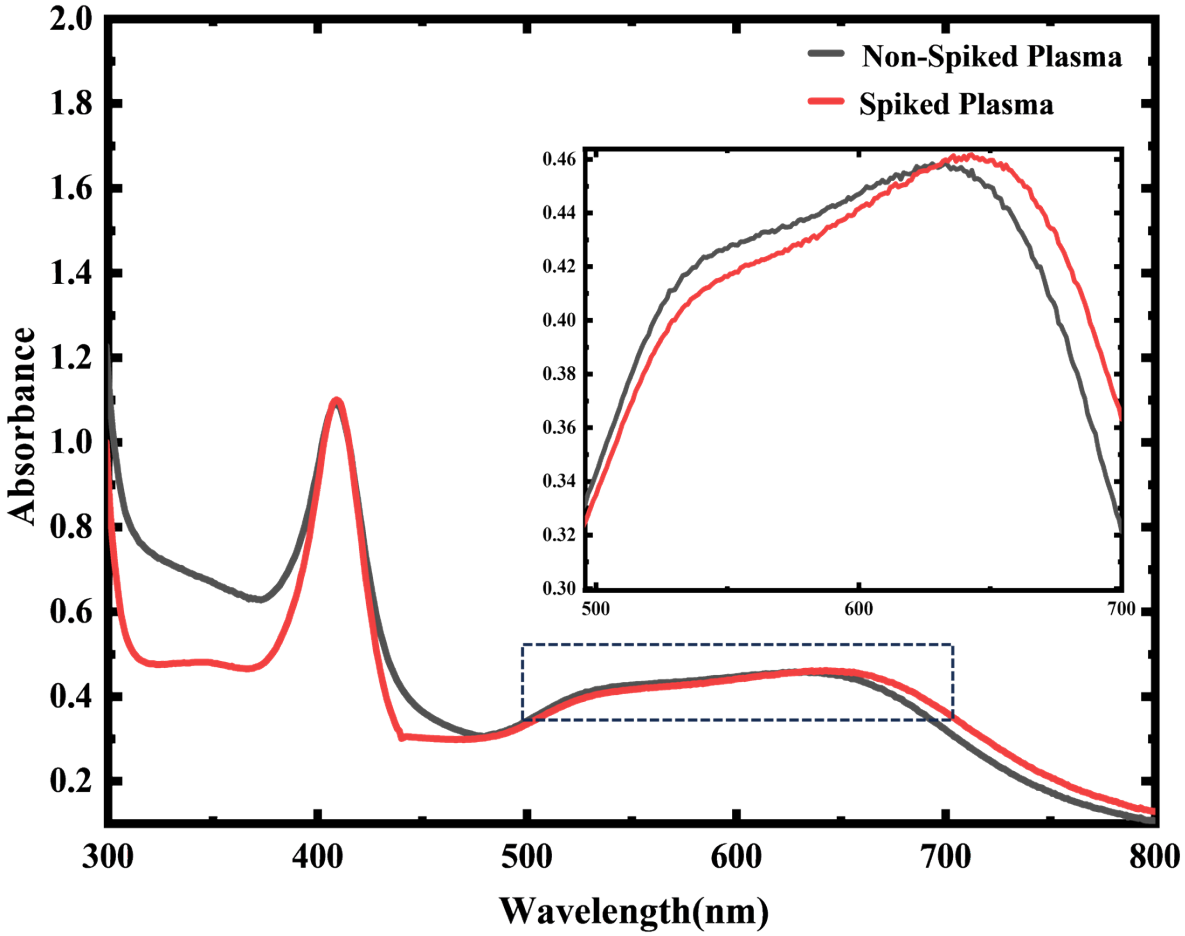


Fig. S5 Solid state UV-Vis of the plasma with non-spiked and Cys(15µM) spiked of sample 1. The black line shows increased absorption intensity at 530nm and decreased at 640nm as compared to the red line. From the solid-state UV-vis calibration curve, we determined a 19.09µM concentration of cysteine in plasma with non-spiked, and 34.26 µM Cys was determined after adding 15µM cysteine concentration which shows good validation of the device with a standard method of cysteine detection.

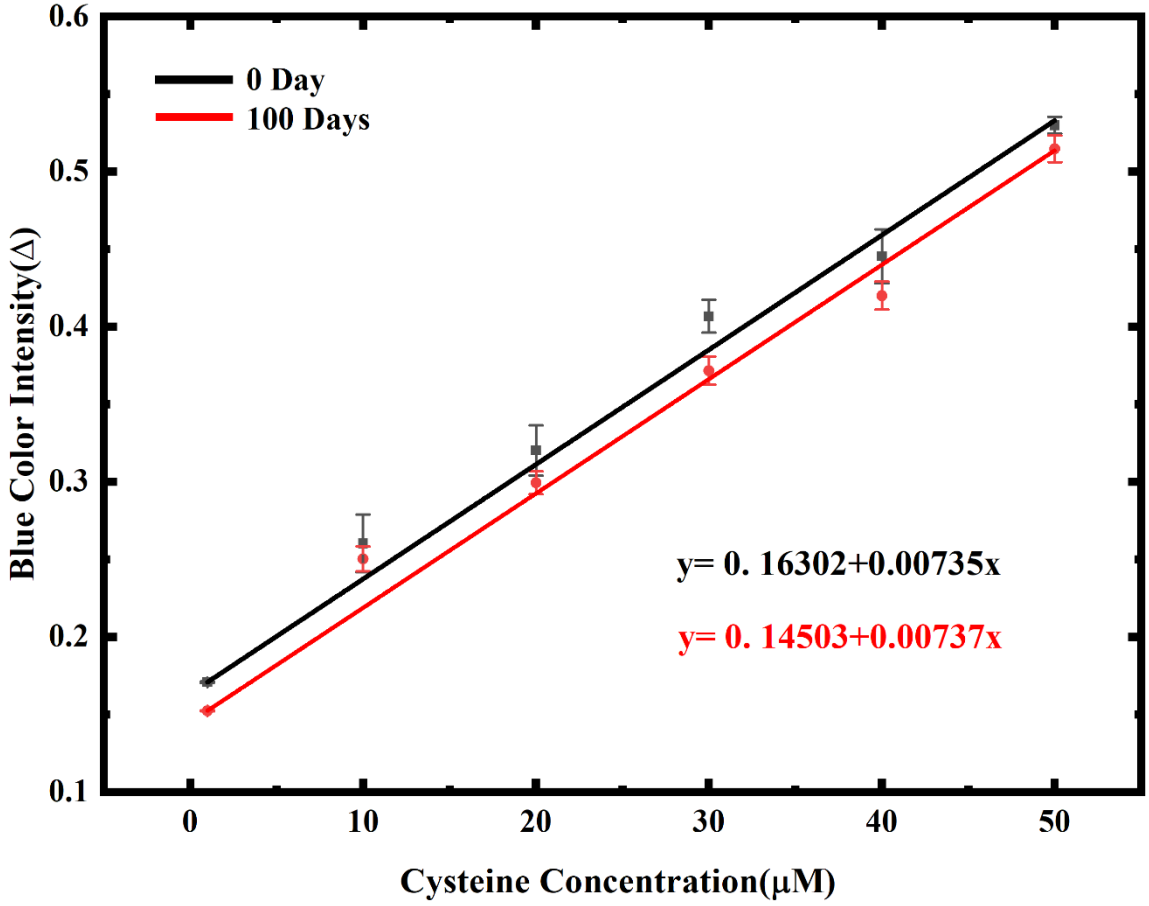


Fig. S6 The comparison of blue color intensity in spot analysis with and without integrated channel for the sample flow. The black line shows spot analysis without channel and it states the linear equation y= 0. 16302+0.00735x with R^2=0.998 and the red line shows channel integration sample analysis and demonstrates the linear equation y= 0. 14503+0.00737x with R^2=0.997. The linear curve found a drop of ~ 6.5% in blue color intensity of Cys indicating the sample loss while flowing through the channel.

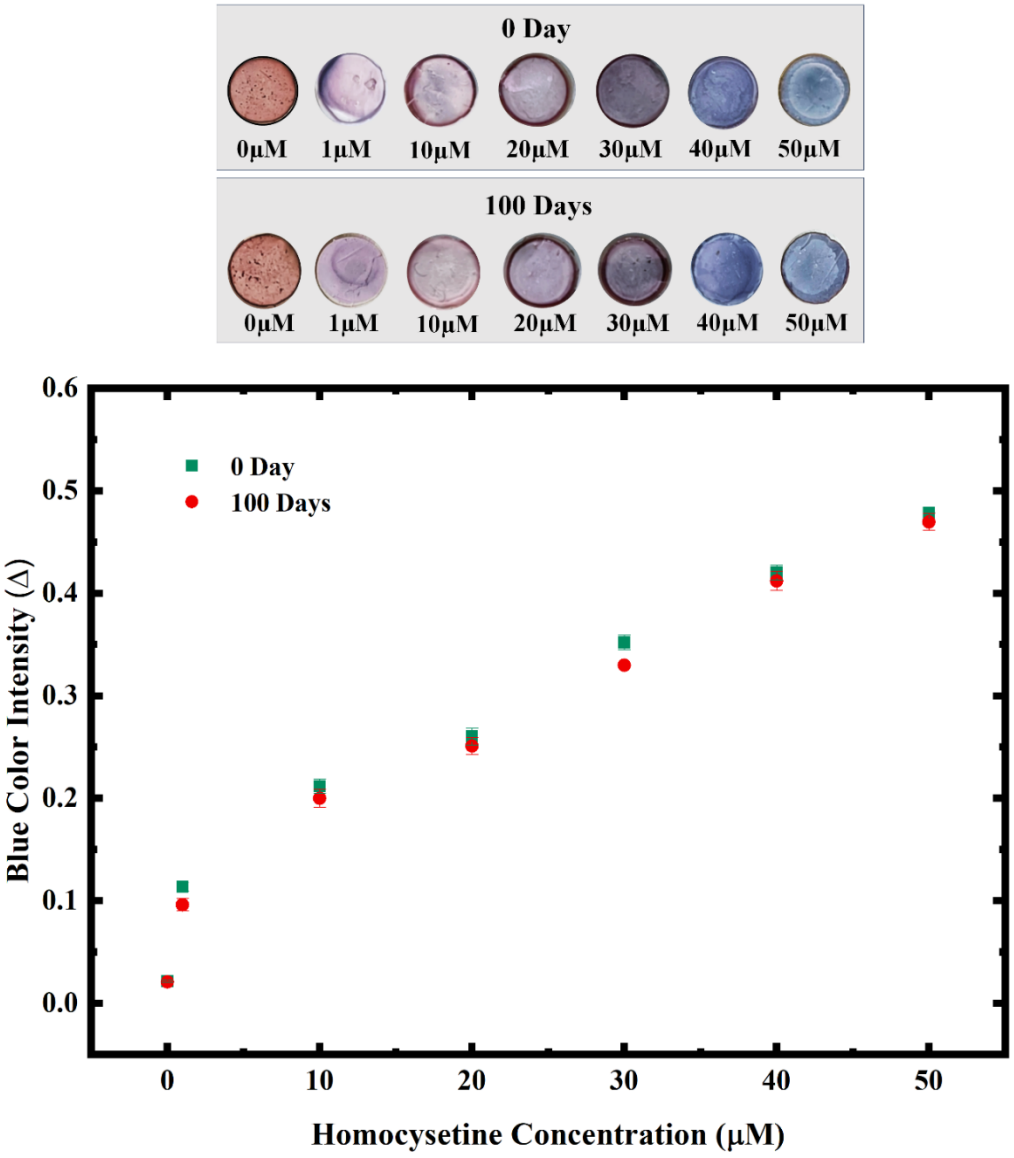


Fig. S7 Real-time images and calibration curve depicting the blue color intensity in spot analysis with homocysteine (Hcy) concentration range of 0-50 μM. The green dots represent spot analysis at day 0 with a linear equation of y = 0.03085 + 0.00896x and an R^2=0.994. The red dots represent spot analysis after 100 days of storage with a linear equation of y = 0.02551 + 0.01007x and an R^2=0.991. The LOD for Hcy was determined to be 0.37 μM for PVP-AuNPs stored for 100 days.