**Supporting information**

# Fluorescent probe with serum albumin as a signal amplifier for real-time sensing of $HSO_3^-$ in solution, mitochondria of animal cells and rice roots

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| Figure S 15: The fluorescence intensity of MGQ (4μM) + BSA (80 μM) in PBS buffer in the presence of different metal cations | Page 10 |
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| S.No. | Reference | Solvent System | LOD for SA's | Response time for SA's | LOD for $HSO_3^-$ | Response time for $HSO_3^-$ | Imaging Animal cells | Imaging Plant cells |
|---|---|---|---|---|---|---|---|---|
| 1 | Dyes and Pigments 2024, 222, 111901 | DMF/Tris (v:v = 2:8, pH = 7.3 | NA | NA | 0.19 μM | 1 min | MCF-7 | NA |
| 2 | Analytica Chimica Acta 1305 (2024) 342588 | PBS, 30 % DMSO, pH = 7.4 | NA | NA | 1.87 μM | 60 min | HeLa | NA |
| 3 | Methods 225 (2024) 100–105 | PBS pH 7.4 | NA | NA | 148.9 nM | 60 min | CT-26 | NA |
| 4 | J. Org. Chem. 2023, 88, 9959−9967 | DMSO/PBS (V/V = 1/99, pH = 7.2 | NA | NA | 0.823 μM | 6 min | HeLa | NA |
| 5 | Chem. Commun., 2021, 57, 655--658 | EtOH:PBS(5:95) pH 7.4 | NA | NA | 67 nM | 10 s | HeLa | NA |
| 6 | Anal. Chem. 2019, 91, 11946−11951 | PBS, 5% DMSO, pH = 5.5 | NA | NA | 20.7nM | 200 s | HeLa | NA |
| 7 | ACS Omega 2018, 3, 11831−11837 | PBS, 1% DMSO, pH 7.4 | NA | NA | 0.1 μM | 5 min | HepG2 | NA |
| 8 | Sens. Actuators, B, 2017, 243, 51–58. | PBS/DMF = 9 : 1, pH 7.4 | NA | NA | 87 nM | NA | HeLa | NA |
| 9 | J. Mater. Chem. B, 2017, 5, 3862-3869 | PBS buffer of pH 7.4. | NA | NA | 22 nM | 1 min | HepG2 | NA |
| 10 | ACS Omega 2023, 8, 2639−2647 | 99.9% PBS 50 μM HSA | 4 to 45nM | 20 to 90 min. | 10 nM | 30 s | MCF-7 | NA |
| 11 | Anal. Chem. 2020, 92, 16130−16137 | PBS, 0.3 μM HSA, pH 7.4 | 0.228 nM | 3 min | 1.4 μM | 5 min | HeLa | NA |
| 12 | Sensors and Actuators B 267 (2018) 104–110 | PBS, 1% DMSO, HSA (5 μM), pH 7.4 | NA | NA | 99 nM | 10 min | MCF-7 | NA |
| 13 | Current work | PBS buffer, pH 7.4, BSA(80 μM) | 10 nM | ≤ 1 min | 4 nM | 1.5 min | HeLA | Roots |

Table S.I : Comparison of probe MGQ with recently published probes for the detection of $HSO_3^-$

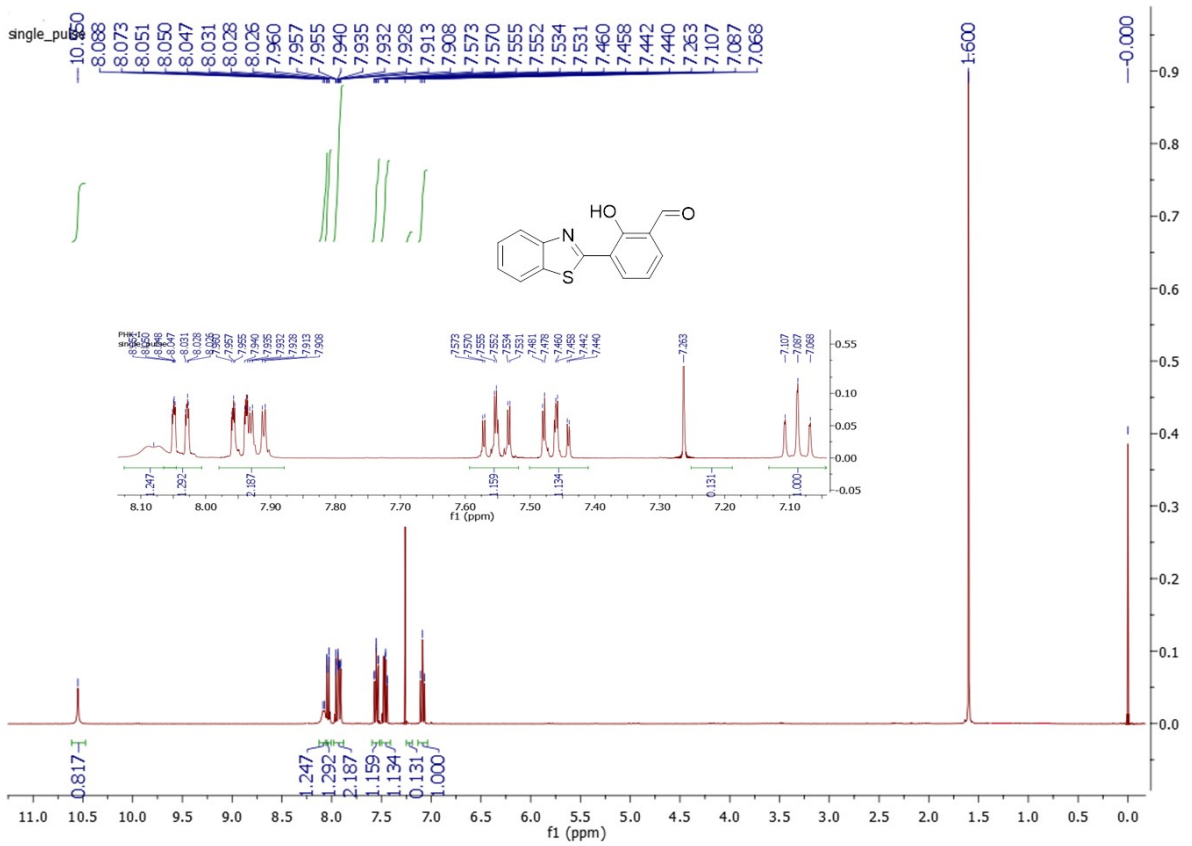


Figure S1: $^{1}H$ NMR spectrum of compound 1

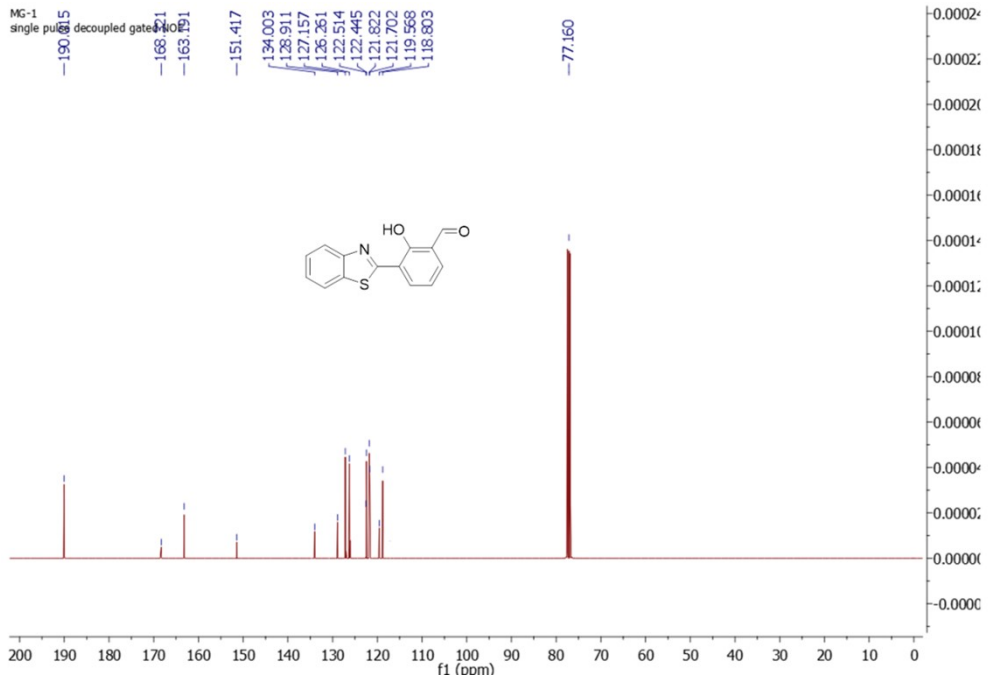


Figure S2: $^{13}C$ NMR spectrum of compound 1

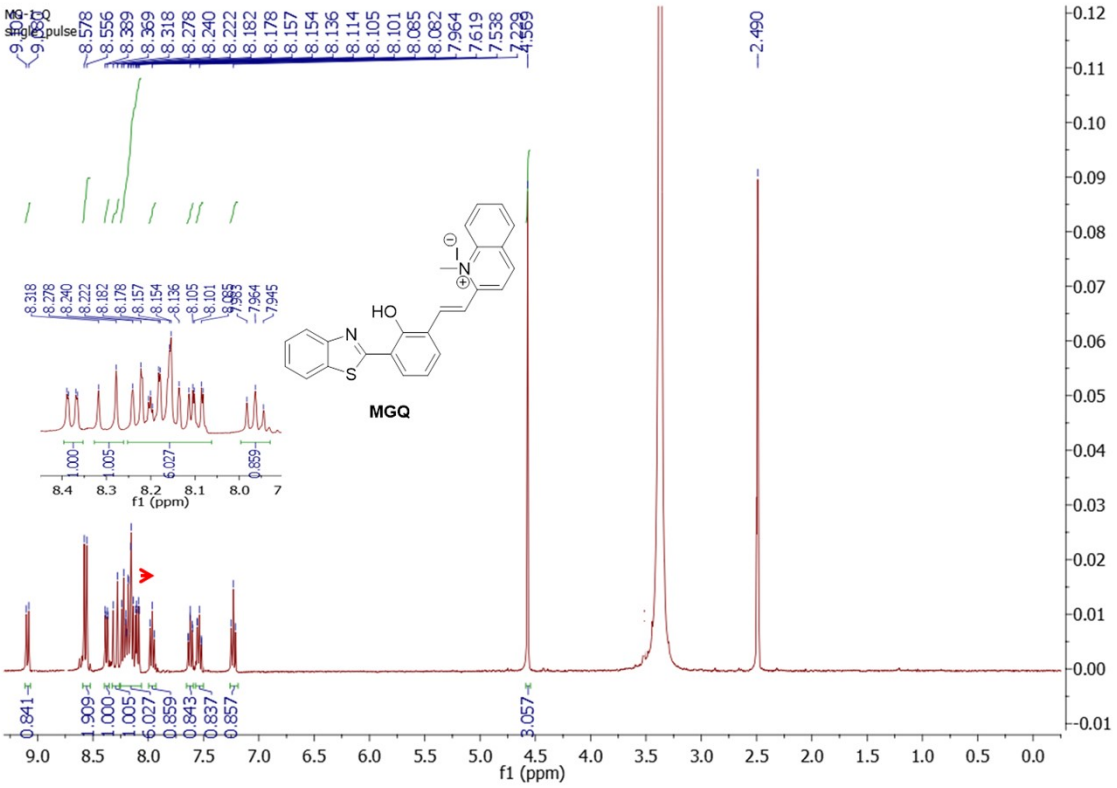


Figure S3: [1]HNMR spectrum of probe MGQ

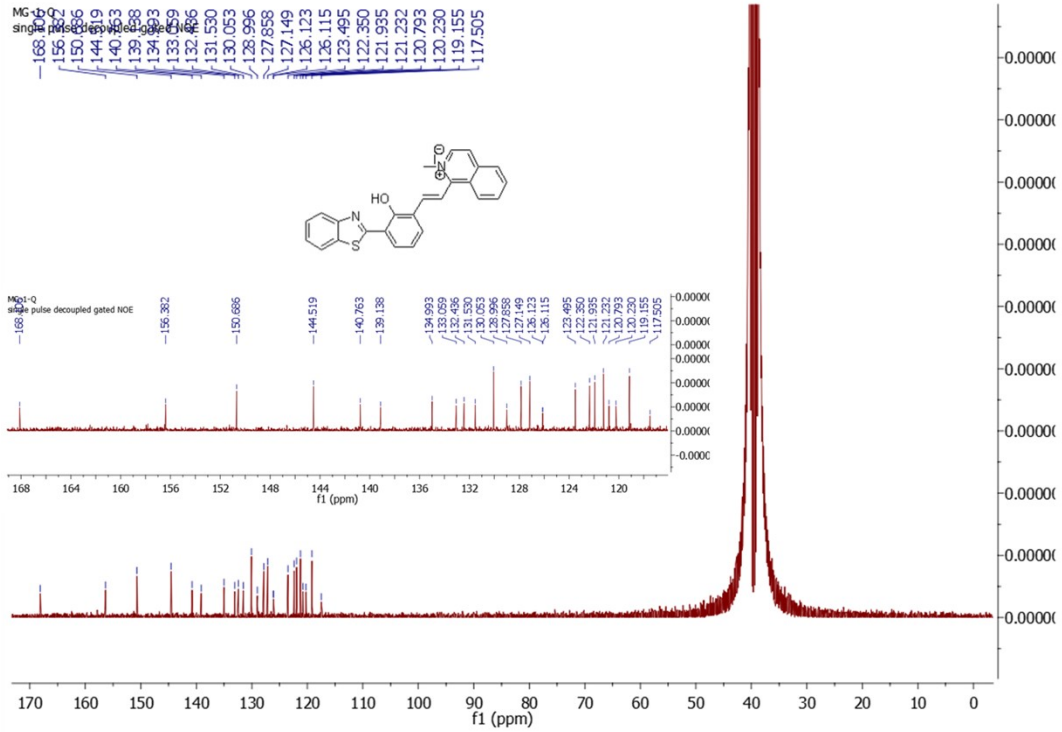


Figure S4: [13]CNMR spectrum of probe MGQ

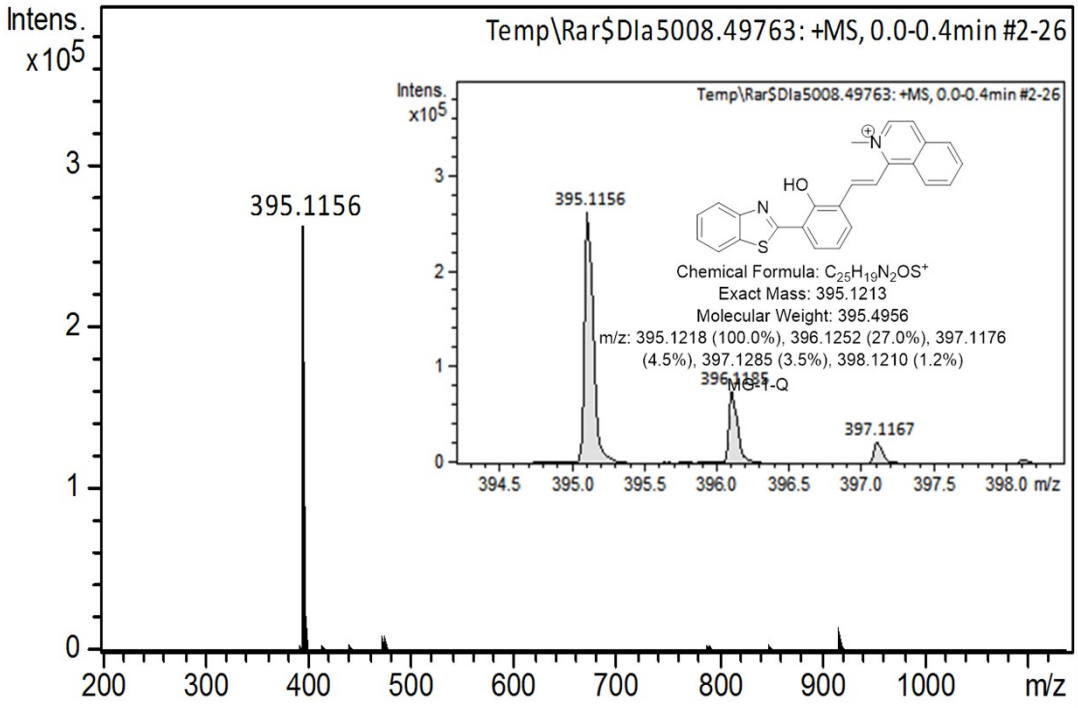


Figure S5: HRMS of probe MGQ

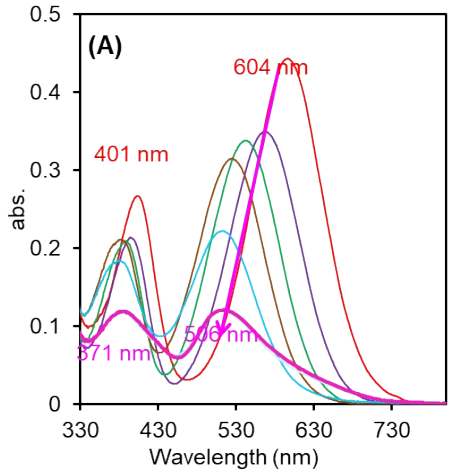


Figure S6. UV-Vis spectra of MGQ (10 μM) in DMSO-water (PBS buffer, pH 7.4) binary mixtures; $\lambda_{ex}$ 400 nm.

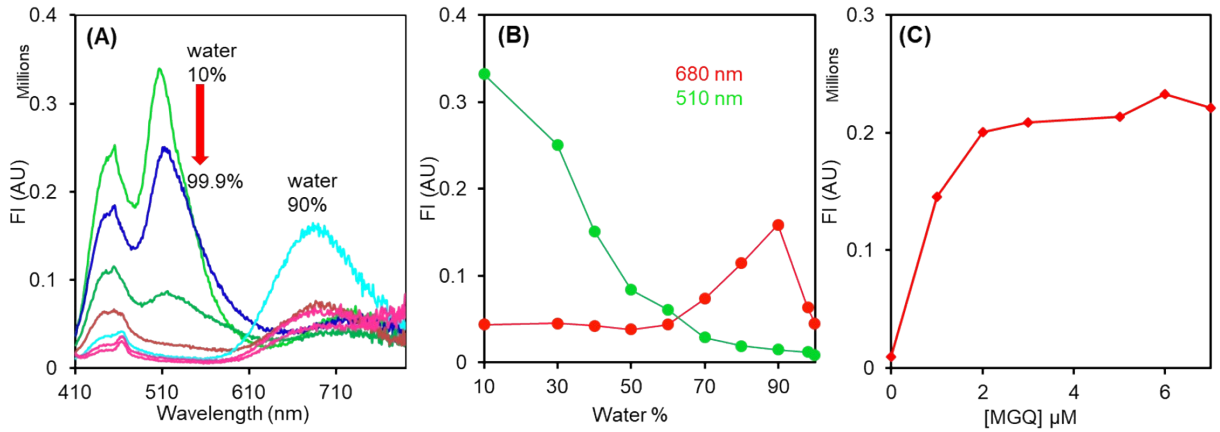


Figure S7. (A) Fluorescence spectra of MGQ (10 μM) in DMSO-water (PBS buffer, pH 7.4) binary mixtures; $\lambda_{ex}$ 400 nm; (B) The plot of fluorescence intensity of MGQ (10 μM) at 680 nm and 510 nm versus the fraction of water in DMSO; (C) The plot of fluorescence intensity at 680 nm against [MGQ] in PBS buffer, pH 7.4 (< 0.1% DMSO).

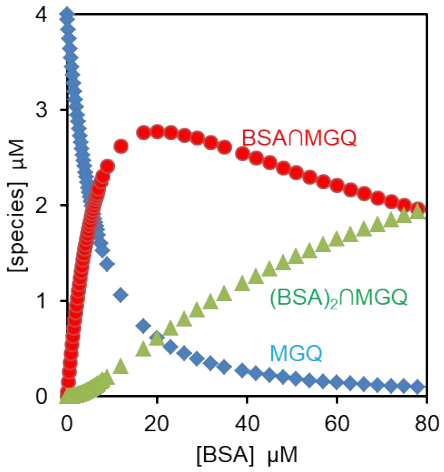


Figure S8. Species distribution in titration of MGQ with BSA

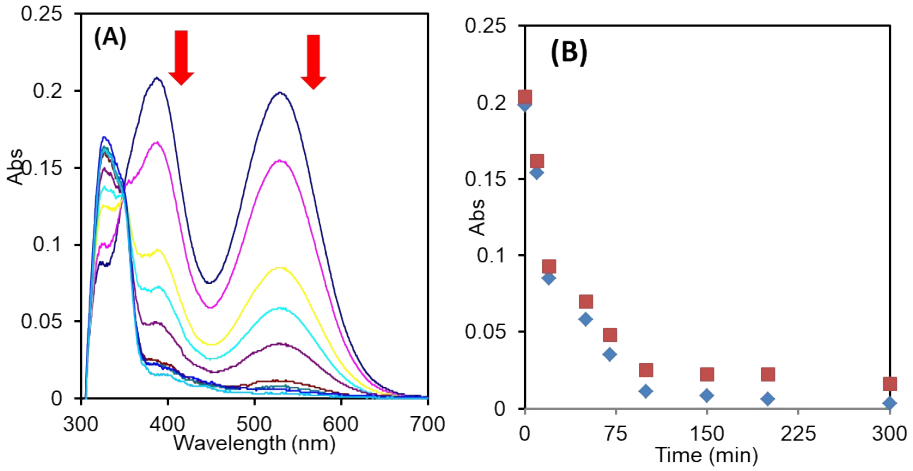


Figure S9. (A) Time dependent UV-Vis spectra of MGQ (4 µM, 1:1 EtOH PBS-buffer pH 7.4) with $HSO_3^-$ (40 µM); (B) The plot of absorbance intensity of MGQ (4 µM, 1:1 EtOH PBS-buffer pH 7.4) at 380 nm and 525 nm vs time with $HSO_3^-$ (40 µM)

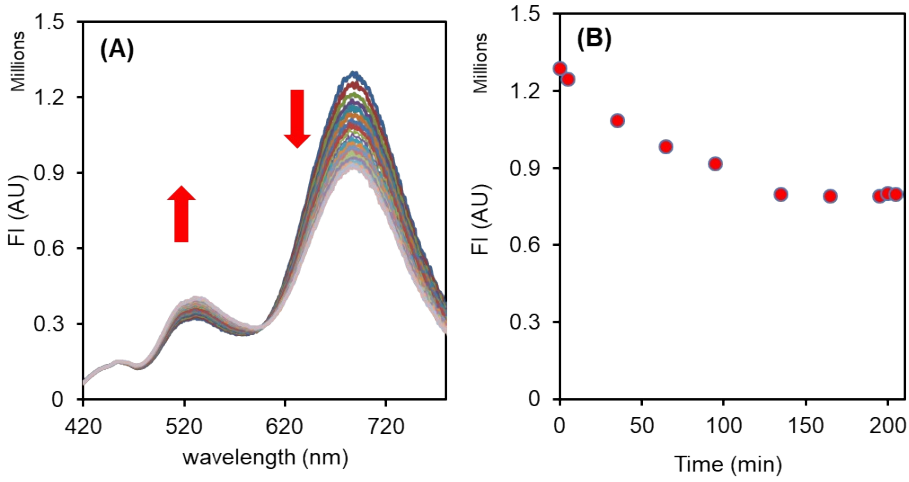


Figure S10. (A) Time dependent fluorescence spectra of MGQ (4 µM, 1:1 EtOH PBS-buffer pH 7.4) with $HSO_3^-$ (40 µM); (B) The plot of fluorescence intensity of MGQ (4 µM) at 670 nm vs Time in 1:1 EtOH PBS-buffer

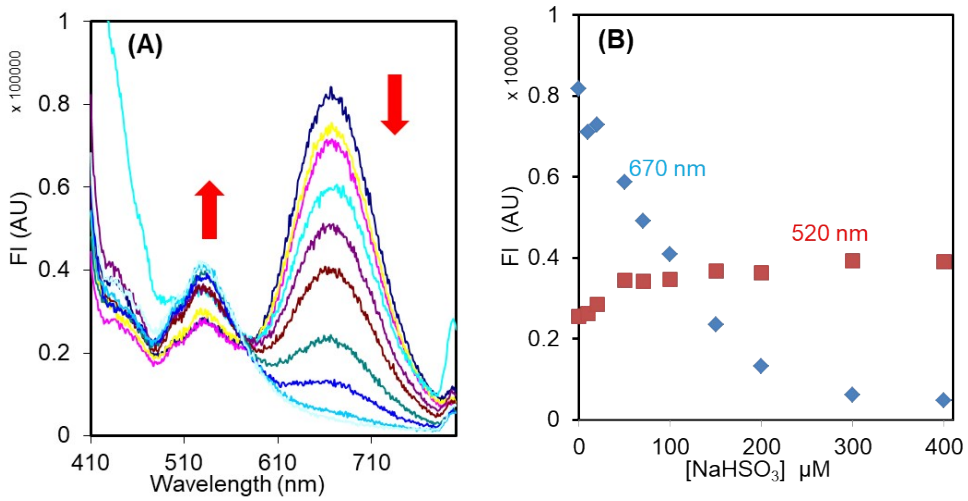


Figure S11. (A) Fluorescence spectra of MGQ (4 µM, 1:1 EtOH PBS-buffer pH 7.4) with different concentrations of $HSO_3^-$; (B) Plot of fluorescence intensity at 520 nm and 670 nm vs [$HSO_3^-$]

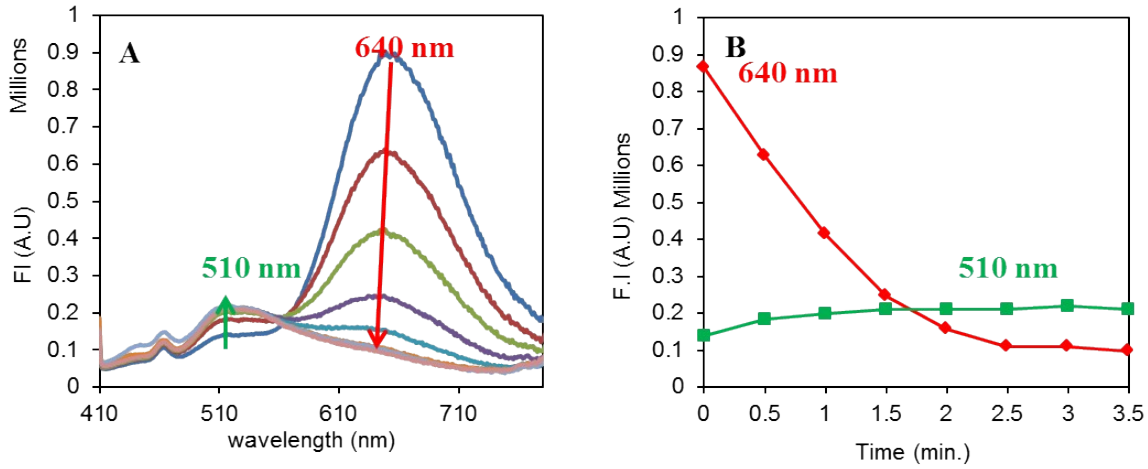


Figure S12. (A) Time dependent Fluorescence spectra of MGQ (4 µM, BSA (80 µM) buffer pH 7.4) with $HSO_3^-$ (50 µM); (B) Time dependent plot of fluorescence intensity at 510 nm and 640 nm vs time (min.)

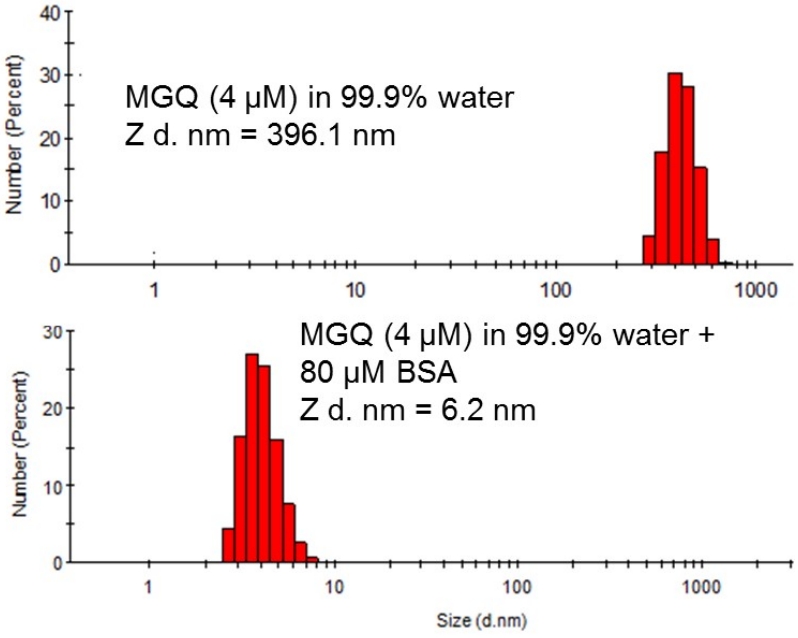


Figure S13. (A) DLS spectra of MGQ (4 μM) in 99.9% (B) DLS spectra of MGQ (4 μM) in 99.9% containing 80 μM of BSA.

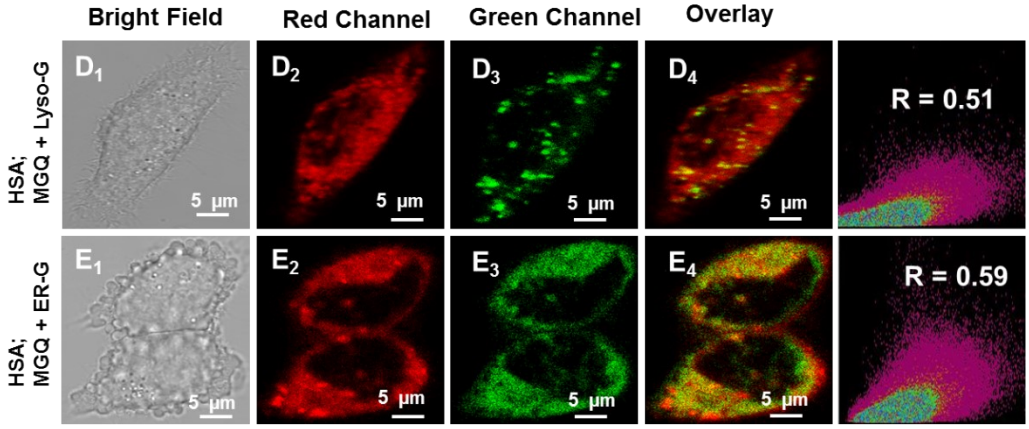


Figure S14 Images of HeLa cells on incubation with, ($D_1$ to $D_4$) HSA (50 μM) for 3 h and then with MGQ (10 μM) and Lyso-tracker green (500 nM) for 1 h; ($E_1$ to $E_4$) HSA (50 μM) for 3 h and then with MGQ (10 μM), ER tracker green (500 nM) for 1h. LASER 405 nm, 488 nm

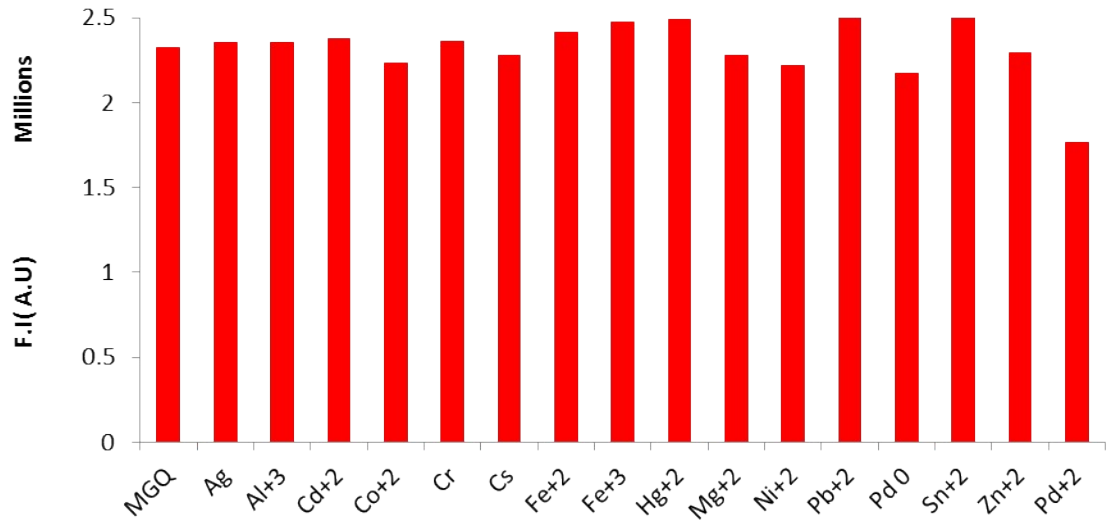


Figure S 15: The fluorescence intensity of **MGQ** (4μM) + BSA (80 μM) in PBS buffer in the presence of different metal cations ; $Ag^{+}$, $Al^{+3}$, $Cd^{+2}$, $Co^{+2}$ $Cr^{+3}$, $Cs^{+}$, $Fe^{+2}$,$Fe^{+3}$, $Hg^{+2}$, $Mg^{+2}$ , $Ni^{+2}$, $Pb^{+2}$, $Pd^{0}$, $Sn^{+2}$, $Zn^{+2}$ and $Pd^{+2}$ (each 40 μM)