## Supplementary Informations

**Table S1.** Statistical parameters for the determination α-$Fe_2O_3$NPs.

| S.N | Parameters | α-$Fe_2O_3$-NPs |
|---|---|---|
| 1. | Color intensity time | 1 day |
| 2. | Temperature of solutions | 25 ± 1ºC |
| 3. | Wavelength(nm) | 360 |
| 4. | Spectra range (nm) | 190-900 |
| 5. | Beer' s law limit (µg/ml) | 0.05-1.0 µg/ml |
| 6. | Molar absorptivity (L/mol/cm) | $9.20 \times 10^3$ |
| 7. | Linear regression equation | A=-0.109+1.732C |
| 8. | $\pm ts_a$ | 0.013 |
| 9. | $\pm ts_b$ | 0.024 |
| 10. | Correlation coefficient (r) | 0.9996 |
| 11. | Variance($So^2$) of calibration line | $2.04 \times 10^{-4}$ |
| 12. | Detection limit (µg/ml) | 402.5 |
| 13. | Quantitation limit (µg/ml) | 1219.7 |

Where $\pm ts_a$ and $\pm ts_b$ are confidence limits for intercepts and slope respectively.

**Table S2.**Test of precision and accuracy of the proposed method for α-$Fe_2O_3$NPs

| Parameters | Intraday | | | Interday | | |
|---|---|---|---|---|---|---|
| **Concentration taken (µg/ml)** | 0.221 | 0.732 | 1.125 | 0.221 | 0.732 | 1.125 |
| **Concentration found (µg/ml)** | 0.223 | 0.733 | 1.126 | 0.220 | 0.727 | 1.122 |
| **Standard deviation (µg/ml)** | 0.002 | 0.014 | 0.016 | 0.003 | 0.013 | 0.017 |
| **Recovery (%)** | 100.94 | 100.13 | 100.08 | 99.54 | 99.31 | 99.76 |
| **Relative Standard deviation** | 0.918 | 1.951 | 1.463 | 1.483 | 1.814 | 1.525 |

Mean measured from five independent (n=5) determinations for all data points at 95% confidence level.