Supporting Information

Fluorescent carbon dots from water hyacinth as detection sensors for ferric ion: The preparation and optimisation using response surface methodology

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Table S1 Comparison of different methods for the detection of Fe^{3+} using biomass-based CDs as sensing probes.

Precursors	QY(%)	Linear Range (μM)	LOD (μM)	Reference
Prunus avium fruits, aqueous ammonia	13	0–100	0.96	1
Chionanthus retusus fruits, aqueous ammonia	9	0–2	70	2
Cranberry beans	10.85	30–600	9.55	3
Crop biomass	3.5	0–500	5.23	4
Milk powder, $FeCl_3$	8.73	20–500	5.13	5
Kentucky bluegrass	7	5–25	1.4	6
Sweet potato	8.64	1–100	0.32	7
Wheat straw	9.2	1.95–250	1.95	8
Water hyacinth	15.12	0–35.7	2.35	This work

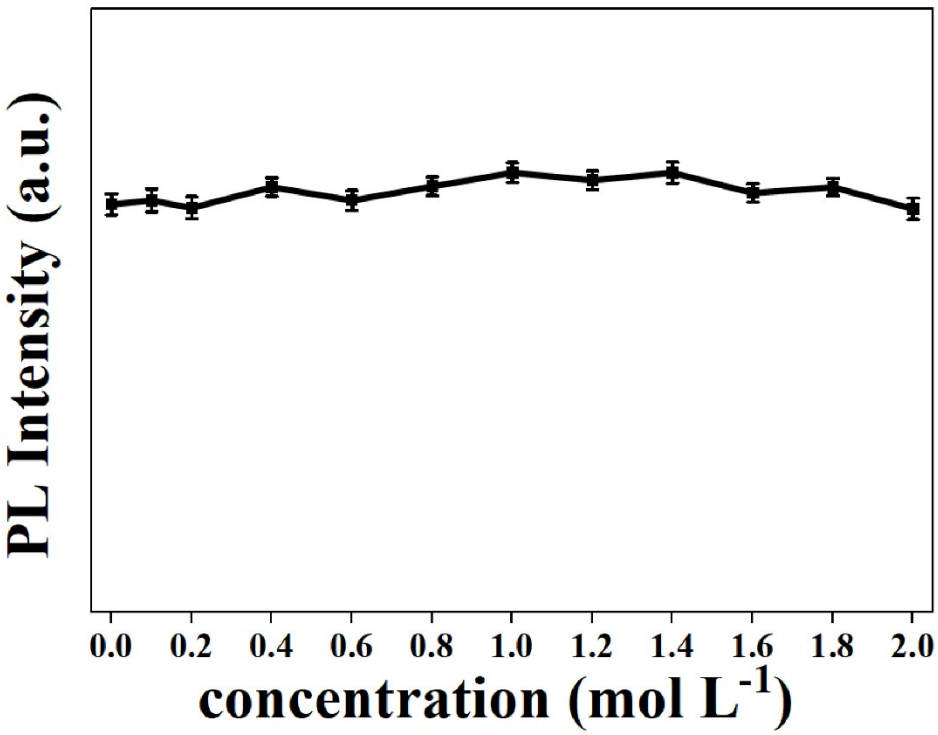

Fig. S1 Ionic strength effect on the fluorescence of W-CDs.

References

1. T. N. J. I. Edison, R. Atchudan, J. J. Shim, S. Kalimuthu, B. C. Ahn, and Y. R. Lee, Turn-off fluorescence sensor for the detection of ferric ion in water using green synthesized N-doped carbon dots and its bio-imaging, *J. Photochem. Photobiol., B*, 2016, **158**, 235-242.
2. R. Atchudan, T. N. J. I. Edison, D. Chakradhar, S. Perumal, J. J. Shim, and Y. R. Lee, Facile green synthesis of nitrogen-doped carbon dots using Chionanthus retusus fruit extract and investigation of their suitability for metal ion sensing and biological applications, *Sens. Actuators, B*, 2017, **246**, 497-509.
3. M. Zulfajri, G. Gedda, C. J. Chang, Y. P. Chang, and G. G. Huang, Cranberry beans derived carbon dots as a potential fluorescence sensor for selective detection of Fe3+ ions in aqueous solution, *ACS Omega*, 2019, **4**, 15382-15392.
4. S. Ding, Y. Gao, B. Ni, and X. Yang, Green synthesis of biomass-derived carbon quantum dots as fluorescent probe for Fe3+ detection, *Inorg. Chem. Commun.*, 2021, **130**, 108636.
5. P. Fan, C. Liu, C. Hu, F. Li, X. Lin, S. Yang, and F. Xiao, Green and facile synthesis of iron-doped biomass carbon dots as a dual-signal colorimetric and fluorometric probe for the detection of ascorbic acid, *New J. Chem.*, 2022, **46**, 2526-2533.

6. P. Krishnaiah, R. Atchudan, S. Perumal, E. S. Salama, Y. R. Lee, and B. H. Jeon, Utilization of waste biomass of Poa pratensis for green synthesis of n-doped carbon dots and its application in detection of Mn2+ and Fe3+, *Chemosphere*, 2022, **286**, 131764.
7. J. Shen, S. Shang, X. Chen, D. Wang, and Y. Cai, Facile synthesis of fluorescence carbon dots from sweet potato for Fe3+ sensing and cell imaging, *Mater. Sci. Eng.*, 2017, **76**, 856-864.
8. M. Yuan, R. Zhong, H. Gao, W. Li, X. Yun, J. Liu, X. Zhao, G. Zhao, and F. Zhang, One-step, green, and economic synthesis of water-soluble photoluminescent carbon dots by hydrothermal treatment of wheat straw, and their bio-applications in labeling, imaging, and sensing, *Appl. Surf. Sci.*, 2015, **355**, 1136-1144.