UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Abbas, K., Usama, Qin, W., Zhu, H., Li, Y., Li, Z., ... & Bi, H. (2025). Exploring carbon dot as a fluorescent nanoprobe for imaging of plant cells under salt/heat-induced stress conditions. *Chemical & Biomedical Imaging*, *3*(8), 534-546. https://doi.org/10.1021/cbmi.4c00109

Abidin, N. H. Z., Shafie, S. N. A., Suhaimi, H., Sambudi, N. S., & Nordin, N. A. H. S. M. (2021). Incorporation of carboxyl and amino functionalized carbon quantum dots in thin film membrane for nanofiltration. *Polymer Testing*, *100*, 107270. https://doi.org/10.1016/j.polymertesting.2021.107270

Abinaya, K., Raja, K., Raja, K., Sathya Moorthy, P., Senthil, A., & Chandrakumar, K. (2024). Impact of green carbon dot nanoparticles on seedling emergence, crop growth and seed yield in blackgram (Vigna mungo L. Hepper). *Scientific Reports*, *14*(1), 23783. https://doi.org/10.1038/s41598-024-75366-5

Adaikalapandi, S., Thangadurai, T. D., Manjubaashini, N., Nataraj, D., Babu, T. S., & Kumar, S. M. (2024). Bamboo stem biomass waste-derived excitation-dependent *carbon dots* for nanomolar detection of fungicide dodine in real samples and their pH-sensitive bacterial interaction studies. *Diamond and Related Materials*, *141*, 110692. https://doi.org/10.1016/j.diamond.2023.110692

Ai, L., Yang, Y., Wang, B., Chang, J., Tang, Z., Yang, B., & Lu, S. (2021). Insights into photoluminescence mechanisms of *carbon dots*: advances and perspectives. *Science Bulletin*, *66*(8), 839-856. https://doi.org/10.1016/j.scib.2020.12.015

Alafeef, M., Srivastava, I., Aditya, T., & Pan, D. (2024). *Carbon dots*: from synthesis to unraveling the fluorescence mechanism. *Small*, *20*(4), 2303937. https://doi.org/10.1002/smll.202303937

Alves, K. S., Guimarães, T., Carneiro, A. C. O., Carvalho, A. M. M. L., Valverde, S. R., & Costa, M. M. (2026). Radial Variability in Bamboo Properties: Implications for Sustainable Biochar Production and Agricultural Applications. *Bioresources and Bioproducts*, 2(2), 10. https://doi.org/10.3390/bioresourbioprod2020010

Aparício, R. R., Hansel, F. A., Acosta, T. L. N., Schiavon, M. A., de Muniz, G. I. B., Magalhães, W. L. E., & de Cademartori, P. H. G. (2025). Lignin as a Renewable Precursor for Carbon Quantum Dots: Synthesis, Doping Strategies, and Applications. *Advanced Energy and Sustainability Research*, *6*(12), 2500187. https://doi.org/10.1002/aesr.202500187

Ar, B. S., Jt, A., & Francis, M. A. (2025). *Green synthesis* of *carbon dots*: Advancements, characterization, and emerging biological applications. *Journal of Fluorescence*. https://doi.org/10.1007/s10895-025-04428-2

Arkin, K., Zheng, Y., Bei, Y., Ma, X., Che, W., & Shang, Q. (2023). Construction of dual-channel ratio sensing platform and molecular logic gate for visual detection of oxytetracycline based on biomass *carbon dots* prepared from

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

cherry tomatoes stalk. *Chemical Engineering Journal*, *464*, 142552. https://doi.org/10.1016/j.cej.2023.142552

Astuti, W., Sulistyaningsih, T., Ramadhan, R. M., & Octaviany, V. A. (2022). Synthesis of Activated Carbon from Petung Bamboo Stems (*Dendrocalamus asper*) Using Microwave-Assisted Pyrolysis (MAP) Process for Biogas Storage. *Jurnal Bahan Alam Terbarukan*, 11(1), 58–67. https://doi.org/10.15294/jbat.v11i1.36939

Atchudan, R., Jebakumar Immanuel Edison, T. N., Shanmugam, M., Perumal, S., Somanathan, T., & Lee, Y. R. (2021). Sustainable synthesis of carbon quantum dots from banana peel waste using hydrothermal process for in vivo *bioimaging*. *Physica E: Low-dimensional Systems and Nanostructures*, *126*, 114417. https://doi.org/10.1016/j.physe.2020.114417

Ayisha Naziba, T., Praveen Kumar, D., Karthikeyan, S., Sriramajayam, S., Djanaguiraman, M., Sundaram, S., ... & Ramesh, D. (2024). Biomass derived biofluorescent carbon dots for energy applications: current progress and prospects. *The Chemical Record*, *24*(6), e202400030. https://doi.org/10.1002/tcr.202400030

Bavya, V., Pillai, A. S., Surendran, K. P., Rajan, T. P. D., & Suresh, K. I. (2024). Fluorescent *carbon dots* from bamboo stem waste: synthesis, characterization, and inkjet printing. https://doi.org/10.1002/slct.202303346

Berdimurodov, E., Berdimuradov, K., Kumar, A., Thakur, A., Rashidova, K., Tursunqulov, J., ... & Eshmetov, R. (2026). Biomass based carbon quantum dots in sensor applications: a review (2021–2025). *Bioresources and Bioprocessing*, *13*(1), 87. https://doi.org/10.1186/s40643-026-01084-7

Bhattacharjee, S. (2016). DLS and zeta potential — What they are and what they are not? *Journal of Controlled Release, 235*, 337–351. https://doi.org/10.1016/j.jconrel.2016.06.017

Bourlinos, A. B., Trivizas, G., Karakassides, M. A., Baikousi, M., Kouloumpis, A., Gournis, D., & Couris, S. (2015). Green and simple route toward boron doped *carbon dots* with significantly enhanced non-linear optical properties. *Carbon*, *83*, 173–179. https://doi.org/10.1016/j.carbon.2014.11.032

Caetano, M. M., Becceneri, A. B., Ferreira, M. V., Assunção, R. M. N., da Silva, R. S., & de Lima, R. G. (2024). Carbonized polymer dots: Influence of the carbon nanoparticle structure on cell biocompatibility. *ACS Omega, 9*(37), 38864–38877. https://doi.org/10.1021/acsomega.4c05011

Cao, L., Wang, X., Meziani, M. J., Lu, F., Wang, H., Luo, P. G., & Sun, Y.-P. (2007). *Carbon dots* for multiphoton *bioimaging*. *Journal of the American Chemical Society*, *129*(37), 11318–11319. https://doi.org/10.1021/ja0735271

Chahal, S., Macairan, J. R., Yousefi, N., Tufenkji, N., & Naccache, R. (2021). *Green synthesis* of *carbon dots* and their applications. *RSC Advances*, *11*(41), 25354–25363. https://doi.org/10.1039/D1RA04718C

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Chai, Y., Feng, Y., Zhang, K., & Li, J. (2022). Preparation of fluorescent *carbon dots* composites and their potential applications in biomedicine and drug delivery—A review. *Pharmaceutics*, *14*(11), 2482. https://doi.org/10.3390/pharmaceutics14112482

Chaudhary, M., Singh, P., Singh, G. P., & Rathi, B. (2024). Structural features of *carbon dots* and their agricultural potential. *ACS Omega*, *9*(4), 4166–4185. https://doi.org/10.1021/acsomega.3c04638

Chu, K. W., Lee, S. L., Chang, C. J., & Liu, L. (2019). Recent progress of carbon dot precursors and photocatalysis applications. *Polymers*, *11*(4), 689. https://doi.org/10.3390/polym11040689

Coates, J. (2000). Interpretation of infrared spectra, a practical approach. In R. A. Meyers (Ed.), *Encyclopedia of analytical chemistry* (pp. 10815–10837). John Wiley & Sons. https://doi.org/10.1002/9780470027318.a5606

Coroaba, A., Ignat, M., Carp, O. E., Stan, C. S., Filipiuc, S. I., Uritu, C. M., ... & Ania, C. O. (2025). Antioxidant activity and in vitro fluorescence imaging application of N-, O-functionalized *carbon dots*. *Scientific Reports*, *15*(1), 25834. https://doi.org/10.1038/s41598-025-11676-6

Cui, L., Ren, X., Sun, M., Liu, H., & Xia, L. (2021). *Carbon dots*: Synthesis, properties and applications. *Nanomaterials*, *11*(12), 3419. https://doi.org/10.3390/nano11123419

Ding, H., Li, X. H., Chen, X. B., Wei, J. S., Li, X. B., & Xiong, H. M. (2020). *Surface states* of *carbon dots* and their influences on luminescence. *Journal of Applied Physics*, *127*(23). https://doi.org/10.1063/1.5143819

Donaldson, L. (2020). Autofluorescence in plants. *Molecules*, *25*(10), 2393. https://doi.org/10.3390/molecules25102393

Dua, S., Kumar, P., Pani, B., Kaur, A., Khanna, M., & Bhatt, G. (2023). Stability of carbon quantum dots: a critical review. *RSC advances*, *13*(20), 13845-13861. https://doi.org/10.1039/D2RA07180K

Duarte De Assuncao, T., Broussier, A., Plain, J., & Proust, J. (2024). Unveiling the photoluminescence of carbon quantum dots with controlled cyan or green emission: synthesis and photophysics investigation. *ACS Applied Optical Materials*, *2*(9), 1947-1954. https://doi.org/10.1021/acsaom.4c00301

Eker, F., Duman, H., Akdaşçi, E., Bolat, E., Sarıtaş, S., Karav, S., & Witkowska, A. M. (2024). A comprehensive review of nanoparticles: from classification to application and toxicity. *Molecules*, *29*(15), 3482. https://doi.org/10.3390/molecules29153482

Esa, M. F., Main, N. M., Roslan, M. N., Jasmani, L., & Kamarudin, K. (2023). Chemical Analysis *Dendrocalamus asper* Bamboo And Suitability for Pulp and Paper. *Journal of Engineering and Applied Sciences*, *18*(6), 581-587. https://doi.org/10.59018/032382

Etefa, H. F., Tessema, A. A., & Dejene, F. B. (2024). *Carbon dots* for future prospects: synthesis, characterizations and recent applications: a review (2019–2023). *C*, *10*(3), 60. https://doi.org/10.3390/c10030060

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Fahmi, M. Z., Haris, A., Permana, A. J., Wibowo, D. L. N., Purwanto, B., Nikmah, Y. L., & Idris, A. (2018). Bamboo leaf-based *carbon dots* for efficient tumor imaging and therapy. *RSC Advances*, *8*(67), 38376–38383. https://doi.org/10.1039/C8RA07944G

Ferrari, A. C., & Robertson, J. (2000). *Interpretation of Raman spectra of disordered and amorphous carbon*. **Physical Review B, 61(20), 14095–14107.** https://doi.org/10.1103/PhysRevB.61.14095

Ferrari, A. C., & Robertson, J. (2001). *Resonant Raman spectroscopy of disordered, amorphous, and diamondlike carbon*. **Physical Review B, 64, 075414.** https://doi.org/10.1103/PhysRevB.64.075414

Gan, J., Chen, L., Chen, Z., Zhang, J., Yu, W., Huang, C., ... & Zhang, K. (2023). Lignocellulosic biomass-based *carbon dots*: synthesis processes, properties, and applications. *Small*, *19*(48), 2304066. https://doi.org/10.1002/smll.202304066

Garg, R., Salam, A., & Nandi, C. K. (2026). Experimental and theoretical overview on the photoluminescence origin in carbon nanodots. *Nanoscale*. https://doi.org/10.1039/D6NR00082G

González-González, R. B., González, L. T., Madou, M., Leyva-Porras, C., Martinez-Chapa, S. O., & Mendoza, A. (2022). Synthesis, purification, and characterization of *carbon dots* from non-activated and activated pyrolytic carbon black. *Nanomaterials*, *12*(3), 298. https://escholarship.org/uc/item/302634tf

Gourich, A. A., Touijer, H., Drioiche, A., Asbabou, A., Remok, F., Saidi, S., ... & Zair, T. (2023). Insight into biological activities of chemically characterized extract from Marrubium vulgare L. in vitro, in vivo and in silico approaches. *Frontiers in Chemistry*, *11*, 1238346. https://doi.org/10.3389/fchem.2023.1238346

Hassanvand, Z., Jalali, F., Nazari, M., Parnianchi, F., & Santoro, C. (2021). Carbon nanodots in electrochemical sensors and biosensors: A review. *ChemElectroChem*, *8*(1), 15–35. https://doi.org/10.1002/celc.202001229

Hsu, P.-C., Chen, P.-C., Ou, C.-M., Chang, H.-Y., & Chang, H.-T. (2013). Extremely high inhibition activity of photoluminescent carbon nanodots toward cancer cells. *Journal of Materials Chemistry B*, *1*(13), 1774–1781. https://doi.org/10.1039/C3TB00545C

Hu, S., Zhang, W., Chang, Q., Yang, J., & Lin, K. (2016). A chemical method for identifying the photocatalytic active sites on *carbon dots*. *Carbon*, *103*, 391–393. https://doi.org/10.1016/j.carbon.2016.03.004

Huang, M., Liang, X., Zhang, Z., Wang, J., Fei, Y., Ma, J., ... & Mi, L. (2020). *Carbon dots* for intracellular pH sensing with fluorescence lifetime imaging microscopy. *Nanomaterials*, *10*(4), 604. https://doi.org/10.3390/nano10040604

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Huang, X., Ye, W., Zhuang, J., Hu, C., Dong, H., Lei, B., & Liu, Y. (2024). π-Conjugated structure enhances the UV absorption performance of *carbon dots* and application in the design of light-colored sunglasses. *ACS sustainable chemistry & engineering*, *12*(28), 10399-10410. https://doi.org/10.1021/acssuschemeng.4c01739

Huang, Z., & Ren, L. (2025). Large scale synthesis of *carbon dots* and their applications: a review. *Molecules*, *30*(4), 774. https://doi.org/10.3390/molecules30040774

International Centre for Diffraction Data. (n.d.). *Powder Diffraction File Card No. 41-1487: Graphite*. ICDD.

Javed, N., & O'Carroll, D. M. (2021). Long-term effects of impurities on the particle size and optical emission of *carbon dots*. *Nanoscale Advances*, *3*(1), 182-189. https://doi.org/10.1039/D0NA00479K

Jiang, K., Sun, S., Zhang, L., Lu, Y., Wu, A., Cai, C., & Lin, H. (2015). Red, green, and blue luminescence by *carbon dots*: full-color emission tuning and multicolor cellular imaging. *Angewandte Chemie International Edition*, *54*(18), 5360–5363. https://doi.org/10.1002/anie.201501193

Jiang, Y., Lv, P., Chen, Y., Yuan, J., Arlyapov, V., Zaytsev, N., ... & Zhang, J. (2026). biomass-derived *carbon dots* for agriculture: reactive oxygen species-mediated stress tolerance, postharvest preservation, and designing for safety. *ACS Materials Letters*, *8*(4), 1021-1044. https://doi.org/10.1021/acsmaterialslett.5c01683

Jing, H. H., Bardakci, F., Akgöl, S., Kusat, K., Adnan, M., Alam, M. J., & Sasidharan, S. (2023). Green *carbon dots*: synthesis, characterization, properties and biomedical applications. *Journal of Functional Biomaterials*, *14*(1), 27. https://doi.org/10.3390/jfb14010027

Jorns, M., & Pappas, D. (2021). A review of fluorescent carbon dots, their synthesis, physical and chemical characteristics, and applications. *Nanomaterials*, *11*(6), 1448. https://doi.org/10.3390/nano11061448

Kasirajan, K., Karunakaran, M., & Choi, H. K. (2024). Synthesis of environmentally-friendly carbon quantum dots from orange juice for selective detection of Fe^{3+} ions, antibacterial activity, and bio-imaging applications. *Journal of Environmental Chemical Engineering*, *12*, 113535. https://doi.org/10.1016/j.jece.2024.113535

Khairol Anuar, N. K., Tan, H. L., Lim, Y. P., So'aib, M. S., & Abu Bakar, N. F. (2021). A review on multifunctional carbon-dots synthesized from biomass waste: Design/fabrication, characterization and applications. *Frontiers in Energy Research*, *9*, 626549. https://doi.org/10.3389/fenrg.2021.626549

Khan, I., Awan, S. A., Rizwan, M., Hassan, Z. U., Akram, M. A., Tariq, R., ... & Xie, W. (2022). Nanoparticle's uptake and translocation mechanisms in plants via seed priming, foliar treatment, and root exposure: a review. *Environmental*

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Science and Pollution Research, *29*(60), 89823-89833. https://doi.org/10.1007/s11356-022-23945-2

Kong, J., Wei, Y., Zhou, F., Shi, L., Zhao, S., Wan, M., & Zhang, X. (2024). Carbon quantum dots: properties, preparation, and applications. *Molecules*, *29*(9), 2002. https://doi.org/10.3390/molecules29092002

Krasley, A. T., Li, E., Galeana, J. M., Bulumulla, C., Beyene, A. G., & Demirer, G. S. (2024). Carbon nanomaterial fluorescent probes and their biological applications. *Chemical Reviews*, *124*(6), 3085-3185. https://doi.org/10.1021/acs.chemrev.3c00581

Kumar, P., Dua, S., Kaur, R., Kumar, M., & Bhatt, G. (2022). A review on advancements in carbon quantum dots and their application in photovoltaics. *RSC advances*, *12*(8), 4714-4759. https://doi.org/10.1039/D1RA08452F

Laptinskiy, K., Khmeleva, M., Vervald, A., Burikov, S., & Dolenko, T. (2022). *Carbon dots* with up-conversion luminescence as pH nanosensor. *Applied Sciences*, *12*(23), 12006. https://doi.org/10.3390/app122312006

Li, H., Kang, Z., Liu, Y., & Lee, S.-T. (2012). Carbon nanodots: Synthesis, properties and applications. *Journal of Materials Chemistry*, *22*(46), 24230–24253. https://doi.org/10.1039/c2jm34690g

Li, T. X., Zhao, D. F., Li, L., Meng, Y., Xie, Y. H., Feng, D., ... & Mei, Y. (2024). Unraveling fluorescent mechanism of biomass-sourced carbon dots based on three major components: Cellulose, lignin, and protein. *Bioresource Technology*, *394*, 130268. https://doi.org/10.1016/j.biortech.2023.130268

Li, W., Zheng, Y., Zhang, H., Liu, Z., Su, W., Chen, S., ... & Lei, B. (2016). Phytotoxicity, uptake, and translocation of fluorescent *carbon dots* in mung bean plants. *ACS applied materials & interfaces*, *8*(31), 19939-19945. https://doi.org/10.1021/acsami.6b07268

Li, X., Yan, L., Si, J., Xu, H., & Xu, Y. (2019). Tuning the photoluminescence property of *carbon dots* by ultraviolet light irradiation. *RSC advances*, *9*(22), 12732-12736. https://doi.org/10.1039/c9ra02080b

Li, X., Zhao, S., Li, B., Yang, K., Lan, M., & Zeng, L. (2021). Advances and perspectives in carbon dot-based fluorescent probes: Mechanism, and application. *Coordination Chemistry Reviews*, *431*, 213686. https://doi.org/10.1016/j.ccr.2020.213686

Liao, L., Qi, J., Gao, J., Qu, X., Hu, Z., Fu, B., & Wu, F. (2024). Nitrogen-doped carbon quantum dots with *photoactivation* properties for ultraviolet ray detection. *ACS Applied Materials & Interfaces*, *16*(32), 42632-42640. https://doi.org/10.1021/acsami.4c07741

Lin, Z., Ali, M. M., Yi, X., Zhang, L., Wang, S., & Chen, F. (2023). Unlocking the Potential of Carbon Quantum Dots for Cell Imaging, Intracellular Localization, and Gene Expression Control in Arabidopsis thaliana (L.)

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Heynh. *International journal of molecular sciences*, *24*(21), 15700. https://doi.org/10.3390/ijms242115700

Liu, C., Zhang, F., Hu, J., Gao, W., & Zhang, M. (2021). A mini review on pH-sensitive photoluminescence in carbon nanodots. *Frontiers in chemistry*, *8*, 605028. https://doi.org/10.3389/fchem.2020.605028

Liu, H., Zhong, X., Pan, Q., Zhang, Y., Deng, W., Zou, G., & Ji, X. (2024). A review of *carbon dots* in synthesis strategy. *Coordination Chemistry Reviews*, *498*, 215468. https://doi.org/10.1016/j.ccr.2023.215468

Liu, J., Li, D., Zhang, K., Yang, M., Sun, H., & Yang, B. (2018). One-step hydrothermal synthesis of nitrogen-doped conjugated carbonized polymer dots with 31% efficient red emission for in vivo imaging. *Small*, *14*(15), e1703919. https://doi.org/10.1002/smll.201703919

Liu, Q., Chen, H., Mi, R., Min, X., Fang, M., Wu, X., & Liu, Y. (2025). Biomass-derived *carbon dots*: preparation, properties, and applications. *Nanomaterials*, *15*(16), 1279. https://doi.org/10.3390/nano15161279

Liu, Y., Zhao, Y., & Zhang, Y. (2014). One-step green synthesized fluorescent carbon nanodots from bamboo leaves for copper (II) ion detection. *Sensors and Actuators B: Chemical*, *196*, 647–652. https://doi.org/10.1016/j.snb.2014.02.053

Liu, Y., Zhao, Y., & Zhang, Y. (2023). Primary amine functionalized *carbon dots* for dead and alive bacterial imaging. *Nanomaterials*, *13*(3), 437. https://doi.org/10.3390/nano13030437

Ma, J., Chen, Q., He, H., Jiang, H., Hu, J., Liu, Y., & Han, F. (2024). *Carbon dots*-based materials and their applications in regenerative medicine. *MedComm–Biomaterials and Applications*, *3*(3), e98. https://doi.org/10.1002/mba2.98

Ma, J., Sun, L., Gao, F., Zhang, S., Zhang, Y., Wang, Y., ... & Ma, H. (2023). A review of dual-emission *carbon dots* and their applications. *Molecules*, *28*(24), 8134. https://doi.org/10.3390/molecules28248134

Magesh, V., Sundramoorthy, A. K., & Ganapathy, D. (2022). Recent advances on synthesis and potential applications of carbon quantum dots. *Frontiers in Materials*, *9*, 906838. https://doi.org/10.3389/fmats.2022.906838

Mansuriya, B. D., & Altintas, Z. (2019). Graphene quantum dot-based electrochemical immunosensors for biomedical applications. *Materials*, *13*(1), 96. https://doi.org/10.3390/ma13010096

Mansuriya, B. D., & Altintas, Z. (2020). Applications of graphene quantum dots in biomedical sensors. *Sensors*, *20*(4), 1072. https://doi.org/10.3390/s20041072

Mansuriya, B. D., & Altintas, Z. (2021). *Carbon dots*: classification, properties, synthesis, characterization, and applications in health care—an updated review (2018–2021). *Nanomaterials*, *11*(10), 2525. https://doi.org/10.3390/nano11102525

Mathew, S. A., Praveena, P., Dhanavel, S., Manikandan, R., Senthilkumar, S., & Stephen, A. (2020). Luminescent chitosan/*carbon dots* as an effective nano-

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

drug carrier for neurodegenerative diseases. *RSC advances*, *10*(41), 24386-24396. https://doi.org/10.1039/D0RA04599C

Matyjasik, W., Matus, K., Długosz, O., Pulit-Prociak, J., & Banach, M. (2025). Preparation of biomass waste-derived *carbon dots* by the thermal degradation process. *ACS omega*, *10*(22), 22529-22548. https://doi.org/10.1021/acsomega.4c10119

Mekuye, B., & Abera, B. (2023). Nanomaterials: An overview of synthesis, classification, characterization, and applications. *Nanoselect*, *4*(8), 486-501. https://doi.org/10.1002/nano.202300038

Meng, W., Bai, X., Wang, B., Liu, Z., Lu, S., & Yang, B. (2019). Biomass-derived *carbon dots* and their applications. *Energy & Environmental Materials*, *2*(3), 172-192. https://doi.org/10.1002/eem2.12038

Mohammadinejad, R., Dadashzadeh, A., Moghassemi, S., Ashrafizadeh, M., Dehshahri, A., Pardakhty, A., & Mandegary, A. (2019). Shedding light on gene therapy: *carbon dots* for the minimally invasive image-guided delivery of plasmids and noncoding RNAs — A review. *Journal of Advanced Research*, *18*, 81–93. https://doi.org/10.1016/j.jare.2019.01.004

Mohammed, S. J., Omer, K. M., & Hawaiz, F. E. (2023). Deep insights to explain the mechanism of carbon dot formation at various reaction times using the hydrothermal technique: FT-IR, 13 C-NMR, 1 H-NMR, and UV-visible spectroscopic approaches. *RSC advances*, *13*(21), 14340-14349. https://doi.org/10.1039/D3RA01646C

Monday, Y. N., Abdullah, J., Yusof, N. A., Rashid, S. A., & Shueb, R. H. (2021). Facile hydrothermal and solvothermal synthesis and characterization of nitrogen-doped *carbon dots* from palm kernel shell precursor. *Applied Sciences*, *11*(4), 1630. https://doi.org/10.3390/app11041630

Mustafa, A. A., Derise, M. R., Yong, W. T. L., & Rodrigues, K. F. (2021). A concise review of *Dendrocalamus asper* and related bamboos: germplasm conservation, propagation and molecular biology. *Plants*, *10*(9), 1897. https://doi.org/10.3390/plants10091897

Naik, G. G., Madavi, R., Minocha, T., Mohapatra, D., Pratap, R., Shreya, S., & Patra, A. (2024). In vitro cytotoxic potential of cow dung and expired tomato sauces-derived carbon nanodots against A-375 human melanoma cell line. *Arabian Journal of Chemistry*, *17*, 105576. https://doi.org/10.1016/j.arabjc.2023.105576

Nandi, N., Sarkar, P., Barnwal, N., & Sahu, K. (2025). Intricacies of carbon dot photoluminescence for emerging applications: a review. *Chemistry–An Asian Journal*, *20*(6), e202401470. https://doi.org/10.1002/asia.202401470

Ng, H. M., Lim, G. K., & Leo, C. P. (2021). Comparison between hydrothermal and microwave-assisted synthesis of *carbon dots* from biowaste and chemical for heavy metal detection: A review. *Microchemical Journal*, *165*, 106116. https://doi.org/10.1016/j.microc.2021.106116

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Omar, N. A. S., Fen, Y. W., Irmawati, R., Hashim, H. S., Ramdzan, N. S. M., & Fauzi, N. I. M. (2022). A review on *carbon dots*: synthesis, characterization and its application in optical sensor for environmental monitoring. *Nanomaterials*, *12*(14), 2365. https://doi.org/10.3390/nano12142365

Papaioannou, N., Titirici, M. M., & Sapelkin, A. (2019). Investigating the effect of reaction time on carbon dot formation, structure, and optical properties. *ACS Omega*, *4*(26), 21658–21665. https://doi.org/10.1021/acsomega.9b01798

Parray, A. H., Sohal, N., Singh, P., & Kolte, J. (2026). *Green synthesis* of carbon quantum dots from biomass: A sustainable approach to nanotechnology. *Biomass and Bioenergy*, *204*, 108447. https://doi.org/10.1016/j.biombioe.2025.108447

Piccinini, L., Nirina Ramamonjy, F., & Ursache, R. (2024). Imaging plant cell walls using fluorescent stains: The beauty is in the details. *Journal of Microscopy*, *295*(2), 102-120. https://doi.org/10.1111/jmi.13289

Praharaj, C., Patel, G. K., & Nara, S. (2025). Plant biomass-derived nanomaterials for biosensing and *bioimaging* applications. *Industrial Crops and Products*, *230*, 121074. https://doi.org/10.1016/j.indcrop.2025.121074

Pramudita, R., Gea, S., Daulay, A., Harahap, M., Tan, Y. Z., Goei, R., & Tok, A. I. Y. (2022). Synthesis of fluorescent citric acid *carbon dots* composites derived from empty fruit bunches of palm oil tree and its anti-bacterial property. *Case Studies in Chemical and Environmental Engineering*, *6*, 100277. https://doi.org/10.1016/j.cscee.2022.100277

Priya, S., & Suseem, S. R. (2024). Plant-based *carbon dots* are a sustainable alternative to conventional nanomaterials for biomedical and sensing applications. *Nano Express*, *5*(1), 012002. https://doi.org/10.1088/2632-959X/ad100c

Qian, Z., Shan, X., Chai, L., Ma, J., Chen, J., & Feng, H. (2014). Si-doped carbon quantum dots: a facile and general preparation strategy, *bioimaging* application, and multifunctional sensor. *ACS Applied Materials & Interfaces*, *6*(9), 6797–6805. https://doi.org/10.1021/am500403n

Qureshi, Z. A., Dabash, H., Ponnamma, D., & Abbas, M. K. G. (2024). *Carbon dots* as versatile nanomaterials in sensing and imaging: Efficiency and beyond. *Heliyon*, *10*(11). https://doi.org/10.1016/j.heliyon.2024.e31634

Ramanan, V., Siddaiah, B., Raji, K., & Ramamurthy, P. (2018). *Green synthesis* of multifunctionalized, nitrogen-doped, highly fluorescent *carbon dots* from waste expanded polystyrene and its application in the fluorimetric detection of Au^{3+} ions in aqueous media. *ACS Sustainable Chemistry & Engineering*, *6*(2), 1627–1638. https://doi.org/10.1021/acssuschemeng.7b02852

Rotman, B., & Papermaster, B. W. (1966). Membrane properties of living mammalian cells as studied by enzymatic hydrolysis of fluorogenic esters. *Proceedings of the National Academy of Sciences, 55*(1), 134–141. https://doi.org/10.1073/pnas.55.1.134

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Saravanan, D., & Mohan, M. (2026). green synthesis of fluorescent biogenic *carbon dots* from *Cucumis maderaspatanus* for *bioimaging* applications. *Chemistry & Biodiversity*, *23*(1), e02674. https://doi.org/10.1002/cbdv.202502674

Sarkar, M. M., Pradhan, N., Subba, R., Saha, P., & Roy, S. (2022). Sugar-terminated carbon-nanodots stimulate osmolyte accumulation and ROS detoxification for the alleviation of salinity stress in *Vigna radiata*. *Scientific Reports, 12*, 17413. https://doi.org/10.1038/s41598-022-22241-w

Sarkar, M.M., Pradhan, N., Subba, R., Saha, P., & Roy, S. (2022). Sugar-terminated carbon-nanodots stimulate osmolyte accumulation and ROS detoxification for the alleviation of salinity stress in *Vigna radiata*. *Scientific Reports*, 12, 17413. https://doi.org/10.1038/s41598-022-22241-w

Shabbir, H., Csapó, E., & Wojnicki, M. (2023). Carbon quantum dots: the role of surface functional groups and proposed mechanisms for metal ion sensing. *Inorganics*, *11*(6), 262. https://doi.org/10.3390/inorganics11060262

She, L., Cheng, X., Tavakoli, M., Borovskii, G., Zhang, W., & Huang, J. (2025). Applications of carbon dot-mediated transformation in plant (epi) genomic studies. *Trends in Plant Science*. https://doi.org/10.1016/j.tplants.2025.02.006

Shivashakarappa, K., Marriboina, S., Yadegari, Z., Paduri, V. R., Sachan, R., Dumenyo, K., & Taheri, A. (2025). DNA delivery into plant tissues using *carbon dots* made from citric acid and β-alanine. *Frontiers in Chemistry*, *13*, 1542504. https://doi.org/10.3389/fchem.2025.1542504

Sigmon, L. R., Catazaro, J., Abdel-Rahman, M., Smith, C., Prasse, C., & Fairbrother, D. H. (2025). Interrogating the photoluminescent properties of *carbon dots* using quantitative 13C NMR combined with systematic *photobleaching*. *Carbon*, *232*, 119796. https://doi.org/10.1016/j.carbon.2024.119796

Song, X., Zhao, S., Xu, Y., Chen, X., Wang, S., Zhao, P., ... & Ragauskas, A. J. (2022). Preparation, properties, and application of lignocellulosic-based fluorescent *carbon dots*. *ChemSusChem*, *15*(8), e202102486. https://doi.org/10.1002/cssc.202102486

Su, R., Wang, D., Liu, M., Yan, J., Wang, J. X., Zhan, Q., Pu, Y., Foster, N. R., & Chen, J. F. (2018). Subgram scale synthesis of biomass waste derived fluorescent *carbon dots* in subcritical water for *bioimaging*, sensing, and solidstate patterning. *ACS Omega*, *3*, 13211–13218. https://doi.org/10.1021/acsomega.8b01919

Sun, J., Yu, J., Jiang, Z., Zhao, Z., & Xia, Y. (2020). Fluorescent carbonized polymer dots prepared from sodium alginate based on the CEE effect. *ACS Omega*, *5*(42), 27514–27521. https://doi.org/10.1021/acsomega.0c03995

Sun, Y. P., Zhou, B., Lin, Y., Wang, W., Fernando, K. S., Pathak, P., & Xie, S. Y. (2006). Quantum-sized *carbon dots* for bright and colorful photoluminescence. *Journal of the American Chemical Society*, *128*(24), 7756–7757. https://doi.org/10.1021/ja062677d

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Szapoczka, W. K., Truskewycz, A. L., Skodvin, T., Holst, B., & Thomas, P. J. (2023). Fluorescence intensity and fluorescence lifetime measurements of various *carbon dots* as a function of pH. *Scientific Reports*, *13*(1), 10660. https://doi.org/10.1038/s41598-023-37578-z

Tahta, B., Sünbül, A. B., & Uruş, S. (2023). Chemical and Physical Stability of Carbon Quantum Dots Synthesized from Mahonia aquifolium. *Journal of NanoScience in Advanced Materials*, *2*(2), 45-51. https://doi.org/10.5281/zenodo.10374001

Tan, D., Zhou, S., Shimotsuma, Y., Miura, K., & Qiu, J. (2014). Effect of UV irradiation on photoluminescence of *carbon dots*. *Optical Materials Express, 4*(2), 213–219. https://doi.org/10.1364/OME.4.000213

Tang, J., Luo, Q., Li, H., Wu, Z., Lin, Z., Zhang, S., Chen, L., & Liu, Y.-G. (2025). An improved fluorescein diacetate–propidium iodide staining system for assessing microspore and pollen viability at different developmental stages. *Plant Biotechnology Journal*, *23*(5), 1601–1603. https://doi.org/10.1111/pbi.14607

Tao, H., Yang, K., Ma, Z., Wan, J., Zhang, Y., Kang, Z., & Liu, Z. (2012). In vivo NIR fluorescence imaging, biodistribution, and toxicology of photoluminescent *carbon dots* produced from carbon nanotubes and graphite. *Small*, *8*(2), 281–290. https://doi.org/10.1002/smll.201101706

Tao, S., Feng, T., Zheng, C., Zhu, S., & Yang, B. (2019). Carbonized polymer dots: a brand new perspective to recognize luminescent carbon-based nanomaterials. *The Journal of Physical Chemistry Letters*, *10*(17), 5182–5188. https://doi.org/10.1021/acs.jpclett.9b01384

Tepliakov, N. V., Kundelev, E. V., Khavlyuk, P. D., Xiong, Y., Leonov, M. Y., Zhu, W., & Rukhlenko, I. D. (2019). sp2–sp3-Hybridized atomic domains determine optical features of *carbon dots*. *ACS Nano*, *13*(9), 10737–10744. https://doi.org/10.1021/acsnano.9b05444

Vandana, M., Shetty, S. L., Sanjith, C., Sharma, A., Ganesh, H., Hegde, G., & Vijeth, H. (2026). *Green synthesis* of carbon quantum dots: sustainable strategies, property tuning, and emerging applications. *Journal of Alloys and Compounds*, 188389. https://doi.org/10.1016/j.jallcom.2026.188389

Wang, H., Zhang, M., Song, Y., Li, H., Huang, H., Shao, M., ... & Kang, Z. (2018). *Carbon dots* promote the growth and photosynthesis of mung bean sprouts. *Carbon*, *136*, 94-102. https://doi.org/10.1016/j.carbon.2018.04.051

Wang, X., Feng, Y., Dong, P., & Huang, J. (2019). A mini review on carbon quantum dots: preparation, properties, and electrocatalytic application. *Frontiers in Chemistry*, *7*, 671. https://doi.org/10.3389/fchem.2019.00671

Wang, X., Xie, H., Wang, P., & Yin, H. (2023). Nanoparticles in plants: uptake, transport and physiological activity in leaf and root. *Materials*, *16*(8), 3097. https://doi.org/10.3390/ma16083097

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Wang, Y., & Hu, A. (2014). Carbon quantum dots: Synthesis, properties and applications. *Journal of Materials Chemistry C*, *2*(34), 6921–6939. https://doi.org/10.1039/C4TC00988F

Wang, Y., Wang, Q., Liu, W., Xin, X., & Zhao, B. (2025). A review on the synthesis of *carbon dots* and their applications in environmental analysis. *Crystals*, *15*(5), 384. https://doi.org/10.3390/cryst15050384

Wang, Z., Qu, Y., Gao, X., Mu, C., Bai, J., & Pu, Q. (2014). Facile preparation of oligo (ethylene glycol)-capped fluorescent *carbon dots* from glutamic acid for plant cell imaging. *Materials Letters*, *129*, 122-125. https://doi.org/10.1016/j.matlet.2014.05.016

Wei, L., Wang, B., Cao, S., Tan, H., Long, T., Bian, C., ... & Zhu, W. (2025). Single-cell insights into *carbon dots* interactions with plant cell walls for distinct internalization pathways via surface charge modulation. *Carbon*, 120747. https://doi.org/10.1016/j.carbon.2025.120747

Williams, D. B., & Carter, C. B. (2009). *Transmission electron microscopy: A textbook for materials science* (2nd ed.). Springer. https://doi.org/10.1007/978-0-387-76501-3

Xia, C., Zhu, S., Feng, T., Yang, M., & Yang, B. (2019). Evolution and synthesis of *carbon dots*: From *carbon dots* to carbonized polymer dots. *Advanced Science*, *6*(23), 1901316. https://doi.org/10.1002/advs.201901316

Xu, J., Lai, T., Feng, Z., Weng, X., & Huang, C. (2015). Formation of fluorescent carbon nanodots from kitchen wastes and their application for detection of Fe^{3+}. *Luminescence*, *30*(4), 420–424. https://doi.org/10.1002/bio.2754

Xu, X., Meng, C., Zhan, J., Wang, Q., Zhang, M., Wang, C., ... & Zhao, X. (2026). Nanoparticle-Plant Interactions: Uptake, Transport, Physiological Effects, and Environmental Implications. *Journal of Hazardous Materials Advances*, 101123. https://doi.org/10.1016/j.hazadv.2026.101123

Xu, X., Ray, R., Gu, Y., Ploehn, H. J., Gearheart, L., Raker, K., & Scrivens, W. A. (2004). Electrophoretic analysis and purification of fluorescent single-walled carbon nanotube fragments. *Journal of the American Chemical Society*, *126*(40), 12736–12737. https://doi.org/10.1021/ja040082h

Yahav, G., Pawar, S., Lipovsky, A., Gupta, A., Gedanken, A., Duadi, H., & Fixler, D. (2023). Probing polarity and ph sensitivity of *carbon dots* in escherichia coli through time-resolved fluorescence analyses. *Nanomaterials*, *13*(14), 2068. https://doi.org/10.3390/nano13142068

Yan, X., Xu, Q., Li, D., Wang, J., & Han, R. (2021). *Carbon dots* inhibit root growth by disrupting auxin biosynthesis and transport in Arabidopsis. *Ecotoxicology and environmental safety*, *216*, 112168. https://doi.org/10.1016/j.ecoenv.2021.112168

Yang, H., Liu, Y., Guo, Z., Lei, B., Zhuang, J., Zhang, X., & Hu, C. (2019). Hydrophobic *carbon dots* with blue dispersed emission and red aggregation-

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

induced emission. *Nature Communications*, *10*, 1789. https://doi.org/10.1038/s41467-019-09830-6

Yang, J., Tang, Q., Meng, Q., Zhang, Z., Li, J., He, B., & Yang, P. (2017). Photoelectric conversion beyond sunny days: all-weather carbon quantum dot solar cells. *Journal of Materials Chemistry A*, *5*, 2143–2150. https://doi.org/10.1039/C6TA09261F

Yang, X., Lotfy, V. F., Basta, A. H., Liu, H., & Fu, S. (2024). Carbon quantum dots derived from rice straw doped with N and S and their nanocomposites with hydroxypropyl cellulose nanocomposite. *International Journal of Biological Macromolecules*, *278*, 134925. https://doi.org/10.1016/j.ijbiomac.2024.134925

Yang, X., Wang, D., Luo, N., Feng, M., Peng, X., & Liao, X. (2020). *Green synthesis* of fluorescent N, S-*carbon dots* from bamboo leaf and the interaction with nitrophenol compounds. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, *239*, 118462. https://doi.org/10.1016/j.saa.2020.118462

Yang, Y. Z., Xiao, N., Liu, S. G., Han, L., Li, N. B., & Luo, H. Q. (2020). pH-induced aggregation of hydrophilic *carbon dots* for fluorescence detection of acidic amino acid and intracellular pH imaging. *Materials Science and Engineering: C*, *108*, 110401. https://doi.org/10.1016/j.msec.2019.110401

Yao, X., Lewis, R. E., & Haynes, C. L. (2022). Synthesis processes, photoluminescence mechanism, and the toxicity of amorphous or polymeric *carbon dots*. *Accounts of Chemical Research*, *55*(23), 3312-3321. https://doi.org/10.1021/acs.accounts.2c00533

Yu, C., Li, X., Qiao, X., Zhang, Z., Zhang, D., Liu, H., ... & Zhou, L. (2023). High-yield, stable, and ultrasensitive *carbon dots* for pH sensing and Fe2+ detection are synthesized at room temperature. *The Journal of Physical Chemistry C*, *127*(6), 3176-3183. https://doi.org/10.1021/acs.jpcc.2c06449

Yuan, R., Guo, Y., Gurgan, I., Siddique, N., Li, Y. S., Jang, S., ... & Kim, S. H. (2025). Raman spectroscopy analysis of disordered and amorphous carbon materials: A review of empirical correlations. *Carbon*, *238*, 120214. https://doi.org/10.1016/j.carbon.2025.120214

Yue, J., Zhang, K., Yu, H., Yu, L., Hou, T., Chen, X., & Wang, S. (2019). Mechanism insights into tunable photoluminescence of *carbon dots* by hydroxyl radicals. *Journal of Materials Science*, *54*(8), 6140–6150. https://doi.org/10.1007/s10853-018-03254-1

Zaini, M. S., Liew, J. Y. C., & Kamarudin, M. A. (2026). Effect of pH on optical and physicochemical properties of green synthesized carbon quantum dots (CQDs) for dye-sensitized solar cell. *Journal of the Indian Chemical Society*, 102666. https://doi.org/10.1016/j.jics.2026.102666

Zamora-Valencia, C. A., Reyes-Valderrama, M. I., Escobar-Alarcón, L., Garibay-Febles, V., & Rodríguez-Lugo, V. (2025). Effect of Concentration and pH on

UNIVERSITAS
GADJAH MADA
Karakterisasi, Stabilitas Optik, dan Evaluasi Carbon Dots dari Bambu Petung (Dendrocalamus asper (Schult. & Schult.f.) Backer) sebagai Agen Bioimaging serta Keamanan Hayatinya pada Tanaman
Citra Riski Nurhartanti, Prof. Dr. Yekti Asih Purwestri, S.Si., M.Si. ; 5. Prof. Indriana Kartini, S.Si., M.Si., Ph.D.
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

the Photoluminescent Properties of CQDs Obtained from Actinidia deliciosa. *Crystals*, *15*(3), 206. https://doi.org/10.3390/cryst15030206

Zhang, L., Yang, X., Yin, Z., & Sun, L. (2022). A review on carbon quantum dots: Synthesis, photoluminescence mechanisms and applications. *Luminescence*, *37*(10), 1612-1638. https://doi.org/10.1002/bio.4351

Zhang, P., Zheng, Y., Ren, L., Li, S., Feng, M., Zhang, Q., Qi, R., Qin, Z., Zhang, J., & Jiang, L. (2024). The enhanced photoluminescence properties of *carbon dots* derived from glucose: The effect of natural oxidation. *Nanomaterials, 14*(11), 970. https://doi.org/10.3390/nano14110970

Zhang, Q., Wang, R., Feng, B., Zhong, X., & Ostrikov, K. (2021). Photoluminescence mechanism of *carbon dots*: triggering high-color-purity red fluorescence emission through edge amino protonation. *Nature Communications*, *12*(1), 6856. https://doi.org/10.1038/s41467-021-27071-4

Zhang, X., Jiang, M., Niu, N., Chen, Z., Li, S., Liu, S., & Li, J. (2018). Natural-product-derived *carbon dots*: From natural products to functional materials. *ChemSusChem*, *11*(1), 11–24. https://doi.org/10.1002/cssc.201701847

Zhang, Z., Wu, C., Hu, J., Li, C., Liu, Y., Lei, B., & Zheng, M. (2025). Recent advances of *carbon dots*: synthesis, plants applications, prospects, and challenges. *ACS Applied Bio Materials*, *8*(2), 935-961. https://doi.org/10.1021/acsabm.4c01785

Zhong, Y., Wang, J., Wu, X., Chang, R., Luo, H., Yang, J., & Zhong, Y. (2025). Synthesis of *carbon dots* as an antibacterial and antioxidant agent. *Frontiers in Chemistry*, *13*, 1627543. https://doi.org/10.3389/fchem.2025.1627543

Zhu, L., Shen, D., Wang, Q., & Luo, K. H. (2021). *Green synthesis* of tunable fluorescent carbon quantum dots from lignin and their application in anti-counterfeit printing. *ACS Applied Materials & Interfaces*, *13*(47), 56465–56475. https://doi.org/10.1021/acsami.1c16679

Zhu, S., Meng, Q., Wang, L., Zhang, J., Song, Y., Jin, H., Zhang, K., Sun, H., Wang, H., & Yang, B. (2013). Highly photoluminescent *carbon dots* for multicolor patterning, sensors, and *bioimaging*. *Angewandte Chemie International Edition*, *52*(14), 3953–3957. https://doi.org/10.1002/anie.201300519

Zhu, S., Song, Y., Zhao, X., Shao, J., Zhang, J., & Yang, B. (2015). The photoluminescence mechanism in *carbon dots* (graphene quantum dots, carbon nanodots, and polymer dots): Current state and future perspective. *Nano Research*, *8*(2), 355–381. https://doi.org/10.1007/s12274-014-0644-3

Zia, M. U., Sambasivam, P. T., Chen, D., Bhuiyan, S. A., Ford, R., & Li, Q. (2024). A carbon dot toolbox for managing biotic and abiotic stresses in crop production systems. *EcoMat*, *6*(5), e12451. https://doi.org/10.1002/eom2.12451