

DAFTAR PUSTAKA

- Agnol, L. D., Neves, R. M., Maraschin, M., Moura, S., Ornaghi, H. L., Dias, F. T. G., & Bianchi, O. (2021a). Green synthesis of Spirulina-based carbon dots for stimulating agricultural plant growth. *Sustainable Materials and Technologies*, 30(October). <https://doi.org/10.1016/j.susmat.2021.e00347>
- Agnol, L. D., Neves, R. M., Maraschin, M., Moura, S., Ornaghi, H. L., Dias, F. T. G., & Bianchi, O. (2021b). Green synthesis of Spirulina-based carbon dots for stimulating agricultural plant growth. *Sustainable Materials and Technologies*, 30(July). <https://doi.org/10.1016/j.susmat.2021.e00347>
- Astuti, Y., Mei, R., Darmawan, A., Arnelli, & Widiyandari, H. (2022). Enhancement of electrical conductivity of bismuth oxide/activated carbon composite. *Scientia Iranica*, 29(6 C), 3119–3131. <https://doi.org/10.24200/SCI.2022.57674.5359>
- Atchudan, R., Jebakumar Immanuel Edison, T. N., Shanmugam, M., Perumal, S., Somanathan, T., & Lee, Y. R. (2021a). 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(August 2020), 114417. <https://doi.org/10.1016/j.physe.2020.114417>
- Atchudan, R., Jebakumar Immanuel Edison, T. N., Shanmugam, M., Perumal, S., Somanathan, T., & Lee, Y. R. (2021b). 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(April 2020), 114417. <https://doi.org/10.1016/j.physe.2020.114417>
- Bressi, V., Balu, A. M., Iannazzo, D., & Espro, C. (2023). Recent advances in the synthesis of carbon dots from renewable biomass by high-efficient hydrothermal and microwave green approaches. *Current Opinion in Green and Sustainable Chemistry*, 40, 100742. <https://doi.org/https://doi.org/10.1016/j.cogsc.2022.100742>
- Castañeda-Serna, H. U., Calderón-Domínguez, G., García-Bórquez, A., Salgado-Cruz, M. de la P., & Farrera Rebollo, R. R. (2022). Structural and luminescent properties of CQDs produced by microwave and conventional hydrothermal methods using pelagic Sargassum as carbon source. *Optical Materials*, 126(January). <https://doi.org/10.1016/j.optmat.2022.112156>
- Chaudhary, N., Gupta, P. K., Eremin, S., & Solanki, P. R. (2020). One-step green approach to synthesize highly fluorescent carbon quantum dots from banana juice for selective detection of copper ions. *Journal of Environmental Chemical Engineering*, 8(3), 103720. <https://doi.org/10.1016/j.jece.2020.103720>

- Chauhan, D. S., Quraishi, M. A., & Verma, C. (2022). Carbon nanodots: recent advances in synthesis and applications. *Carbon Letters*, 32(7), 1603–1629. <https://doi.org/10.1007/s42823-022-00359-1>
- Chen, Q., Chen, L., Nie, X., Man, H., Guo, Z., Wang, X., Tu, J., Jin, G., & Ci, L. (2020). Impacts of surface chemistry of functional carbon nanodots on the plant growth. *Ecotoxicology and Environmental Safety*, 206, 111220. <https://doi.org/https://doi.org/10.1016/j.ecoenv.2020.111220>
- Chowmasundaram, Y. A. P., Tan, T. L., Nulit, R., Jusoh, M., & Rashid, S. A. (2023). Recent developments, applications and challenges for carbon quantum dots as a photosynthesis enhancer in agriculture. *RSC Advances*, 13(36), 25093–25117. <https://doi.org/10.1039/d3ra01217d>
- Dhanush, C., & Sethuraman, M. G. (2021). Independent hydrothermal synthesis of the undoped , nitrogen , boron and sulphur doped biogenic carbon nanodots and their potential application in the catalytic chemo-reduction of Alizarine yellow R azo dye. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 260, 119920. <https://doi.org/10.1016/j.saa.2021.119920>
- 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), 231101. <https://doi.org/10.1063/1.5143819>
- 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>
- Emile, C., Sacla, E., Honfo, H., & Glèlè, R. (2024). Heliyon On the use of post-hoc tests in environmental and biological sciences : A critical review. *Heliyon*, 10(3), e25131. <https://doi.org/10.1016/j.heliyon.2024.e25131>
- Ferdiansyah, F., Heriyanto, H., Wijaya, C. H., & Limantara, L. (2017). Pengaruh Metode Nanoenkapsulasi terhadap Stabilitas Pigmen Karotenoid dan Umur Simpan Minyak dari Buah Merah (Pandanus conoideus L). *Agritech*, 37(4), 369. <https://doi.org/10.22146/agritech.15467>
- Ferjani, H., Abdalla, S., Oyewo, O. A., & Onwudiwe, D. C. (2024). Facile synthesis of carbon dots by the hydrothermal carbonization of avocado peels and evaluation of the photocatalytic property. *Inorganic Chemistry Communications*, 160(October 2023), 111866. <https://doi.org/10.1016/j.inoche.2023.111866>
- Filippov, S. K., Khusnutdinov, R., Murmiliuk, A., Inam, W., Zakharova, L. Y., Zhang, H., & Khutoryanskiy, V. V. (2023). Dynamic light scattering and transmission electron microscopy in drug delivery: a roadmap for correct characterization of nanoparticles and interpretation of results. *Materials*

Horizons, 10(12), 5354–5370. <https://doi.org/10.1039/d3mh00717k>

- Gan, J., Chen, L., Chen, Z., Zhang, J., Yu, W., Huang, C., Wu, Y., & Zhang, K. (2023). Lignocellulosic Biomass-Based Carbon Dots: Synthesis Processes, Properties, and Applications. *Small*, 19(48). <https://doi.org/10.1002/sml.202304066>
- Görlach, B. M., Sagervanshi, A., Henningsen, J. N., Pitann, B., & Mühlhling, K. H. (2021). Uptake, subcellular distribution, and translocation of foliar-applied phosphorus: Short-term effects on ion relations in deficient young maize plants. *Plant Physiology and Biochemistry*, 166, 677–688. <https://doi.org/https://doi.org/10.1016/j.plaphy.2021.06.028>
- Guo, B., Liu, G., Li, W., Hu, C., Lei, B., Zhuang, J., Zheng, M., & Liu, Y. (2022). The role of carbon dots in the life cycle of crops. *Industrial Crops and Products*, 187, 115427. <https://doi.org/https://doi.org/10.1016/j.indcrop.2022.115427>
- Guo, B., Liu, G., Wei, H., Qiu, J., Zhuang, J., Zhang, X., Zheng, M., Li, W., Zhang, H., Hu, C., Lei, B., & Liu, Y. (2022). The role of fluorescent carbon dots in crops: Mechanism and applications. *SmartMat*, 3(2), 208–225. <https://doi.org/https://doi.org/10.1002/smm2.1111>
- Hagiwara, K., Horikoshi, S., & Serpone, N. (2021). Photoluminescent Carbon Quantum Dots: Synthetic Approaches and Photophysical Properties. *Chemistry - A European Journal*, 27(37), 9466–9481. <https://doi.org/10.1002/chem.202100823>
- He, M., Zhang, J., Wang, H., Kong, Y., Xiao, Y., & Xu, W. (2018). Material and Optical Properties of Fluorescent Carbon Quantum Dots Fabricated from Lemon Juice via Hydrothermal Reaction. *Nanoscale Research Letters*, 13. <https://doi.org/10.1186/s11671-018-2581-7>
- Jorns, M., & Pappas, D. (2021). A Review of Fluorescent Carbon Dots, Their Synthesis, Physical and Chemical Characteristics, and Applications. *Nanomaterials (Basel, Switzerland)*, 11(6). <https://doi.org/10.3390/nano11061448>
- Kaur, P., & Verma, G. (2022). Converting fruit waste into carbon dots for bioimaging applications. *Materials Today Sustainability*, 18, 100137. <https://doi.org/https://doi.org/10.1016/j.mtsust.2022.100137>
- Khan, M. E., Mohammad, A., & Yoon, T. (2022). State-of-the-art developments in carbon quantum dots (CQDs): Photo-catalysis, bio-imaging, and bio-sensing applications. *Chemosphere*, 302(April), 134815. <https://doi.org/10.1016/j.chemosphere.2022.134815>

- Kim, K. W., Kwon, Y. M., Kim, S. Y., & Kim, J. Y. H. (2022). One-pot synthesis of UV-protective carbon nanodots from sea cauliflower (*Leathesia difformis*). *Electronic Journal of Biotechnology*, *56*, 22–30. <https://doi.org/https://doi.org/10.1016/j.ejbt.2021.12.004>
- Kim, T. (2017). Understanding one-way ANOVA using conceptual figures. *Korean Journal of Anesthesiology*, *70*, 22. <https://doi.org/10.4097/kjae.2017.70.1.22>
- 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>
- Li, G., Xu, J., & Xu, K. (2023). Physiological Functions of Carbon Dots and Their Applications in Agriculture: A Review. In *Nanomaterials* (Vol. 13, Nomor 19). <https://doi.org/10.3390/nano13192684>
- Li, W., Zheng, Y., Zhang, H., Liu, Z., Su, W., Chen, S., Liu, Y., Zhuang, J., & 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>
- Manjubaashini, N., Bargavi, P., & Balakumar, S. (2024). Carbon quantum dots derived from agro waste biomass for pioneering bioanalysis and in vivo bioimaging. *Journal of Photochemistry and Photobiology A: Chemistry*, *454*(February), 115702. <https://doi.org/10.1016/j.jphotochem.2024.115702>
- Manzoor, S., Dar, A. H., Dash, K. K., Pandey, V. K., Srivastava, S., Bashir, I., & Khan, S. A. (2023). Carbon dots applications for development of sustainable technologies for food safety: A comprehensive review. *Applied Food Research*, *3*(1), 100263. <https://doi.org/https://doi.org/10.1016/j.afres.2023.100263>
- Mitra, S., Hamada, N., & Mitra, S. K. (2024). Experimental observation and characterization of amorphous carbon generated in graphene on gold nanoparticles. *RSC Advances*, *14*(35), 25307–25315. <https://doi.org/10.1039/d4ra04893h>
- Mohamed, M., Jaafar, J., Ismail, A., Othman, M. H., & Rahman, M. (2017). Fourier Transform Infrared (FTIR) Spectroscopy. In *Membrane Characterization* (hal. 3–29). <https://doi.org/10.1016/B978-0-444-63776-5.00001-2>
- Nazibudin, N. A., Zainuddin, M., & che abdullah, che azurahaman. (2023). Hydrothermal Synthesis of Carbon Quantum Dots: An Updated Review. *Journal of Advanced Research in Fluid Mechanics and Thermal Sciences*, *101*, 192–206. <https://doi.org/10.37934/arfmts.101.1.192206>
- Nguyen, T. N., Le, P. A., & Phung, V. B. T. (2022). Facile green synthesis of carbon

- quantum dots and biomass-derived activated carbon from banana peels: synthesis and investigation. *Biomass Conversion and Biorefinery*, 12(7), 2407–2416. <https://doi.org/10.1007/s13399-020-00839-2>
- Pandey, F. P., Rastogi, A., & Singh, S. (2020). Optical properties and zeta potential of carbon quantum dots (CQDs) dispersed nematic liquid crystal 4'-heptyl-4-biphenylcarbonitrile (7CB). *Optical Materials*, 105(December 2019), 109849. <https://doi.org/10.1016/j.optmat.2020.109849>
- Pliszka, B., Olszewska, T., & Drabent, R. (2001). Fluorescence of anthocyanin pigments in plant extracts at various pH. *Proceedings of SPIE - The International Society for Optical Engineering*, 4515. <https://doi.org/10.1117/12.432965>
- Raikwar, V. R. (2022). Synthesis and study of carbon quantum dots (CQDs) for enhancement of luminescence intensity of CQD@LaPO₄:Eu³⁺ nanocomposite. *Materials Chemistry and Physics*, 275(September 2021), 125277. <https://doi.org/10.1016/j.matchemphys.2021.125277>
- Ramaye, Y., Dabrio, M., Roebben, G., & Kestens, V. (2021). Development and Validation of Optical Methods for Zeta Potential Determination of Silica and Polystyrene Particles in Aqueous Suspensions. In *Materials* (Vol. 14, Nomor 2). <https://doi.org/10.3390/ma14020290>
- Saikia, M., Hazarika, A., Roy, K., Khare, P., Dihingia, A., Konwar, R., & Saikia, B. K. (2023). Waste-derived high-yield biocompatible fluorescent carbon quantum dots for biological and nanofertiliser applications. *Journal of Environmental Chemical Engineering*, 11(6), 111344. <https://doi.org/10.1016/j.jece.2023.111344>
- Sood, M. (2025). Reactive oxygen species (ROS): plant perspectives on oxidative signalling and biotic stress response. *Discover Plants*. <https://doi.org/10.1007/s44372-025-00275-4>
- Syifa, Salsabilla, U., Kusumawati Hari, D., & Fitriana. (2024). Karakteristik Carbon Dots (C-dots) Dari Buah Jeruk Mandarin (*Citrus Reticulata*) yang Disintesis Menggunakan Metode Hidrotermal. *Jurnal Inovasi Fisika Indonesia (IFI)*, 13, 60–73.
- Tavan, M., Yousefian, Z., Bakhtiar, Z., Rahmandoust, M., & Mirjalili, M. H. (2025). Carbon quantum dots: Multifunctional fluorescent nanomaterials for sustainable advances in biomedicine and agriculture. *Industrial Crops and Products*, 231(May), 121207. <https://doi.org/10.1016/j.indcrop.2025.121207>
- Tuok, L. P., Elkady, M., Zkria, A., Yoshitake, T., & Nour Eldemerdash, U. (2023). Evaluation of stability and functionality of zinc oxide nanofluids for enhanced oil recovery. *Micro and Nano Systems Letters*, 11(1), 12.

<https://doi.org/10.1186/s40486-023-00180-z>

- Utami, W., Saragih, E. B., & Andini, M. (2023). Potensi Aktivitas Sitotoksik Belimbing Wuluh (*Averrhoa bilimbi* L.) Pada Sel Kanker. *Lansau: Jurnal Ilmu Kefarmasian*, *1*(2), 140–152. <https://doi.org/10.33772/lansau.v1i2.18>
- Veerana, M., Ketya, W., Choi, E. H., & Park, G. (2024). Non-thermal plasma enhances growth and salinity tolerance of bok choy (*Brassica rapa* subsp. *chinensis*) in hydroponic culture. *Frontiers in Plant Science*, *15*(September), 1–16. <https://doi.org/10.3389/fpls.2024.1445791>
- Venugopalan, P., & Vidya, N. (2022). Bilimbi (*Averrhoa bilimbi*) fruit derived carbon dots for dual sensing of Cu(II) and quinalphos. *International Journal of Environmental Analytical Chemistry*, *11*, 1–17. <https://doi.org/10.1080/03067319.2022.2149331>
- Wakary, P., Taunaumang, H., & Lolowang, J. (2020). Analisis Struktur Fisis Dan Sifat Optik Film Tipis Sudan Iii Hasil Deposisi Evaporasi Vakum. *Jurnal FisTa: Fisika dan Terapannya*, *1*(2), 46–52. <https://doi.org/10.53682/fista.v1i2.90>
- Wang, C., Xu, Z., Cheng, H., Lin, H., Humphrey, M. G., & Zhang, C. (2015). A hydrothermal route to water-stable luminescent carbon dots as nanosensors for pH and temperature. *Carbon*, *82*, 87–95. <https://doi.org/https://doi.org/10.1016/j.carbon.2014.10.035>
- Wang, H., Zhang, M., Song, Y., Li, H., Huang, H., Shao, M., Liu, Y., & 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>
- Wareing, T. C., Gentile, P., & Phan, A. N. (2021). Biomass-Based Carbon Dots: Current Development and Future Perspectives. *ACS Nano*, *15*(10), 15471–15501. <https://doi.org/10.1021/acsnano.1c03886>
- Wu, J., Chen, T., Ge, S., Fan, W., Wang, H., Zhang, Z., Lichtfouse, E., Van Tran, T., Liew, R. K., Rezakazemi, M., & Huang, R. (2023). Synthesis and applications of carbon quantum dots derived from biomass waste: a review. *Environmental Chemistry Letters*, *21*(6), 3393–3424. <https://doi.org/10.1007/s10311-023-01636-9>
- Yusoff, I. M., Azelee, N. I. W., Chua, L. S., & Mustafa, R. R. (2024). A comparison of phytoconstituent and functional loaded low moisture food from *Averrhoa bilimbi* using freeze drying and oven drying methods. *Journal of Food Measurement and Characterization*, *18*(9), 7468–7479. <https://doi.org/10.1007/s11694-024-02741-1>
- Zasoski, R. J. (2008). *Zeta potential BT - Encyclopedia of Soil Science* (W.

Chesworth (ed.); hal. 841–845). Springer Netherlands.
https://doi.org/10.1007/978-1-4020-3995-9_644

- 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. In *Nanomaterials* (Vol. 14, Nomor 11). <https://doi.org/10.3390/nano14110970>
- Zhang, Y., Xu, S., Ji, F., Hu, Y., Gu, Z., & Xu, B. (2020). Plant cell wall hydrolysis process reveals structure–activity relationships. *Plant Methods*, *16*(1), 147. <https://doi.org/10.1186/s13007-020-00691-5>
- Agnol, L. D., Neves, R. M., Maraschin, M., Moura, S., Ornaghi, H. L., Dias, F. T. G., & Bianchi, O. (2021a). Green synthesis of Spirulina-based carbon dots for stimulating agricultural plant growth. *Sustainable Materials and Technologies*, *30*(October). <https://doi.org/10.1016/j.susmat.2021.e00347>
- Agnol, L. D., Neves, R. M., Maraschin, M., Moura, S., Ornaghi, H. L., Dias, F. T. G., & Bianchi, O. (2021b). Green synthesis of Spirulina-based carbon dots for stimulating agricultural plant growth. *Sustainable Materials and Technologies*, *30*(July). <https://doi.org/10.1016/j.susmat.2021.e00347>
- Astuti, Y., Mei, R., Darmawan, A., Arnelli, & Widiyandari, H. (2022). Enhancement of electrical conductivity of bismuth oxide/activated carbon composite. *Scientia Iranica*, *29*(6 C), 3119–3131. <https://doi.org/10.24200/SCI.2022.57674.5359>
- Atchudan, R., Jebakumar Immanuel Edison, T. N., Shanmugam, M., Perumal, S., Somanathan, T., & Lee, Y. R. (2021a). 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*(August 2020), 114417. <https://doi.org/10.1016/j.physe.2020.114417>
- Atchudan, R., Jebakumar Immanuel Edison, T. N., Shanmugam, M., Perumal, S., Somanathan, T., & Lee, Y. R. (2021b). 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*(April 2020), 114417. <https://doi.org/10.1016/j.physe.2020.114417>
- Bressi, V., Balu, A. M., Iannazzo, D., & Espro, C. (2023). Recent advances in the synthesis of carbon dots from renewable biomass by high-efficient hydrothermal and microwave green approaches. *Current Opinion in Green and Sustainable Chemistry*, *40*, 100742. <https://doi.org/https://doi.org/10.1016/j.cogsc.2022.100742>
- Castañeda-Serna, H. U., Calderón-Domínguez, G., García-Bórquez, A., Salgado-Cruz, M. de la P., & Farrera Rebollo, R. R. (2022). Structural and luminescent

- properties of CQDs produced by microwave and conventional hydrothermal methods using pelagic Sargassum as carbon source. *Optical Materials*, 126(January). <https://doi.org/10.1016/j.optmat.2022.112156>
- Chaudhary, N., Gupta, P. K., Eremin, S., & Solanki, P. R. (2020). One-step green approach to synthesize highly fluorescent carbon quantum dots from banana juice for selective detection of copper ions. *Journal of Environmental Chemical Engineering*, 8(3), 103720. <https://doi.org/10.1016/j.jece.2020.103720>
- Chauhan, D. S., Quraishi, M. A., & Verma, C. (2022). Carbon nanodots: recent advances in synthesis and applications. *Carbon Letters*, 32(7), 1603–1629. <https://doi.org/10.1007/s42823-022-00359-1>
- Chen, Q., Chen, L., Nie, X., Man, H., Guo, Z., Wang, X., Tu, J., Jin, G., & Ci, L. (2020). Impacts of surface chemistry of functional carbon nanodots on the plant growth. *Ecotoxicology and Environmental Safety*, 206, 111220. <https://doi.org/https://doi.org/10.1016/j.ecoenv.2020.111220>
- Chowmasundaram, Y. A. P., Tan, T. L., Nulit, R., Jusoh, M., & Rashid, S. A. (2023). Recent developments, applications and challenges for carbon quantum dots as a photosynthesis enhancer in agriculture. *RSC Advances*, 13(36), 25093–25117. <https://doi.org/10.1039/d3ra01217d>
- Dhanush, C., & Sethuraman, M. G. (2021). Independent hydrothermal synthesis of the undoped , nitrogen , boron and sulphur doped biogenic carbon nanodots and their potential application in the catalytic chemo-reduction of Alizarine yellow R azo dye. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 260, 119920. <https://doi.org/10.1016/j.saa.2021.119920>
- 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), 231101. <https://doi.org/10.1063/1.5143819>
- 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>
- Emile, C., Sacla, E., Honfo, H., & Glèlè, R. (2024). Heliyon On the use of post-hoc tests in environmental and biological sciences : A critical review. *Heliyon*, 10(3), e25131. <https://doi.org/10.1016/j.heliyon.2024.e25131>
- Ferdiansyah, F., Heriyanto, H., Wijaya, C. H., & Limantara, L. (2017). Pengaruh Metode Nanoenkapsulasi terhadap Stabilitas Pigmen Karotenoid dan Umur Simpan Minyak dari Buah Merah (*Pandanus conoideus* L). *Agritech*, 37(4), 369. <https://doi.org/10.22146/agritech.15467>

- Ferjani, H., Abdalla, S., Oyewo, O. A., & Onwudiwe, D. C. (2024). Facile synthesis of carbon dots by the hydrothermal carbonization of avocado peels and evaluation of the photocatalytic property. *Inorganic Chemistry Communications*, *160*(October 2023), 111866. <https://doi.org/10.1016/j.inoche.2023.111866>
- Filippov, S. K., Khusnutdinov, R., Murmiliuk, A., Inam, W., Zakharova, L. Y., Zhang, H., & Khutoryanskiy, V. V. (2023). Dynamic light scattering and transmission electron microscopy in drug delivery: a roadmap for correct characterization of nanoparticles and interpretation of results. *Materials Horizons*, *10*(12), 5354–5370. <https://doi.org/10.1039/d3mh00717k>
- Gan, J., Chen, L., Chen, Z., Zhang, J., Yu, W., Huang, C., Wu, Y., & Zhang, K. (2023). Lignocellulosic Biomass-Based Carbon Dots: Synthesis Processes, Properties, and Applications. *Small*, *19*(48). <https://doi.org/10.1002/sml.202304066>
- Görlach, B. M., Sagervanshi, A., Henningsen, J. N., Pitann, B., & Mühlhng, K. H. (2021). Uptake, subcellular distribution, and translocation of foliar-applied phosphorus: Short-term effects on ion relations in deficient young maize plants. *Plant Physiology and Biochemistry*, *166*, 677–688. <https://doi.org/https://doi.org/10.1016/j.plaphy.2021.06.028>
- Guo, B., Liu, G., Li, W., Hu, C., Lei, B., Zhuang, J., Zheng, M., & Liu, Y. (2022). The role of carbon dots in the life cycle of crops. *Industrial Crops and Products*, *187*, 115427. <https://doi.org/https://doi.org/10.1016/j.indcrop.2022.115427>
- Guo, B., Liu, G., Wei, H., Qiu, J., Zhuang, J., Zhang, X., Zheng, M., Li, W., Zhang, H., Hu, C., Lei, B., & Liu, Y. (2022). The role of fluorescent carbon dots in crops: Mechanism and applications. *SmartMat*, *3*(2), 208–225. <https://doi.org/https://doi.org/10.1002/smm2.1111>
- Hagiwara, K., Horikoshi, S., & Serpone, N. (2021). Photoluminescent Carbon Quantum Dots: Synthetic Approaches and Photophysical Properties. *Chemistry - A European Journal*, *27*(37), 9466–9481. <https://doi.org/10.1002/chem.202100823>
- He, M., Zhang, J., Wang, H., Kong, Y., Xiao, Y., & Xu, W. (2018). Material and Optical Properties of Fluorescent Carbon Quantum Dots Fabricated from Lemon Juice via Hydrothermal Reaction. *Nanoscale Research Letters*, *13*. <https://doi.org/10.1186/s11671-018-2581-7>
- Jorns, M., & Pappas, D. (2021). A Review of Fluorescent Carbon Dots, Their Synthesis, Physical and Chemical Characteristics, and Applications. *Nanomaterials (Basel, Switzerland)*, *11*(6). <https://doi.org/10.3390/nano11061448>

- Kaur, P., & Verma, G. (2022). Converting fruit waste into carbon dots for bioimaging applications. *Materials Today Sustainability*, *18*, 100137. <https://doi.org/https://doi.org/10.1016/j.mtsust.2022.100137>
- Khan, M. E., Mohammad, A., & Yoon, T. (2022). State-of-the-art developments in carbon quantum dots (CQDs): Photo-catalysis, bio-imaging, and bio-sensing applications. *Chemosphere*, *302*(April), 134815. <https://doi.org/10.1016/j.chemosphere.2022.134815>
- Kim, K. W., Kwon, Y. M., Kim, S. Y., & Kim, J. Y. H. (2022). One-pot synthesis of UV-protective carbon nanodots from sea cauliflower (*Leathesia difformis*). *Electronic Journal of Biotechnology*, *56*, 22–30. <https://doi.org/https://doi.org/10.1016/j.ejbt.2021.12.004>
- Kim, T. (2017). Understanding one-way ANOVA using conceptual figures. *Korean Journal of Anesthesiology*, *70*, 22. <https://doi.org/10.4097/kjae.2017.70.1.22>
- 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>
- Li, G., Xu, J., & Xu, K. (2023). Physiological Functions of Carbon Dots and Their Applications in Agriculture: A Review. In *Nanomaterials* (Vol. 13, Nomor 19). <https://doi.org/10.3390/nano13192684>
- Li, W., Zheng, Y., Zhang, H., Liu, Z., Su, W., Chen, S., Liu, Y., Zhuang, J., & 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>
- Manjubaashini, N., Bargavi, P., & Balakumar, S. (2024). Carbon quantum dots derived from agro waste biomass for pioneering bioanalysis and in vivo bioimaging. *Journal of Photochemistry and Photobiology A: Chemistry*, *454*(February), 115702. <https://doi.org/10.1016/j.jphotochem.2024.115702>
- Manzoor, S., Dar, A. H., Dash, K. K., Pandey, V. K., Srivastava, S., Bashir, I., & Khan, S. A. (2023). Carbon dots applications for development of sustainable technologies for food safety: A comprehensive review. *Applied Food Research*, *3*(1), 100263. <https://doi.org/https://doi.org/10.1016/j.afres.2023.100263>
- Mitra, S., Hamada, N., & Mitra, S. K. (2024). Experimental observation and characterization of amorphous carbon generated in graphene on gold nanoparticles. *RSC Advances*, *14*(35), 25307–25315. <https://doi.org/10.1039/d4ra04893h>
- Mohamed, M., Jaafar, J., Ismail, A., Othman, M. H., & Rahman, M. (2017). Fourier

- Transform Infrared (FTIR) Spectroscopy. In *Membrane Characterization* (hal. 3–29). <https://doi.org/10.1016/B978-0-444-63776-5.00001-2>
- Nazibudin, N. A., Zainuddin, M., & che abdullah, che azurahamanim. (2023). Hydrothermal Synthesis of Carbon Quantum Dots: An Updated Review. *Journal of Advanced Research in Fluid Mechanics and Thermal Sciences*, *101*, 192–206. <https://doi.org/10.37934/arfmts.101.1.192206>
- Nguyen, T. N., Le, P. A., & Phung, V. B. T. (2022). Facile green synthesis of carbon quantum dots and biomass-derived activated carbon from banana peels: synthesis and investigation. *Biomass Conversion and Biorefinery*, *12*(7), 2407–2416. <https://doi.org/10.1007/s13399-020-00839-2>
- Pandey, F. P., Rastogi, A., & Singh, S. (2020). Optical properties and zeta potential of carbon quantum dots (CQDs) dispersed nematic liquid crystal 4'-heptyl-4-biphenylcarbonitrile (7CB). *Optical Materials*, *105*(December 2019), 109849. <https://doi.org/10.1016/j.optmat.2020.109849>
- Pliszka, B., Olszewska, T., & Drabent, R. (2001). Fluorescence of anthocyanin pigments in plant extracts at various pH. *Proceedings of SPIE - The International Society for Optical Engineering*, *4515*. <https://doi.org/10.1117/12.432965>
- Raikwar, V. R. (2022). Synthesis and study of carbon quantum dots (CQDs) for enhancement of luminescence intensity of CQD@LaPO₄:Eu³⁺ nanocomposite. *Materials Chemistry and Physics*, *275*(September 2021), 125277. <https://doi.org/10.1016/j.matchemphys.2021.125277>
- Ramaye, Y., Dabrio, M., Roebben, G., & Kestens, V. (2021). Development and Validation of Optical Methods for Zeta Potential Determination of Silica and Polystyrene Particles in Aqueous Suspensions. In *Materials* (Vol. 14, Nomor 2). <https://doi.org/10.3390/ma14020290>
- Saikia, M., Hazarika, A., Roy, K., Khare, P., Dihingia, A., Konwar, R., & Saikia, B. K. (2023). Waste-derived high-yield biocompatible fluorescent carbon quantum dots for biological and nanofertiliser applications. *Journal of Environmental Chemical Engineering*, *11*(6), 111344. <https://doi.org/10.1016/j.jece.2023.111344>
- Sood, M. (2025). Reactive oxygen species (ROS): plant perspectives on oxidative signalling and biotic stress response. *Discover Plants*. <https://doi.org/10.1007/s44372-025-00275-4>
- Syifa, Salsabilla, U., Kusumawati Hari, D., & Fitriana. (2024). Karakteristik Carbon Dots (C-dots) Dari Buah Jeruk Mandarin (*Citrus Reticulata*) yang Disintesis Menggunakan Metode Hidrotermal. *Jurnal Inovasi Fisika Indonesia (IFI)*, *13*, 60–73.

- Tavan, M., Yousefian, Z., Bakhtiar, Z., Rahmandoust, M., & Mirjalili, M. H. (2025). Carbon quantum dots: Multifunctional fluorescent nanomaterials for sustainable advances in biomedicine and agriculture. *Industrial Crops and Products*, 231(May), 121207. <https://doi.org/10.1016/j.indcrop.2025.121207>
- Tuok, L. P., Elkady, M., Zkria, A., Yoshitake, T., & Nour Eldemerdash, U. (2023). Evaluation of stability and functionality of zinc oxide nanofluids for enhanced oil recovery. *Micro and Nano Systems Letters*, 11(1), 12. <https://doi.org/10.1186/s40486-023-00180-z>
- Utami, W., Saragih, E. B., & Andini, M. (2023). Potensi Aktivitas Sitotoksik Belimbing Wuluh (*Averrhoa bilimbi* L.) Pada Sel Kanker. *Lansau: Jurnal Ilmu Kefarmasian*, 1(2), 140–152. <https://doi.org/10.33772/lansau.v1i2.18>
- Veerana, M., Ketya, W., Choi, E. H., & Park, G. (2024). Non-thermal plasma enhances growth and salinity tolerance of bok choy (*Brassica rapa* subsp. *chinensis*) in hydroponic culture. *Frontiers in Plant Science*, 15(September), 1–16. <https://doi.org/10.3389/fpls.2024.1445791>
- Venugopalan, P., & Vidya, N. (2022). Bilimbi (*Averrhoa bilimbi*) fruit derived carbon dots for dual sensing of Cu(II) and quinalphos. *International Journal of Environmental Analytical Chemistry*, 1(2), 1–17. <https://doi.org/10.1080/03067319.2022.2149331>
- Wakary, P., Taunamang, H., & Lolowang, J. (2020). Analisis Struktur Fisis Dan Sifat Optik Film Tipis Sudan Iii Hasil Deposisi Evaporasi Vakum. *Jurnal FisTa: Fisika dan Terapannya*, 1(2), 46–52. <https://doi.org/10.53682/fista.v1i2.90>
- Wang, C., Xu, Z., Cheng, H., Lin, H., Humphrey, M. G., & Zhang, C. (2015). A hydrothermal route to water-stable luminescent carbon dots as nanosensors for pH and temperature. *Carbon*, 82, 87–95. <https://doi.org/https://doi.org/10.1016/j.carbon.2014.10.035>
- Wang, H., Zhang, M., Song, Y., Li, H., Huang, H., Shao, M., Liu, Y., & 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>
- Wareing, T. C., Gentile, P., & Phan, A. N. (2021). Biomass-Based Carbon Dots: Current Development and Future Perspectives. *ACS Nano*, 15(10), 15471–15501. <https://doi.org/10.1021/acsnano.1c03886>
- Wu, J., Chen, T., Ge, S., Fan, W., Wang, H., Zhang, Z., Lichtfouse, E., Van Tran, T., Liew, R. K., Rezakazemi, M., & Huang, R. (2023). Synthesis and applications of carbon quantum dots derived from biomass waste: a review. *Environmental Chemistry Letters*, 21(6), 3393–3424. <https://doi.org/10.1007/s10311-023-01636-9>

- Yusoff, I. M., Azelee, N. I. W., Chua, L. S., & Mustafa, R. R. (2024). A comparison of phytoconstituent and functional loaded low moisture food from Averrhoa bilimbi using freeze drying and oven drying methods. *Journal of Food Measurement and Characterization*, 18(9), 7468–7479. <https://doi.org/10.1007/s11694-024-02741-1>
- Zasoski, R. J. (2008). *Zeta potential BT - Encyclopedia of Soil Science* (W. Chesworth (ed.); hal. 841–845). Springer Netherlands. https://doi.org/10.1007/978-1-4020-3995-9_644
- 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. In *Nanomaterials* (Vol. 14, Nomor 11). <https://doi.org/10.3390/nano14110970>
- Zhang, Y., Xu, S., Ji, F., Hu, Y., Gu, Z., & Xu, B. (2020). Plant cell wall hydrolysis process reveals structure–activity relationships. *Plant Methods*, 16(1), 147. <https://doi.org/10.1186/s13007-020-00691-5>