REFERENCES

References

Abdellah, M.H., Nosier, S.A., El-Shazly, A.H., Mubarak, A.A., 2018. Photocatalytic decolorization of methylene blue using TiO_2/UV system enhanced by air sparging. Alexandria Eng. J. 57, 3727–3735. https://doi.org/10.1016/j.aej.2018.07.018

Abid, M.F., Zablouk, M.A., Abid-Alameer, A.M., 2012. Experimental study of dye removal from industrial wastewater by membrane technologies of reverse osmosis and nanofiltration. J. Environ. Heal. Sci. Eng. 9, 1–9.

Abu Talha, M., Goswami, M., Giri, B.S., Sharma, A., Rai, B.N., Singh, R.S., 2018. Bioremediation of Congo red dye in immobilized batch and continuous packed bed bioreactor by *Brevibacillus parabrevis* using coconut shell bio-char. Bioresour. Technol. 252, 37–43. https://doi.org/10.1016/j.biortech.2017.12.081

Adenan, N.H., Lim, Y.Y., Ting, A.S.Y., 2020. Discovering Decolorization Potential of Triphenylmethane Dyes by *Actinobacteria* from Soil. Water. Air. Soil Pollut. 231. https://doi.org/10.1007/s11270-020-04928-w

Akansha, K., Chakraborty, D., Sachan, S.G., 2019. Decolorization and degradation of methyl orange by *Bacillus stratosphericus* SCA1007. Biocatal. Agric. Biotechnol. 18. https://doi.org/10.1016/j.bcab.2019.101044

Al-Mamun, M.R., Kader, S., Islam, M.S., Khan, M.Z.H., 2019. Photocatalytic activity improvement and application of UV-TiO_2 photocatalysis in textile wastewater treatment: A review. J. Environ. Chem. Eng. 7. https://doi.org/10.1016/j.jece.2019.103248

Al-Musawi, T.J., Mengelizadeh, N., Taghavi, M., Shehu, Z., Balarak, D., 2022. Capability of copper–nickel ferrite nanoparticles loaded onto multi-walled carbon nanotubes to degrade acid blue 113 dye in the sonophotocatalytic treatment process. Environ. Sci. Pollut. Res. 1, 1–14. https://doi.org/10.1007/S11356-022-19460-Z/FIGURES/8

Al-Tohamy, R., Ali, S.S., Li, F., Okasha, K.M., Mahmoud, Y.A.G., Elsamahy, T., Jiao, H., Fu, Y., Sun, J., 2022. A critical review on the treatment of dye-containing wastewater: Ecotoxicological and health concerns of textile dyes and possible remediation approaches for environmental safety. Ecotoxicol. Environ. Saf. 231. https://doi.org/10.1016/j.ecoenv.2021.113160

Al Farraj, D.A., Elshikh, M.S., Al Khulaifi, M.M., Hadibarata, T., Yuniarto, A., Syafiuddin, A., 2019. Biotransformation and Detoxification of Antraquione Dye Green 3 using halophilic *Hortaea* sp. Int. Biodeterior. Biodegrad. https://doi.org/10.1016/j.ibiod.2019.03.011

Aliyev, E., Filiz, V., Khan, M.M., Lee, Y.J., Abetz, C., Abetz, V., 2019. Structural characterization of graphene oxide: Surface functional groups and fractionated oxidative debris. Nanomaterials 9. https://doi.org/10.3390/nano9081180

Ambaye, T.G., Hagos, K., 2020. Photocatalytic and biological oxidation treatment of real textile wastewater. Nanotechnol. Environ. Eng. 5. https://doi.org/10.1007/s41204-020-00094-w

Ameenudeen, S., Unnikrishnan, S., Ramalingam, K., 2021. Statistical optimization for the efficacious degradation of reactive azo dyes using *Acinetobacter baumannii* JC359. J. Environ. Manage. 279, 111512. https://doi.org/10.1016/j.jenvman.2020.111512

Andriani, A., Yanto, D.H.Y., 2021. Comparative kinetic study on biodecolorization of synthetic dyes by *Bjerkandera adusta* SM46 in alginate beads-packed bioreactor system and shaking culture under saline-alkaline stress. https://doi.org/10.1080/10242422.2021.1929193.

Aragão, M.S., Menezes, D.B., Ramos, L.C., Oliveira, H.S., Bharagava, R.N., Romanholo Ferreira, L.F., Teixeira, J.A., Ruzene, D.S., Silva, D.P., 2020. Mycoremediation of vinasse by surface response methodology and preliminary studies in air-lift bioreactors. Chemosphere 244, 125432. https://doi.org/10.1016/j.chemosphere.2019.125432

Arikan, E.B., Isik, Z., Bouras, H.D., Dizge, N., 2019. Investigation of immobilized filamentous fungi for treatment of real textile industry wastewater using up flow packed bed bioreactor. Bioresour. Technol. Reports 7, 100197. https://doi.org/10.1016/j.biteb.2019.100197

Asri, M., Elabed, S., Koraichi, S.I., Ghachtouli, N. El, 2019. Biofilm-Based Systems for Industrial Wastewater Treatment 1767–1787. https://doi.org/10.1007/978-3-319-73645-7_137

Axelsson, J., Nilsson, U., Terrazas, E., Alvarez Aliaga, T., Welander, U., 2006.

Decolorization of the textile dyes Reactive Red 2 and Reactive Blue 4 using *Bjerkandera* sp. Strain BOL 13 in a continuous rotating biological contactor reactor. Enzyme Microb. Technol. 39, 32–37. https://doi.org/10.1016/j.enzmictec.2005.09.006

Ayed, L., Bakir, K., Ben Mansour, H., Hammami, S., Cheref, A., Bakhrouf, A., 2017. In vitro mutagenicity, NMR metabolite characterization of azo and triphenylmethanes dyes by adherents bacteria and the role of the "cna" adhesion gene in activated sludge. Microb. Pathog. 103, 29–39. https://doi.org/10.1016/j.micpath.2016.12.016

Bafana, A., Devi, S.S., Chakrabarti, T., 2011. Azo dyes: past, present and the future. https://doi.org/10.1139/a11-018 19, 350–370. https://doi.org/10.1139/A11-018

Balapure, K., Bhatt, N., Madamwar, D., 2015. Mineralization of reactive azo dyes present in simulated textile waste water using down flow microaerophilic fixed film bioreactor. Bioresour. Technol. 175, 1–7. https://doi.org/10.1016/j.biortech.2014.10.040

Balarak, D., Mostafapour, F.K., 2019. Photocatalytic degradation of amoxicillin using UV/Synthesized NiO from pharmaceutical wastewater. Indones. J. Chem. 19, 211–218. https://doi.org/10.22146/ijc.33837

Banerjee, A., Ghoshal, A.K., 2017. Biodegradation of an actual petroleum wastewater in a packed bed reactor by an immobilized biomass of *Bacillus cereus*. J. Environ. Chem. Eng. 5, 1696–1702. https://doi.org/10.1016/j.jece.2017.03.008

Banerjee, P., Barman, S.R., Swarnakar, S., Mukhopadhyay, A., Das, P., 2018. Treatment of textile effluent using bacteria-immobilized graphene oxide nanocomposites: evaluation of effluent detoxification using *Bellamya bengalensis*. Clean Technol. Environ. Policy 2018 2010 20, 2287–2298. https://doi.org/10.1007/S10098-018-1602-7

Bankole, P.O., Adekunle, A.A., Govindwar, S.P., 2018. Enhanced decolorization and biodegradation of acid red 88 dye by newly isolated fungus, *Achaetomium strumarium*. J. Environ. Chem. Eng. 6, 1589–1600. https://doi.org/10.1016/J.JECE.2018.01.069

Bansal, P., Singh, D., Sud, D., 2010. Photocatalytic degradation of azo dye in aqueous TiO_2 suspension: Reaction pathway and identification of intermediates products by LC/MS. Sep. Purif. Technol. 72, 357–365. https://doi.org/10.1016/j.seppur.2010.03.005

Barwal, A., Chaudhary, R., 2014. To study the performance of biocarriers in moving bed biofilm reactor (MBBR) technology and kinetics of biofilm for retrofitting the existing aerobic treatment systems : a review 285–299. https://doi.org/10.1007/s11157-014-9333-7

Beltrán-Flores, E., Sarrà, M., Blánquez, P., 2021. Pesticide bioremediation by *Trametes versicolor*: Application in a fixed-bed reactor, sorption contribution and bioregeneration. Sci. Total Environ. 794, 148386. https://doi.org/10.1016/j.scitotenv.2021.148386

Berradi, M., Hsissou, R., Khudhair, M., Assouag, M., Cherkaoui, O., El Bachiri, A., El Harfi, A., 2019. Textile finishing dyes and their impact on aquatic environs. Heliyon 5, e02711. https://doi.org/10.1016/j.heliyon.2019.E02711

Bharti, V., Vikrant, K., Goswami, M., Tiwari, H., Sonwani, R.K., Lee, J., Tsang, D.C.W., Kim, K.H., Saeed, M., Kumar, S., Rai, B.N., Giri, B.S., Singh, R.S., 2019. Biodegradation of methylene blue dye in a batch and continuous mode using biochar as packing media. Environ. Res. https://doi.org/10.1016/j.envres.2019.01.051

Bilińska, L., Gmurek, M., 2021. Novel trends in AOPs for textile wastewater treatment. Enhanced dye by-products removal by catalytic and synergistic actions. Water Resour. Ind. 26, 100160. https://doi.org/10.1016/j.wri.2021.100160

Boumansour, B.E., Vasel, J.L., 1998. A new tracer gas method to measure oxygen transfer and enhancement factor on RBC. Water Res. 32, 1049–1058. https://doi.org/10.1016/S0043-1354(97)00324-2

Brosillon, S., Djelal, H., Merienne, N., Amrane, A., 2008. Innovative integrated process for the treatment of azo dyes: coupling of photocatalysis and biological treatment. Desalination 222, 331–339. https://doi.org/10.1016/j.desal.2007.01.153

Burghate, S.P., Ingole, N.W., 2013. Fluidized Bed Biofilm Reactor-A Novel Wastewater Treatment Reactor. Int. J. Res. Environ. Sci. Technol. 3, 145–155.

Bustos-Terrones, Y.A., Bandala, E.R., Moeller-Chávez, G.E., Bustos-Terrones, V., 2022. Enhanced biological wastewater treatment using sodium alginate-immobilized microorganisms in a fluidized bed reactor. Water Sci. Eng. 15, 125–133. https://doi.org/10.1016/j.wse.2022.02.002

Butler, M., 2003. Hybridomas, Genetic Engineering of. Encycl. Phys. Sci. Technol. 427–443.

https://doi.org/10.1016/B0-12-227410-5/00319-7

Carolin, C.F., Kumar, P.S., Joshiba, G.J., 2021. Sustainable approach to decolourize methyl orange dye from aqueous solution using novel bacterial strain and its metabolites characterization. Clean Technol. Environ. Policy 23, 173–181. https://doi.org/10.1007/s10098-020-01934-8

Castro, F.D., Bassin, J.P., Alves, T.L.M., Sant'Anna, G.L., Dezotti, M., 2020. Reactive Orange 16 dye degradation in anaerobic and aerobic MBBR coupled with ozonation: addressing pathways and performance. Int. J. Environ. Sci. Technol. 2020 187 18, 1991–2010. https://doi.org/10.1007/S13762-020-02983-8

Chakraborty, J.N., 2014. Colouring materials 12–21. https://doi.org/10.1016/B978-93-80308-46-3.50002-9

Chang, H., Seong, G., Yoo, I., Park, J., 1998. Method for immobilization of whole microbial cells in calcium alginate capsules. US Pat. 1–7.

Chang, J.S., Kuo, T.S., 2000. Kinetics of bacterial decolorization of azo dye with *Escherichia coli* NO_3. Bioresour. Technol. 75, 107–111. https://doi.org/10.1016/S0960-8524(00)00049-3

Chaturvedi, A., Rai, B.N., Singh, R.S., Jaiswal, R.P., 2022. A comprehensive review on the integration of advanced oxidation processes with biodegradation for the treatment of textile wastewater containing azo dyes. Rev. Chem. Eng. 38, 617–639. https://doi.org/10.1515/revce-2020-0010

Chaturvedi, A., Rai, B.N., Singh, R.S., Jaiswal, R.P., 2021. Comparative toxicity assessment using plant and luminescent bacterial assays after anaerobic treatments of dyeing wastewater in a recirculating fixed bed bioreactor. J. Environ. Chem. Eng. 9, 1–9. https://doi.org/10.1016/j.jece.2021.105466

Chavan, R.B., 2011. Environmentally friendly dyes. Handb. Text. Ind. Dye. Princ. Process. Types Dye. 1, 515–561. https://doi.org/10.1533/9780857093974.2.515

Chebli, D., Fourcade, F., Brosillon, S., Nacef, S., Amrane, A., 2011. Integration of photocatalysis and biological treatment for azo dye removal-application to AR183. Environ. Technol. 32, 507–514. https://doi.org/10.1080/09593330.2010.504236

Chebli, D., Fourcade, F., Brosillon, S., Nacef, S., Amrane, A., 2010. Supported photocatalysis as a pre-treatment prior to biological degradation for the removal of some dyes from aqueous solutions; acid red 183, Biebrich Scarlet, methyl red sodium salt, orange II. J. Chem. Technol. Biotechnol. https://doi.org/10.1002/jctb.2342

Chen, C.Y., Kuo, J.T., Yang, H.A., Chung, Y.C., 2013. A coupled biological and photocatalysis pretreatment system for the removal of crystal violet from wastewater. Chemosphere 92, 695–701. https://doi.org/10.1016/j.chemosphere.2013.04.040

Chen, C.Y., Yen, S.H., Chung, Y.C., 2014. Combination of photoreactor and packed bed bioreactor for the removal of ethyl violet from wastewater. Chemosphere 117, 494–501. https://doi.org/10.1016/j.chemosphere.2014.08.069

Chern, J.M., Chou, S.R., Shang, C.S., 2001. Effects of impurities on oxygen transfer rates in diffused aeration systems. Water Res. 35, 3041–3048. https://doi.org/10.1016/S0043-1354(01)00031-8

Choudhary, D.M.P., Saxena, S., 2017. Efficiency of Wastewater Treatment At Saras Dairy Plant , Kota , Rajasthan 3.

Cortez, S., Teixeira, P., Oliveira, R., Mota, M., 2008. Rotating biological contactors: A review on main factors affecting performance. Rev. Environ. Sci. Biotechnol. 7, 155–172. https://doi.org/10.1007/s11157-008-9127-x

Courtens, E.N.P., Boon, N., De Clippeleir, H., Berckmoes, K., Mosquera, M., Seuntjens, D., Vlaeminck, S.E., 2014. Control of nitratation in an oxygen-limited autotrophic nitrification/denitrification rotating biological contactor through disc immersion level variation. Bioresour. Technol. 155, 182–188. https://doi.org/10.1016/j.biortech.2013.12.108

Cozma, P., Cozma, M., 2010. Airlift reactors: Hydrodynamics, mass transfer and applications in environmental remediation. Environ. Eng. Manag. J. 9, 681–702. https://doi.org/10.30638/eemj.2010.093

Cozma, P., Gavrilescu, M., 2012. Airlift reactors: Applications in wastewater treatment. Environ. Eng. Manag. J. 11, 1505–1515. https://doi.org/10.30638/eemj.2012.189

Dargahi, A., Shokoohi, R., Asgari, G., Ansari, A., Nematollahi, D., Samarghandi, M.R.,

2021. Moving-bed biofilm reactor combined with three-dimensional electrochemical pretreatment (MBBR-3DE) for 2,4-D herbicide treatment: application for real wastewater, improvement of biodegradability. RSC Adv. 11, 9608–9620. https://doi.org/10.1039/d0ra10821a

Das, A., Mishra, S., 2017. Removal of textile dye reactive green-19 using bacterial consortium: Process optimization using response surface methodology and kinetics study. J. Environ. Chem. Eng. 5, 612–627. https://doi.org/10.1016/j.jece.2016.10.005

Das, S., Mahalingam, H., 2020. Novel immobilized ternary photocatalytic polymer film based airlift reactor for efficient degradation of complex phthalocyanine dye wastewater. J. Hazard. Mater. 383. https://doi.org/10.1016/j.jhazmat.2019.121219

Datta Madamwar, Onkar Tiwari, K.J., 2019. Mapping of Research Outcome on Remediation of Dyes , Dye Intermediates and first eddi.

de Araujo, C.M.B., Ghislandi, M.G., Rios, A.G., da Costa, G.R.B., do Nascimento, B.F., Ferreira, A.F.P., da Motta Sobrinho, M.A., Rodrigues, A.E., 2022. Wastewater treatment using recyclable agar-graphene oxide biocomposite hydrogel in batch and fixed-bed adsorption column: Bench experiments and modeling for the selective removal of organics. Colloids Surfaces A Physicochem. Eng. Asp. https://doi.org/10.1016/j.colsurfa.2022.128357

De Oliveira Cruz, F.S., Nascimento, M.A., Puiatti, G.A., De Oliveira, A.F., Mounteer, A.H., Lopes, R.P., 2020. Textile effluent treatment using a fixed bed reactor using bimetallic Fe/Ni nanoparticles supported on chitosan spheres. J. Environ. Chem. Eng. 8. https://doi.org/10.1016/j.jece.2020.104133

Deveci, E.Ü., Dizge, N., Yatmaz, H.C., Aytepe, Y., 2016. Integrated process of fungal membrane bioreactor and photocatalytic membrane reactor for the treatment of industrial textile wastewater. Biochem. Eng. J. 105, 420–427. https://doi.org/10.1016/j.bej.2015.10.016

Dias, N.C., Bassin, J.P., Sant'Anna, G.L., Dezotti, M., 2019. Ozonation of the dye Reactive Red 239 and biodegradation of ozonation products in a moving-bed biofilm reactor: Revealing reaction products and degradation pathways. Int. Biodeterior. Biodegrad. 144. https://doi.org/10.1016/j.ibiod.2019.104742

Dihom, H.R., Al-Shaibani, M.M., Radin Mohamed, R.M.S., Al-Gheethi, A.A., Sharma, A., Khamidun, M.H. Bin, 2022. Photocatalytic degradation of disperse azo dyes in textile wastewater using green zinc oxide nanoparticles synthesized in plant extract: A critical review. J. Water Process Eng. 47. https://doi.org/10.1016/j.jwpe.2022.102705

Dong, X., Zhou, J., Liu, Y., 2003. Peptone-induced biodecolorization of Reactive Brilliant Blue (KN-R) by *Rhodocyclus gelatinosus* XL-1. Process Biochem. 39, 89–94. https://doi.org/10.1016/S0032-9592(02)00319-9

Doumic, L.I., Soares, P.A., Ayude, M.A., Cassanello, M., Boaventura, R.A.R., Vilar, V.J.P., 2015. Enhancement of a solar photo-Fenton reaction by using ferrioxalate complexes for the treatment of a synthetic cotton-textile dyeing wastewater. Chem. Eng. J. 277, 86–96. https://doi.org/10.1016/j.cej.2015.04.074

Du, Y., Wang, M., Ye, X., Liu, B., Han, L., Jafri, S.H.M., Liu, W., Zheng, X., Ning, Y., Li, H., 2023. Advances in the Field of Graphene-Based Composites for Energy–Storage Applications. Crystals 13, 912. https://doi.org/10.3390/cryst13060912

Eldyasti, A., Nakhla, G., Zhu, J., 2013. Impact of calcium on biofilm morphology, structure, detachment and performance in denitrifying fluidized bed bioreactors (DFBBRs). Chem. Eng. J. 232, 183–195. https://doi.org/10.1016/j.cej.2013.07.084

Eslami, H., Shariatifar, A., Rafiee, E., Shiranian, M., Salehi, F., Hosseini, S.S., Eslami, G., Ghanbari, R., Ebrahimi, A.A., 2019. Decolorization and biodegradation of reactive Red 198 Azo dye by a new *Enterococcus faecalis–Klebsiella variicol*a bacterial consortium isolated from textile wastewater sludge. World J. Microbiol. Biotechnol. 35. https://doi.org/10.1007/s11274-019-2608-y

Ewida, A.Y.I., El-Sesy, M.E., Abou Zeid, A., 2019. Complete degradation of azo dyeacid red 337 by *Bacillus megaterium* KY848339.1 isolated from textile wastewater. Water Sci. 33, 154–161. https://doi.org/10.1080/11104929.2019.1688996

Fan, J., Shi, Z., Lian, M., Li, H., Yin, J., 2013. Mechanically strong graphene oxide/sodium alginate/polyacrylamide nanocomposite hydrogel with improved dye adsorption capacity. J. Mater. Chem. A 1, 7433–7443. https://doi.org/10.1039/c3ta10639j

Fares, M.M., Abu Al-Rub, F.A., Talafha, T., 2020. Diblock Sodium Alginate Grafted Poly

(N-vinylimidazole) in blank copolymeric beads and immobilized algal beads for water treatment. Chem. Eng. Res. Des. 153, 603–612. https://doi.org/10.1016/j.cherd.2019.11.001

Feijoo, S., Yu, X., Kamali, M., Appels, L., Dewil, R., 2023. Generation of oxidative radicals by advanced oxidation processes (AOPs) in wastewater treatment: a mechanistic, environmental and economic review. Rev. Environ. Sci. Bio/Technology 2023 221 22, 205–248. https://doi.org/10.1007/S11157-023-09645-4

Ferrand, A., Siaj, M., Claverie, J.P., 2020. Graphene, the Swiss Army Knife of Nanomaterials Science. ACS Appl. Nano Mater. 3, 7305–7313. https://doi.org/10.1021/acsanm.0c02055

Ferraz, E.R.A., Grando, M.D., Oliveira, D.P., 2011. The azo dye Disperse Orange 1 induces DNA damage and cytotoxic effects but does not cause ecotoxic effects in *Daphnia similis* and *Vibrio fischeri*. J. Hazard. Mater. 192, 628–633. https://doi.org/10.1016/j.jhazmat.2011.05.063

Ferreira, L.C., Lucas, M.S., Fernandes, J.R., Tavares, P.B., 2016. Photocatalytic oxidation of Reactive Black 5 with UV-A LEDs. J. Environ. Chem. Eng. 4, 109–114. https://doi.org/10.1016/j.jece.2015.10.042

Galinha, C.F., Sanches, S., Crespo, J.G., 2018. Membrane bioreactors. Fundam. Model. Membr. Syst. Membr. Process Perform. 209–249. https://doi.org/10.1016/B978-0-12-813483-2.00006-X

Gan, L., Li, H., Chen, L., Xu, L., Liu, J., Geng, A., Mei, C., Shang, S., 2018. Graphene oxide incorporated alginate hydrogel beads for the removal of various organic dyes and bisphenol A in water. Colloid Polym. Sci. 296, 607–615. https://doi.org/10.1007/s00396-018-4281-3

Gan, L., Shang, S., Hu, E., Yuen, C.W.M., Jiang, S.X., 2015. Konjac glucomannan/graphene oxide hydrogel with enhanced dyes adsorption capability for methyl blue and methyl orange. Appl. Surf. Sci. 357, 866–872. https://doi.org/10.1016/j.apsusc.2015.09.106

García-Martínez, Y., Bengoa, C., Stüber, F., Fortuny, A., Font, J., Fabregat, A., 2015. Biodegradation of acid orange 7 in an anaerobic–aerobic sequential treatment system.

Chem. Eng. Process. - Process Intensif. 94, 99–104. https://doi.org/10.1016/j.cep.2014.12.011

Garcia-Ochoa, F., Gomez, E., Santos, V.E., Merchuk, J.C., 2010. Oxygen uptake rate in microbial processes: An overview. Biochem. Eng. J. 49, 289–307. https://doi.org/10.1016/j.bej.2010.01.011

Garcia-Ochoa, F., Santos, V.E., Gomez, E., 2011. Stirred Tank Bioreactors, in: Comprehensive Biotechnology, Second Edition. Elsevier Inc., pp. 179–198. https://doi.org/10.1016/B978-0-08-088504-9.00108-2

Garg, N., Garg, A., Mukherji, S., 2020. Eco-friendly decolorization and degradation of reactive yellow 145 textile dye by *Pseudomonas aeruginosa* and *Thiosphaera pantotropha*. J. Environ. Manage. 263. https://doi.org/10.1016/j.jenvman.2020.110383

Gatidou, G., Stasinakis, A.S., Iatrou, E.I., 2015. Assessing single and joint toxicity of three phenylurea herbicides using Lemna minor and *Vibrio fischeri* bioassays. Chemosphere 119, S69–S74. https://doi.org/10.1016/j.chemosphere.2014.04.030

Gebregiorgis, T., van Hullebusch, E.D., Hagos, K., 2018. Decolourization of real textile wastewater by the combination of photocatalytic and biological oxidation processes. Adv. Sci. Technol. Innov. 115–117. https://doi.org/10.1007/978-3-319-70548-4_40

Geed, S.R., Kureel, M.K., Giri, B.S., Singh, R.S., Rai, B.N., 2017. Performance evaluation of Malathion biodegradation in batch and continuous packed bed bioreactor (PBBR). Bioresour. Technol. https://doi.org/10.1016/j.biortech.2016.12.020

Geed, S.R., Kureel, M.K., Prasad, S., Singh, R.S., Rai, B.N., 2018. Novel study on biodegradation of malathion and investigation of mass transfer correlation using alginate beads immobilized *Bacillus* sp. S4 in bioreactor. J. Environ. Chem. Eng. 6, 3444–3450. https://doi.org/10.1016/j.jece.2018.05.025

Godiya, C.B., Xiao, Y., Lu, X., 2020. Amine functionalized sodium alginate hydrogel for efficient and rapid removal of methyl blue in water. Int. J. Biol. Macromol. 144, 671–681. https://doi.org/10.1016/j.ijbiomac.2019.12.139

Gopi Kiran, M., Pakshirajan, K., Das, G., 2017. A new application of anaerobic rotating biological contactor reactor for heavy metal removal under sulfate reducing condition.

Chem. Eng. J. 321, 67–75. https://doi.org/10.1016/j.cej.2017.03.080

Goswami, M., Chaturvedi, P., Kumar Sonwani, R., Dutta Gupta, A., Rani Singhania, R., Shekher Giri, B., Nath Rai, B., Singh, H., Yadav, S., Sharan Singh, R., 2020. Application of Arjuna (*Terminalia arjuna*) seed biochar in hybrid treatment system for the bioremediation of Congo red dye. Bioresour. Technol. 307, 123203. https://doi.org/10.1016/j.biortech.2020.123203

Gu, Q., Sun, T., Wu, G., Li, M., Qiu, W., 2014. Influence of carrier filling ratio on the performance of moving bed biofilm reactor in treating coking wastewater. Bioresour. Technol. 166, 72–78. https://doi.org/10.1016/j.biortech.2014.05.026

Gu, X., Ning, Y., Yang, Y., Wang, C., 2014. One-step synthesis of porous graphene-based hydrogels containing oil droplets for drug delivery. RSC Adv. 4, 3211–3218. https://doi.org/10.1039/c3ra44993a

Guieysse, B., Quijano, G., Muñoz, R., 2011. Airlift Bioreactors, Second Edi. ed, Comprehensive Biotechnology, Second Edition. Elsevier B.V. https://doi.org/10.1016/B978-0-08-088504-9.00095-7

Guo, G., Hao, J., Tian, F., Liu, C., Ding, K., Xu, J., Zhou, W., Guan, Z., 2020. Decolorization and detoxification of azo dye by halo-alkaliphilic bacterial consortium: Systematic investigations of performance, pathway and metagenome. Ecotoxicol. Environ. Saf. https://doi.org/10.1016/j.ecoenv.2020.111073

Guo, H., Jiao, T., Zhang, Q., Guo, W., Peng, Q., Yan, X., 2015. Preparation of Graphene Oxide-Based Hydrogels as Efficient Dye Adsorbents for Wastewater Treatment. Nanoscale Res. Lett. 10, 0–9. https://doi.org/10.1186/s11671-015-0931-2

Gupta, V.K., Jain, R., Mittal, A., Saleh, T.A., Nayak, A., Agarwal, S., Sikarwar, S., 2012. Photo-catalytic degradation of toxic dye amaranth on TiO_2/UV in aqueous suspensions. Mater. Sci. Eng. C 32, 12–17. https://doi.org/10.1016/j.msec.2011.08.018

Gurav, A. a, Ghosh, J.S., Kulkarni, G.S., 2011. Decolorization of anthroquinone based dye Vat Red 10 by *Pseudomonas desmolyticum* NCIM 2112 and *Galactomyces geotrichum* MTCC 1360. Mol. Biol. 2, 93–97.

Gusain, R., Kumar, N., Ray, S.S., 2020. Recent advances in carbon nanomaterial-based adsorbents for water purification. Coord. Chem. Rev. 405, 0–2. https://doi.org/10.1016/j.ccr.2019.213111

Hafeez, A., Javed, F., Fazal, T., Shezad, N., Amjad, U. e. S., Rehman, M.S. ur, Rehman, F., 2021. Intensification of ozone generation and degradation of azo dye in non-thermal hybrid corona-DBD plasma micro-reactor. Chem. Eng. Process. - Process Intensif. 159, 108205. https://doi.org/10.1016/j.cep.2020.108205

He, H., Ma, H., Liu, L., 2020. Combined photocatalytic pre-oxidation reactor and sequencing batch bioreactor for advanced treatment of industrial wastewater. J. Water Process Eng. 36. https://doi.org/10.1016/j.jwpe.2020.101259

Hermann, K.L., Costa, T.M., Helm, C.V., Marconatto, L., Borges, L.G.D.A., Vegini, A.A., Giongo, A., Tavares, L.B.B., 2020. Discoloration of rhodamine b dye by white-rot fungi in solid bleached sulfate paperboard coated with polyethylene terephthalate: Scale-up into non-sterile packed-bed bioreactor. J. Environ. Chem. Eng. 8. https://doi.org/10.1016/j.jece.2020.103685

Hewawasam, C., Matsuura, N., Maharjan, N., Hatamoto, M., Yamaguchi, T., 2017. Oxygen transfer dynamics and nitrification in a novel rotational sponge reactor. Biochem. Eng. J. 128, 162–167. https://doi.org/10.1016/j.bej.2017.09.021

Hossen, M.Z., Hussain, M.E., Hakim, A., Islam, K., Uddin, M.N., Azad, A.K., 2019. Biodegradation of reactive textile dye Novacron Super Black G by free cells of newly isolated *Alcaligenes faecalis* AZ26 and *Bacillus* spp obtained from textile effluents. Heliyon. https://doi.org/10.1016/j.heliyon.2019.e02068

Ihsanullah, I., Jamal, A., Ilyas, M., Zubair, M., Khan, G., Atieh, M.A., 2020. Bioremediation of dyes: Current status and prospects. J. Water Process Eng. 38. https://doi.org/10.1016/j.jwpe.2020.101680

Islam, Tarekul, Repon, M.R., Islam, Tarikul, Sarwar, Z., Rahman, M.M., 2022. Impact of textile dyes on health and ecosystem: a review of structure, causes, and potential solutions, Environmental Science and Pollution Research. https://doi.org/10.1007/s11356-022-24398-3

Israni, S.H., Koli, S.S., Patwardhan, A.W., Melo, J.S., D’Souza, S.F., 2002. Phenol degradation in rotating biological contactors. J. Chem. Technol. Biotechnol. 77, 1050–1057. https://doi.org/10.1002/jctb.677

Jaafari, J., Mesdaghinia, A., Nabizadeh, R., Hoseini, M., kamani, H., Mahvi, A.H., 2014. Influence of upflow velocity on performance and biofilm characteristics of Anaerobic Fluidized Bed Reactor (AFBR) in treating high-strength wastewater. J. Environ. Heal. Sci. Eng. 2014 121 12, 1–10. https://doi.org/10.1186/S40201-014-0139-X

Jafari, N., Kasra-Kermanshahi, R., Soudi, M.R., Mahvi, A.H., Gharavi, S., 2012. Degradation of a textile reactive azo dye by a combined biological-photocatalytic process: Candida tropicalis Jks2-TiO_2/UV. J. Environ. Heal. Sci. Eng. 9, 1–7.

Jaibiba, P., Vignesh, S.N., Hariharan, S., 2020. Working principle of typical bioreactors, Bioreactors. INC. https://doi.org/10.1016/B978-0-12-821264-6.00010-3

Ji, J., Kulshreshtha, S., Kakade, A., Majeed, S., Li, X., Liu, P., 2020. Bioaugmentation of membrane bioreactor with *Aeromonas hydrophila* LZ-MG14 for enhanced malachite green and hexavalent chromium removal in textile wastewater. Int. Biodeterior. Biodegrad. 150, 104939. https://doi.org/10.1016/j.ibiod.2020.104939

Jia, Y., Yu, C., Fan, J., Fu, Y., Ye, Z., Guo, X., Xu, Y., Shen, C., 2020. Alterations in the Cell Wall of *Rhodococcus biphenylivorans* Under Norfloxacin Stress. Front. Microbiol. 11, 2447. https://doi.org/10.3389/FMICB.2020.554957/BIBTEX

Jiao, C., Xiong, J., Tao, J., Xu, S., Zhang, D., Lin, H., Chen, Y., 2016. Sodium alginate/graphene oxide aerogel with enhanced strength–toughness and its heavy metal adsorption study. Int. J. Biol. Macromol. 83, 133–141. https://doi.org/10.1016/j.ijbiomac.2015.11.061

Jo, W.-K., Tayade, R.J., 2014. Recent developments in photocatalytic dye degradation upon irradiation with energy-efficient light emitting diodes. Chinese J. Catal. 35, 1781–1792. https://doi.org/10.1016/S1872-2067(14)60205-9

Jorfi, S., Pourfadakari, S., Kakavandi, B., 2018. A new approach in sono-photocatalytic degradation of recalcitrant textile wastewater using MgO@Zeolite nanostructure under UVA irradiation. Chem. Eng. J. 343, 95–107. https://doi.org/10.1016/j.cej.2018.02.067

Joshi, A., Hinsu, A., Kothari, R., 2022. Evaluating the efficacy of bacterial consortium for decolorization of diazo dye mixture. Arch. Microbiol. 2022 2048 204, 1–8. https://doi.org/10.1007/S00203-022-03108-0

Junploy, P., Janta, R., Wongchai, P., Deethae, A., Thongtem, T., Thongtem, S., 2021. Photodegradation of organic dyes and antibacterial activity of *Escherichia coli* and *Staphylococcus aureus* by ZnO nanoparticles under UVA radiation. Mater. Technol. https://doi.org/10.1080/10667857.2021.1885226

Kadic, E., Heindel, T.J., 2014a. Airlift Bioreactors, in: An Introduction to Bioreactor Hydrodynamics and Gas-Liquid Mass Transfer. John Wiley & Sons, Inc., pp. 168–208. https://doi.org/10.1002/9781118869703.ch8

Kadic, E., Heindel, T.J., 2014b. Fixed Bed Bioreactors. An Introd. to Bioreact. Hydrodyn. Gas-Liquid Mass Transf. 209–242. https://doi.org/10.1002/9781118869703.ch9

Kanakaraju, D., Glass, B.D., Oelgemöller, M., 2018. Advanced oxidation process-mediated removal of pharmaceuticals from water: A review. J. Environ. Manage. 219, 189–207. https://doi.org/10.1016/j.jenvman.2018.04.103

Karapinar Kapdan, I., Kargi, F., 2002. Biological decolorization of textile dyestuff containing wastewater by *Coriolus versicolor* in a rotating biological contactor. Enzyme Microb. Technol. 30, 195–199. https://doi.org/10.1016/S0141-0229(01)00468-9

Karim, M.E., Dhar, K., Hossain, M.T., 2018. Decolorization of Textile Reactive Dyes by Bacterial Monoculture and Consortium Screened from Textile Dyeing Effluent. J. Genet. Eng. Biotechnol. 16, 375–380. https://doi.org/10.1016/j.jgeb.2018.02.005

Kathiravan, M.N., Praveen, S.A., Gim, G.H., Han, G.H., Kim, S.W., 2014. Biodegradation of Methyl Orange by alginate-immobilized *Aeromonas* sp. in a packed bed reactor: External mass transfer modeling. Bioprocess Biosyst. Eng. 37, 2149–2162. https://doi.org/10.1007/S00449-014-1192-7

Khan, Z.U.H., Shah, N.S., Iqbal, J., Khan, A.U., Imran, M., Alshehri, S.M., Muhammad, N., Sayed, M., Ahmad, N., Kousar, A., Ashfaq, M., Howari, F., Tahir, K., 2020. Biomedical and photocatalytic applications of biosynthesized silver nanoparticles: Ecotoxicology study of brilliant green dye and its mechanistic degradation pathways. J. Mol. Liq. 319, 114114. https://doi.org/10.1016/j.molliq.2020.114114

Khouni, I., Marrot, B., Amar, R. Ben, 2012. Treatment of reconstituted textile wastewater containing a reactive dye in an aerobic sequencing batch reactor using a novel bacterial consortium. Sep. Purif. Technol. 87, 110–119. https://doi.org/10.1016/j.seppur.2011.11.030

Kim, B.J., Molof, A.H., 1982. The scale-up and limitation of physical oxygen transfer in rotating biological contractors. Water Sci. Technol. 14, 569–579. https://doi.org/10.2166/wst.1982.0126

Kishor, R., Purchase, D., Saratale, G.D., Saratale, R.G., Ferreira, L.F.R., Bilal, M., Chandra, R., Bharagava, R.N., 2021. Ecotoxicological and health concerns of persistent coloring pollutants of textile industry wastewater and treatment approaches for environmental safety. J. Environ. Chem. Eng. 9, 105012. https://doi.org/10.1016/j.jece.2020.105012

Kora, E., Theodorelou, D., Gatidou, G., Fountoulakis, M.S., Stasinakis, A.S., 2020. Removal of polar micropollutants from domestic wastewater using a methanogenic – aerobic moving bed biofilm reactor system. Chem. Eng. J. 382, 122983. https://doi.org/10.1016/j.cej.2019.122983

Kumar, A., Sharma, G., Naushad, M., Al-Muhtaseb, A.H., García-Peñas, A., Mola, G.T., Si, C., Stadler, F.J., 2020. Bio-inspired and biomaterials-based hybrid photocatalysts for environmental detoxification: A review. Chem. Eng. J. 382. https://doi.org/10.1016/j.cej.2019.122937

Kumar, A., Subrahmanyam, G., Mondal, R., Cabral-Pinto, M.M.S., Shabnam, A.A., Jigyasu, D.K., Malyan, S.K., Fagodiya, R.K., Khan, S.A., Yu, Z.G., 2021. Bio-remediation approaches for alleviation of cadmium contamination in natural resources. Chemosphere 268. https://doi.org/10.1016/j.chemosphere.2020.128855

Kumar, C.G., Mongolla, P., Joseph, J., Sarma, V.U.M., 2012. Decolorization and biodegradation of triphenylmethane dye, brilliant green, by *Aspergillus* sp. isolated from Ladakh, India. Process Biochem. 47, 1388–1394. https://doi.org/10.1016/j.procbio.2012.05.015

Kumar, N., Sinha, S., Mehrotra, T., Singh, R., Tandon, S., Thakur, I.S., 2019. Biodecolorization of azo dye Acid Black 24 by *Bacillus pseudomycoides*: Process optimization using Box Behnken design model and toxicity assessment. Bioresour.

Technol. Reports. https://doi.org/10.1016/j.biteb.2019.100311

Kumar Sonwani, R., Pandey, S., Kumar Yadav, S., Shekhar Giri, B., Katiyar, V., Sharan Singh, R., Nath Rai, B., 2021. Construction of integrated system for the treatment of Acid orange 7 dye from wastewater: Optimization and growth kinetic study. Bioresour. Technol. 337, 125478. https://doi.org/10.1016/j.biortech.2021.125478

Kumari, S., Naraian, R., 2016. Decolorization of synthetic brilliant green carpet industry dye through fungal co-culture technology. J. Environ. Manage. 180, 172–179. https://doi.org/10.1016/j.jenvman.2016.04.060

Kuppusamy, S., Jayaraman, N., Jagannathan, M., Kadarkarai, M., Aruliah, R., 2017. Electrochemical decolorization and biodegradation of tannery effluent for reduction of chemical oxygen demand and hexavalent chromium. J. Water Process Eng. 20, 22–28. https://doi.org/10.1016/j.jwpe.2017.09.008

Laing, I.G., 1991. The impact of effluent regulations on the dyeing industry. Rev. Prog. Color. Relat. Top. 21, 56–71. https://doi.org/10.1111/j.1478-4408.1991.tb00081.x

Lal Maurya, K., Swain, G., Kumar Sonwani, R., Verma, A., Sharan Singh, R., 2022. Biodegradation of Congo red dye using polyurethane foam-based biocarrier combined with activated carbon and sodium alginate: Batch and continuous study. Bioresour. Technol. https://doi.org/10.1016/j.biortech.2022.126999

Lazar, A., 1991. Immobilization of animal cells in fixed bed bioreactors Department of Biotechnology , Israel Institute for Biological Research , Ne ~ s Ziona , 411–424.

Lellis, B., Zani Fávaro-Polonio, C., Pamphile, J.A., Polonio, J.C., 2019. Effects of textile dyes on health and the environment and bioremediation potential of living organisms. Biotechnol. Res. Innov. 3, 275–290. https://doi.org/10.1016/j.biori.2019.09.001

Lentz, L., Mayer, D.A., Dogenski, M., Ferreira, S.R.S., 2022. Hybrid aerogels of sodium alginate/graphene oxide as efficient adsorbents for wastewater treatment. Mater. Chem. Phys. 283, 125981. https://doi.org/10.1016/j.matchemphys.2022.125981

Li, B., Gan, L., Owens, G., Chen, Z., 2018. New nano-biomaterials for the removal of malachite green from aqueous solution via a response surface methodology. Water Res. 146, 55–66. https://doi.org/10.1016/j.watres.2018.09.006

Li, G., Park, S., Rittmann, B.E., 2012a. Degradation of reactive dyes in a photocatalytic circulating-bed biofilm reactor. Biotechnol. Bioeng. https://doi.org/10.1002/bit.24366

Li, G., Park, S., Rittmann, B.E., 2012b. Developing an efficient TiO_2-coated biofilm carrier for intimate coupling of photocatalysis and biodegradation. Water Res. 46, 6489–6496. https://doi.org/10.1016/j.watres.2012.09.029

Li, N., Zeng, W., Yang, Y., Wang, B., Li, Z., Peng, Y., 2019. Oxygen mass transfer and post-denitrification in a modified rotating drum biological contactor. Biochem. Eng. J. 144, 48–56. https://doi.org/10.1016/j.bej.2019.01.008

Li, Wenqian, Zhao, J.W., Yan, C., Dong, B., Zhang, Y., Li, Wenjing, Zai, J., Li, G.R., Qian, X., 2022. Asymmetric Activation of the Nitro Group over a Ag/Graphene Heterointerface to Boost Highly Selective Electrocatalytic Reduction of Nitrobenzene. ACS Appl. Mater. Interfaces. https://doi.org/10.1021/acsami.2c04533

Li, Y., Du, Q., Liu, T., Sun, J., Wang, Y., Wu, S., Wang, Z., Xia, Y., Xia, L., 2013. Methylene blue adsorption on graphene oxide/calcium alginate composites. Carbohydr. Polym. 95, 501–507. https://doi.org/10.1016/j.carbpol.2013.01.094

Lin, C., Gao, Y., Zhang, J., Xue, D., Fang, H., Tian, J., Zhou, C., Zhang, C., Li, Y., Li, H., 2020. GO/TiO_2 composites as a highly active photocatalyst for the degradation of methyl orange. J. Mater. Res. 35, 1307–1315. https://doi.org/10.1557/jmr.2020.41

Lin, Y., Ferronato, C., Deng, N., Chovelon, J.M., 2011. Study of benzylparaben photocatalytic degradation by TiO_2. Appl. Catal. B Environ. 104, 353–360. https://doi.org/10.1016/j.apcatb.2011.03.006

Liu, C., Liu, H., Xiong, T., Xu, A., Pan, B., Tang, K., 2018. Graphene oxide reinforced alginate/PVA double network hydrogels for efficient dye removal. Polymers (Basel). 10, 1–14. https://doi.org/10.3390/polym10080835

Liu, E., Wilkins, M.R., 2020. Process optimization and scale-up production of fungal aryl alcohol oxidase from genetically modified *Aspergillus nidulans* in stirred-tank bioreactor. Bioresour. Technol. 315, 123792. https://doi.org/10.1016/j.biortech.2020.123792

Liu, L., Chen, Z., Zhang, J., Shan, D., Wu, Y., Bai, L., Wang, B., 2021. Treatment of industrial dye wastewater and pharmaceutical residue wastewater by advanced oxidation processes and its combination with nanocatalysts: A review. J. Water Process Eng. 42, 102122. https://doi.org/10.1016/j.jwpe.2021.102122

Liu, W., You, Y., Sun, D., Wang, S., Zhu, J., Liu, C., 2018. Decolorization and detoxification of water-insoluble Sudan dye by *Shewanella putrefaciens* CN32 co-cultured with *Bacillus circulans* BWL1061. Ecotoxicol. Environ. Saf. 166, 11–17. https://doi.org/10.1016/j.ecoenv.2018.09.055

Liu, X., Cui, B., Liu, S., Ma, Q., 2019. Methylene Blue Removal by Graphene Oxide/Alginate Gel Beads. Fibers Polym. 20, 1666–1672. https://doi.org/10.1007/s12221-019-9011-z

Lu, Z., Xu, Y., Akbari, M.Z., Liang, C., Peng, L., 2022. Insight into integration of photocatalytic and microbial wastewater treatment technologies for recalcitrant organic pollutants: From sequential to simultaneous reactions. Chemosphere 295. https://doi.org/10.1016/j.chemosphere.2022.133952

Malik, S.N., Khan, S.M., Ghosh, P.C., Vaidya, A.N., Das, S., Mudliar, S.N., 2019. Nano catalytic ozonation of biomethanated distillery wastewater for biodegradability enhancement, color and toxicity reduction with biofuel production. Chemosphere 230, 449–461. https://doi.org/10.1016/j.chemosphere.2019.05.067

Mallikarjuna, C., Dash, R.R., 2020. A review on hydrodynamic parameters and biofilm characteristics of inverse fluidized bed bioreactors for treating industrial wastewater. J. Environ. Chem. Eng. 8, 104233. https://doi.org/10.1016/j.jece.2020.104233

Mani, S., Bharagava, R.N., 2016. Exposure to crystal violet, its toxic, genotoxic and carcinogenic effects on environment and its degradation and detoxification for environmental safety. Rev. Environ. Contam. Toxicol. 237, 71–104. https://doi.org/10.1007/978-3-319-23573-8_4/COVER

Maniyam, M.N., Ibrahim, A.L., Cass, A.E.G., 2018. Decolourization and biodegradation of azo dye methyl red by *Rhodococcus* strain UCC 0016. https://doi.org/10.1080/09593330.2018.1491634 41, 71–85.

Mansour, H. Ben, Ayed-Ajmi, Y., Mosrati, R., Corroler, D., Ghedira, K., Barillier, D., Chekir-Ghedira, L., 2010. Acid violet 7 and its biodegradation products induce chromosome aberrations, lipid peroxidation, and cholinesterase inhibition in mouse bone marrow. Environ. Sci. Pollut. Res. 17, 1371–1378. https://doi.org/10.1007/s11356-010-0323-1

Mehmood, C.T., Lu, C., Maqbool, T., Xiao, Y., Zhong, Z., 2022. Molecular transformations of dissolved organic matter during UV/O_3-assisted membrane filtration of UASB-treated real textile wastewater. Chemosphere 307. https://doi.org/10.1016/j.chemosphere.2022.136101

Mendoza Martnez, A.M., Escamilla Silv, E.M., 2013. Airlift Bioreactors: Hydrodynamics and Rheology Application to Secondary Metabolites Production. Mass Transf. - Adv. Sustain. Energy Environ. Oriented Numer. Model. https://doi.org/10.5772/53711

Mishra, S., Maiti, A., 2020. Effectual bio-decolourization of anthraquinone dye reactive blue-19 containing wastewater by *Bacillus cohnii* LAP217: process optimization. Bioremediat. J. 24, 1–20. https://doi.org/10.1080/10889868.2019.1671793

Mishra, S., Maiti, A., 2018. The efficacy of bacterial species to decolourise reactive azo, anthroquinone and triphenylmethane dyes from wastewater: a review. Environ. Sci. Pollut. Res. 25, 8286–8314. https://doi.org/10.1007/s11356-018-1273-2

Mizyed, A.G., 2021. Review on Application of Rotating Biological Contactor in Removal of Various Pollutants From Effluent 2, 41–61.

Mohammadzadeh, S., Olya, M.E., Arabi, A.M., Shariati, A., Khosravi Nikou, M.R., 2015. Synthesis, characterization and application of ZnO-Ag as a nanophotocatalyst for organic compounds degradation, mechanism and economic study. J. Environ. Sci. (China) 35, 194–207. https://doi.org/10.1016/j.jes.2015.03.030

Mohanty, S.S., Kumar, A., 2021. Biodegradation of Indanthrene Blue RS dye in immobilized continuous upflow packed bed bioreactor using corncob biochar. Sci. Reports 2021 111 11, 1–13. https://doi.org/10.1038/s41598-021-92889-3

Mortazavian, S., Saber, A., James, D.E., 2019. Optimization of photocatalytic degradation of acid blue 113 and acid red 88 textile dyes in a UV-c/TiO_2 suspension system: Application of response surface methodology (rsm). Catalysts 9.

https://doi.org/10.3390/catal9040360

Muruganandham, M., Swaminathan, M., 2006. TiO_2-UV photocatalytic oxidation of Reactive Yellow 14: Effect of operational parameters. J. Hazard. Mater. 135, 78–86. https://doi.org/10.1016/j.jhazmat.2005.11.022

Narayan Thorat, B., Kumar Sonwani, R., 2022. Current technologies and future perspectives for the treatment of complex petroleum refinery wastewater: A review. Bioresour. Technol. 355, 127263. https://doi.org/10.1016/j.biortech.2022.127263

Nardjess, M., Ridha, A., Haythem, B., Adala, C., Meriem, H., Hichem, H.A., 2023. Synthesis, characterization, antimicrobial activity and DNA/BSA interaction of functionalized graphene oxide nanoparticles with 2-(ferrocenylmethylamino) benzonitrile. J. Mol. Liq. 376, 121374. https://doi.org/10.1016/j.molliq.2023.121374

Nath, J., Ray, L., Bera, D., 2016. Continuous removal of malachite green by calcium alginate immobilized *Bacillus cereus* M116 in packed bed column. Environ. Technol. Innov. 6, 132–140. https://doi.org/10.1016/j.eti.2016.06.002

Nezamdoost-Sani, N., Khaledabad, M.A., Amiri, S., Mousavi Khaneghah, A., 2023. Alginate and derivatives hydrogels in encapsulation of probiotic bacteria: An updated review. Food Biosci. 52. https://doi.org/10.1016/j.fbio.2023.102433

Novotný, Č., Trošt, N., Šušla, M., Svobodová, K., Mikesková, H., Válková, H., Malachová, K., Pavko, A., 2012. The use of the fungus *Dichomitus squalens* for degradation in rotating biological contactor conditions. Bioresour. Technol. 114, 241–246. https://doi.org/10.1016/j.biortech.2012.03.080

Nowik, W., 2000. DYES | Liquid Chromatography. Encycl. Sep. Sci. 2602–2618. https://doi.org/10.1016/B0-12-226770-2/00811-5

Obayomi, K.S., Lau, S.Y., Danquah, M., Chiong, T., Takeo, M., 2022. Advances in graphene oxide based nanobiocatalytic technology for wastewater treatment. Environ. Nanotechnology, Monit. Manag. 17. https://doi.org/10.1016/j.enmm.2022.100647

Oberoi, A.S., Philip, L., 2017. Performance evaluation of attached biofilm reactors for the treatment of wastewater contaminated with aromatic hydrocarbons and phenolic compounds. J. Environ. Chem. Eng. 5, 3852–3864.

https://doi.org/10.1016/j.jece.2017.07.053

Oladoye, P.O., Ajiboye, T.O., Omotola, E.O., Oyewola, O.J., 2022. Methylene blue dye: Toxicity and potential elimination technology from wastewater. Results Eng. 16. https://doi.org/10.1016/j.rineng.2022.100678

Pakshirajan, K., Kheria, S., 2012. Continuous treatment of coloured industry wastewater using immobilized *Phanerochaete chrysosporium* in a rotating biological contactor reactor. J. Environ. Manage. 101, 118–123. https://doi.org/10.1016/j.jenvman.2012.02.008

Pandey, A., Singh, P., Iyengar, L., 2007. Bacterial decolorization and degradation of azo dyes. Int. Biodeterior. Biodegrad. 59, 73–84. https://doi.org/10.1016/j.ibiod.2006.08.006

Pandey, B.V., Dubey, M.K., Upadhyay, R.S., 2020. Bioremediation of Textile Dye Procion Red Yellow by Using *Pseudomonas fluorescens*. Proc. Natl. Acad. Sci. India Sect. B - Biol. Sci. 90, 135–141. https://doi.org/10.1007/s40011-019-01089-7

Pandey, R.K., Tewari, S., Tewari, L., 2018. Lignolytic mushroom Lenzites elegans WDP2: Laccase production, characterization, and bioremediation of synthetic dyes. Ecotoxicol. Environ. Saf. 158, 50–58. https://doi.org/10.1016/j.ecoenv.2018.04.003

Pavlidis, I. V., Patila, M., Bornscheuer, U.T., Gournis, D., Stamatis, H., 2014. Graphene-based nanobiocatalytic systems: Recent advances and future prospects. Trends Biotechnol. 32, 312–320. https://doi.org/10.1016/j.tibtech.2014.04.004

Pereira, C.A.A., Nava, M.R., Walter, J.B., Scherer, C.E., Dominique Kupfer Dalfovo, A., Barreto-Rodrigues, M., 2021. Application of zero valent iron (ZVI) immobilized in Ca-Alginate beads for C.I. Reactive Red 195 catalytic degradation in an air lift reactor operated with ozone. J. Hazard. Mater. 401, 123275. https://doi.org/10.1016/j.jhazmat.2020.123275

Phugare, S.S., Kalyani, D.C., Patil, A. V., Jadhav, J.P., 2011. Textile dye degradation by bacterial consortium and subsequent toxicological analysis of dye and dye metabolites using cytotoxicity, genotoxicity and oxidative stress studies. J. Hazard. Mater. 186, 713–723. https://doi.org/10.1016/j.jhazmat.2010.11.049

Pörtner, R., Faschian, R., 2019. Design and Operation of Fixed-Bed Bioreactors for

Immobilized Bacterial Culture. Grow. Handl. Bact. Cult. https://doi.org/10.5772/intechopen.87944

Prado Barragán, L.A., Figueroa, J.J.B., Rodríguez Durán, L.V., Aguilar González, C.N., Hennigs, C., 2016. Fermentative Production Methods. Biotransformation Agric. Waste By-Products Food, Feed. Fibre, Fuel Econ. 189–217. https://doi.org/10.1016/B978-0-12-803622-8.00007-0

Priyadarsini, S., Mohanty, S., Mukherjee, S., Basu, S., Mishra, M., 2018. Graphene and graphene oxide as nanomaterials for medicine and biology application. J. Nanostructure Chem. 8, 123–137. https://doi.org/10.1007/s40097-018-0265-6

R Ananthashankar, A.G., 2013. Production, Characterization and Treatment of Textile Effluents: A Critical Review. J. Chem. Eng. Process Technol. 05, 1–18. https://doi.org/10.4172/2157-7048.1000182

Rajasimman, M., Babu, S.V., Rajamohan, N., 2017. Biodegradation of textile dyeing industry wastewater using modified anaerobic sequential batch reactor – Start-up, parameter optimization and performance analysis. J. Taiwan Inst. Chem. Eng. 72, 171–181. https://doi.org/10.1016/j.jtice.2017.01.027

Ramsay, J., Shin, M., Wong, S., Goode, C., 2006. Amaranth decoloration by *Trametes versicolor* in a rotating biological contacting reactor. J. Ind. Microbiol. Biotechnol. 33, 791–795. https://doi.org/10.1007/s10295-006-0117-0

Rasool, K., Lee, D.S., 2016. Effect of ZnO nanoparticles on biodegradation and biotransformation of co-substrate and sulphonated azo dye in anaerobic biological sulfate reduction processes. Int. Biodeterior. Biodegrad. 109, 150–156. https://doi.org/10.1016/j.ibiod.2016.01.015

Rathour, R., Jain, K., Madamwar, D., Desai, C., 2021. Performance and biofilm-associated bacterial community dynamics of an upflow fixed-film microaerophilic-aerobic bioreactor system treating raw textile effluent. J. Clean. Prod. 295. https://doi.org/10.1016/j.jclepro.2021.126380

Ravi, R., Sarayu, K., Sandhya, S., Swaminathan, T., 2013. Rotating Biological Contactors. Air Pollut. Prev. Control Bioreact. Bioenergy 207–220.

https://doi.org/10.1002/9781118523360.ch9

Ravikumar, K.V.G., Sudakaran, S.V., Ravichandran, K., Pulimi, M., Natarajan, C., Mukherjee, A., 2018. Green synthesis of NiFe nano particles using *Punica granatum* peel extract for tetracycline removal. https://doi.org/10.1016/j.jclepro.2018.11.108

Rawat, J.M., Bhandari, A., Raturi, M., Rawat, B., 2019. *Agrobacterium rhizogenes* mediated hairy root cultures: A promising approach for production of useful metabolites. New Futur. Dev. Microb. Biotechnol. Bioeng. Microb. Second. Metab. Biochem. Appl. 103–118. https://doi.org/10.1016/B978-0-444-63504-4.00008-6

Raza, N., Rizwan, M., Mujtaba, G., 2022. Bioremediation of real textile wastewater with a microalgal-bacterial consortium: an eco-friendly strategy. Biomass Convers. Biorefinery. https://doi.org/10.1007/s13399-022-03214-5

Rusten, B., Eikebrokk, B., Ulgenes, Y., Lygren, E., 2006. Design and operations of the Kaldnes moving bed biofilm reactors. Aquac. Eng. 34, 322–331. https://doi.org/10.1016/j.aquaeng.2005.04.002

Sadhasivam, S., Savitha, S., Swaminathan, K., Lin, F.H., 2010. Biosorption of RBBR by *Trichoderma harzianum* WL1 in stirred tank and fluidized bed reactor models. J. Taiwan Inst. Chem. Eng. 41, 326–332. https://doi.org/10.1016/j.jtice.2009.09.005

Saha, P., Madliya, S., Khare, A., Subudhi, I., Bhaskara Rao, K.V., 2022. Enzymatic biodegradation, kinetic study, and detoxification of Reactive Red-195 by *Halomonas meridiana* isolated from Marine Sediments of Andaman Sea, India. https://doi.org/10.1080/09593330.2022.2038276

Samsami, S., Mohamadi, M., Sarrafzadeh, M.H., Rene, E.R., Firoozbahr, M., 2020. Recent advances in the treatment of dye-containing wastewater from textile industries: Overview and perspectives. Process Saf. Environ. Prot. 143, 138–163. https://doi.org/10.1016/j.psep.2020.05.034

Saqib, N. us, Adnan, R., Shah, I., 2016. A mini-review on rare earth metal-doped TiO_2 for photocatalytic remediation of wastewater. Environ. Sci. Pollut. Res. 23, 15941–15951. https://doi.org/10.1007/s11356-016-6984-7

Sathishkumar, K., Sathiyaraj, S., Parthipan, P., Akhil, A., Murugan, K., Rajasekar, A., 2017.

Electrochemical decolorization of methyl red by RuO_2-IrO_2-TiO_2 electrode and biodegradation with *Pseudomonas stutzeri* MN1 and *Acinetobacter baumannii* MN3: An integrated approach. Chemosphere 183, 204–211. https://doi.org/10.1016/j.chemosphere.2017.05.087

Sen, P., Nath, A., Bhattacharjee, C., 2017. Packed-Bed Bioreactor and Its Application in Dairy, Food, and Beverage Industry. Curr. Dev. Biotechnol. Bioeng. Bioprocesses, Bioreact. Control. 235–277. https://doi.org/10.1016/B978-0-444-63663-8.00009-4

Shalini, Y., P.S., 2019. Multistage fluidized bed bioreactor for dye decolorization using immobilized polyurethane foam: A novel approach. Biochem. Eng. J. 152, 107368. https://doi.org/10.1016/j.bej.2019.107368

Sharma, G., Kamalesu, S., 2023. Review on sustainable synthesis of semi-amorphous Ti-BDS MOF material, activated carbon, and graphene. Mater. Today Proc. 1–5. https://doi.org/10.1016/j.matpr.2023.01.249

Sharma, S.K., Bhunia, H., Bajpai, P.K., 2012. Photocatalytic Decolorization Kinetics and Mineralization of Reactive Black 5 Aqueous Solution by UV/TiO_2 Nanoparticles. Clean - Soil, Air, Water 40, 1290–1296. https://doi.org/10.1002/clen.201100557

Shen, L., Jin, Z., Wang, D., Wang, Y., Lu, Y., 2018. Enhance wastewater biological treatment through the bacteria induced graphene oxide hydrogel. Chemosphere. https://doi.org/10.1016/j.chemosphere.2017.09.105

Shen, L., Jin, Z., Xu, W., Jiang, X., Shen, Y.X., Wang, Y., Lu, Y., 2019. Enhanced Treatment of Anionic and Cationic Dyes in Wastewater through Live Bacteria Encapsulation Using Graphene Hydrogel. Ind. Eng. Chem. Res. 58, 7817–7824. https://doi.org/10.1021/acs.iecr.9b01950

Šíma, J., Pocedič, J., Hasal, P., 2016. Decolorization of Reactive Orange 16 in Rotating Drum Biological Contactor. J. Environ. Chem. Eng. 4, 4540–4548. https://doi.org/10.1016/j.jece.2016.10.010

Šíma, J., Pocedič, J., Roubíčková, T., Hasal, P., 2012. Rotating drum biological contactor and its application for textile dyes decolorization. Procedia Eng. 42, 1579–1586. https://doi.org/10.1016/j.proeng.2012.07.551

Singh, H., Raj, S., Kumar, D., Sharma, S., Bhatt, U., 2021. Bioremediation Potential of Duckweed (*Lemna Gibba*) in The Decolorization of C.I. Basic Green 4 and Chlorophyll a Fluorescence Analysis: Understanding Plant Performance. Res. Sq.

Sirianuntapiboon, S., 2006. Treatment of wastewater containing Cl_2 residue by packed cage rotating biological contactor (RBC) system. Bioresour. Technol. 97, 1735–1744. https://doi.org/10.1016/j.biortech.2005.07.030

Sivakumar, D., 2014. Role of Lemna minor Lin. in treating the textile industry wastewater. Int. J. Mater. Text. Eng. 8, 208–212.

Sivarajasekar, N., Baskar, R., 2014. Adsorption of basic red 9 on activated waste *Gossypium hirsutum* seeds: Process modeling, analysis and optimization using statistical design. J. Ind. Eng. Chem. 20, 2699–2709. https://doi.org/10.1016/j.jiec.2013.10.058

Skybová, T., Přibyl, M., Hasal, P., 2015. Mathematical model of decolourization in a rotating disc reactor. Biochem. Eng. J. 93, 151–165. https://doi.org/10.1016/j.bej.2014.09.010

So, C.M., Cheng, M.Y., Yu, J.C., Wong, P.K., 2002. Degradation of azo dye Procion Red MX-5B by photocatalytic oxidation. Chemosphere 46, 905–912. https://doi.org/10.1016/S0045-6535(01)00153-9

Sondhi, S., Kaur, R., Kaur, S., Kaur, P.S., 2018. Immobilization of laccase-ABTS system for the development of a continuous flow packed bed bioreactor for decolorization of textile effluent. Int. J. Biol. Macromol. 117, 1093–1100. https://doi.org/10.1016/j.ijbiomac.2018.06.007

Sonwani, R.K., Giri, B.S., Das, T., Singh, R.S., Rai, B.N., 2019. Biodegradation of fluorene by neoteric LDPE immobilized *Pseudomonas pseudoalcaligenes* NRSS3 in a packed bed bioreactor and analysis of external mass transfer correlation 77, 106–112.

Sonwani, R.K., Kim, K.H., Zhang, M., Tsang, Y.F., Lee, S.S., Giri, B.S., Singh, R.S., Rai, B.N., 2021. Construction of biotreatment platforms for aromatic hydrocarbons and their future perspectives. J. Hazard. Mater. 416, 125968. https://doi.org/10.1016/j.jhazmat.2021.125968

Sonwani, R.K., Swain, G., Giri, B.S., Singh, R.S., Rai, B.N., 2020. Biodegradation of Congo red dye in a moving bed biofilm reactor: Performance evaluation and kinetic modeling.

Bioresour. Technol. 302, 122811. https://doi.org/10.1016/j.biortech.2020.122811

Spennati, F., Ricotti, A., Mori, G., Siracusa, G., Becarelli, S., Gregorio, S. Di, Tigini, V., Varese, G.C., Munz, G., 2020. The role of cosubstrate and mixing on fungal biofilm efficiency in the removal of tannins. Environ. Technol. (United Kingdom) 41, 3515–3523. https://doi.org/10.1080/09593330.2019.1615128

Su, C.X.H., Low, L.W., Teng, T.T., Wong, Y.S., 2016. Combination and hybridisation of treatments in dye wastewater treatment: A review. J. Environ. Chem. Eng. 4, 3618–3631. https://doi.org/10.1016/j.jece.2016.07.026

Su, X., Li, S., Xie, M., Tao, L., Zhou, Y., Xiao, Y., Lin, H., Chen, J., Sun, F., 2021. Enhancement of polychlorinated biphenyl biodegradation by resuscitation promoting factor (Rpf) and Rpf-responsive bacterial community. Chemosphere 263. https://doi.org/10.1016/j.chemosphere.2020.128283

Sui, Z.Y., Cui, Y., Zhu, J.H., Han, B.H., 2013. Preparation of Three-dimensional graphene oxide-polyethylenimine porous materials as dye and gas adsorbents. ACS Appl. Mater. Interfaces 5, 9172–9179. https://doi.org/10.1021/am402661t

Sun, L., Fugetsu, B., 2014. Graphene oxide captured for green use: Influence on the structures of calcium alginate and macroporous alginic beads and their application to aqueous removal of acridine orange. Chem. Eng. J. 240, 565–573. https://doi.org/10.1016/j.cej.2013.10.083

Sur, D.H., Mukhopadhyay, M., 2018. Process parametric study for COD removal of electroplating industry effluent. 3 Biotech 8, 1–10. https://doi.org/10.1007/s13205-017-1059-0

Sutar, S.S., Patil, P.J., Tamboli, A.S., Patil, D.N., Apine, O.A., Jadhav, J.P., 2019. Biodegradation and detoxification of malachite green by a newly isolated bioluminescent bacterium *Photobacterium leiognathi* strain MS under RSM optimized culture conditions. Biocatal. Agric. Biotechnol. 20, 101183. https://doi.org/10.1016/j.bcab.2019.101183

Swain, G., Singh, S., Sonwani, R.K., Singh, R.S., Jaiswal, R.P., Rai, B.N., 2021. Removal of Acid Orange 7 dye in a packed bed bioreactor: Process optimization using response surface methodology and kinetic study. Bioresour. Technol. Reports 13, 100620. https://doi.org/10.1016/j.biteb.2020.100620

Swain, G., Sonwani, R.K., Giri, B.S., Singh, R.S., Jaiswal, R.P., Rai, B.N., 2020. Collective removal of phenol and ammonia in a moving bed biofilm reactor using modified bio-carriers: Process optimization and kinetic study. Bioresour. Technol. 306, 123177. https://doi.org/10.1016/j.biortech.2020.123177

Swathi, D., Sabumon, P.C., Trivedi, A., 2021. Simultaneous decolorization and mineralization of high concentrations of methyl orange in an anoxic up-flow packed bed reactor in denitrifying conditions. J. Water Process Eng. 40, 101813. https://doi.org/10.1016/j.jwpe.2020.101813

Takdastan, A., Kakavandi, B., Azizi, M., Golshan, M., 2018. Efficient activation of peroxymonosulfate by using ferroferric oxide supported on carbon/UV/US system: A new approach into catalytic degradation of bisphenol A. Chem. Eng. J. 331, 729–743. https://doi.org/10.1016/j.cej.2017.09.021

Tang, K., Rosborg, P., Rasmussen, E.S., Hambly, A., Madsen, M., Jensen, N.M., Hansen, A.A., Sund, C., Andersen, H.G., Torresi, E., Kragelund, C., Andersen, H.R., 2021. Impact of intermittent feeding on polishing of micropollutants by moving bed biofilm reactors (MBBR). J. Hazard. Mater. 403, 123536. https://doi.org/10.1016/j.jhazmat.2020.123536

Tang, W., Xu, X., Ye, B.C., Cao, P., Ali, A., 2019. Decolorization and degradation analysis of Disperse Red 3B by a consortium of the fungus: *Aspergillus* sp. XJ-2 and the microalgae *Chlorella sorokiniana* XJK. RSC Adv. 9, 14558–14566. https://doi.org/10.1039/c9ra01169b

Thakur, K., Kandasubramanian, B., 2019. Graphene and Graphene Oxide-Based Composites for Removal of Organic Pollutants: A Review. J. Chem. Eng. Data 64, 833–867. https://doi.org/10.1021/acs.jced.8b01057

Thiruppathi, K., Rangasamy, K., Ramasamy, M., Muthu, D., 2021. Evaluation of textile dye degrading potential of ligninolytic bacterial consortia. Environ. Challenges 4. https://doi.org/10.1016/j.envc.2021.100078

Tiwari, H., Sonwani, R.K., Singh, R.S., 2023. Bioremediation of dyes: a brief review of bioreactor performance. Environ. Technol. Rev. 12, 83–128. https://doi.org/10.1080/21622515.2023.2184276

Tiwari, H., Sonwani, R.K., Singh, R.S., 2022. A comprehensive evaluation of the integrated photocatalytic-fixed bed bioreactor system for the treatment of Acid Blue 113 dye. Bioresour. Technol. 364, 128037. https://doi.org/10.1016/j.biortech.2022.128037

Tony, B.D., Goyal, D., Khanna, S., 2009. Decolorization of textile azo dyes by aerobic bacterial consortium. Int. Biodeterior. Biodegrad. 63, 462–469. https://doi.org/10.1016/j.ibiod.2009.01.003

Travis, A.S., 1990. Perkin's Mauve: Ancestor of the Organic Chemical Industry. Technol. Cult. 31, 51. https://doi.org/10.2307/3105760

Unnikrishnan, S., Khan, M.H., Ramalingam, K., 2018. Dye-tolerant marine *Acinetobacter baumannii*-mediated biodegradation of reactive red. Water Sci. Eng. 11, 265–275. https://doi.org/10.1016/j.wse.2018.08.001

Vairavel, P., Murty, V.R., 2020. Decolorization of congo red dye in a continuously operated rotating biological contactor reactor. Desalin. Water Treat. 196, 299–314. https://doi.org/10.5004/dwt.2020.25931

Vandevivere, P.C., Bianchi, R., Verstraete, W., 1998. Review: Treatment and reuse of wastewater from the textile wet-processing industry: review of emerging technologies. J. Chem. Technol. Biotechnol. https://doi.org/10.1002/(sici)1097-4660(199808)72:4<289::aid-jctb905>3.3.co;2-r

Varjani, S., Rakholiya, P., Ng, H.Y., You, S., Teixeira, J.A., 2020. Microbial degradation of dyes: An overview. Bioresour. Technol. 314. https://doi.org/10.1016/j.biortech.2020.123728

Velayutham, K., Madhava, A.K., Pushparaj, M., Thanarasu, A., Devaraj, T., Periyasamy, K., Subramanian, S., 2017. Biodegradation of Remazol Brilliant Blue R using isolated bacterial culture (*Staphylococcus* sp. K2204). 39, 2900–2907. https://doi.org/10.1080/09593330.2017.1369579

Vikrant, K., Giri, B.S., Raza, N., Roy, K., Kim, K.H., Rai, B.N., Singh, R.S., 2018. Recent advancements in bioremediation of dye: Current status and challenges. Bioresour. Technol. 253, 355–367. https://doi.org/10.1016/j.biortech.2018.01.029

Vyrides, I., Drakou, E.M., Ioannou, S., Michael, F., Gatidou, G., Stasinakis, A.S., 2018. Biodegradation of bilge water: Batch test under anaerobic and aerobic conditions and performance of three pilot aerobic Moving Bed Biofilm Reactors (MBBRs) at different filling fractions. J. Environ. Manage. https://doi.org/10.1016/j.jenvman.2018.03.086

Waghmode, T.R., Kurade, M.B., Lade, H.S., Govindwar, S.P., 2012. Decolorization and biodegradation of rubine GFL by microbial consortium GG-BL in sequential aerobic/microaerophilic process. Appl. Biochem. Biotechnol. 167, 1578–1594. https://doi.org/10.1007/s12010-012-9585-z

Waghmode, T.R., Kurade, M.B., Sapkal, R.T., Bhosale, C.H., Jeon, B.H., Govindwar, S.P., 2019. Sequential photocatalysis and biological treatment for the enhanced degradation of the persistent azo dye methyl red. J. Hazard. Mater. 371, 115–122. https://doi.org/10.1016/j.jhazmat.2019.03.004

Walter, M., Safari, A., Ivankovic, A., Casey, E., 2013. Detachment characteristics of a mixed culture biofilm using particle size analysis. Chem. Eng. J. 228, 1140–1147. https://doi.org/10.1016/j.cej.2013.05.071

Wang, D., Jin, Z., Pang, X., Jiang, X., Lu, Y., Shen, L., 2020. Fabrication and functionalization of biological graphene aerogel by reusing microorganism in activated sludge and ionic dyes. Chem. Eng. J. 392. https://doi.org/10.1016/j.cej.2020.124823

Wang, S., Parajuli, S., Sivalingam, V., Bakke, R., 2020. Biofilm in Moving Bed Biofilm Process for Wastewater Treatment. Bact. Biofilms. https://doi.org/10.5772/intechopen.88520

Wang, S., Parajuli, S., Sivalingam, V., Bakke, R., 2019. Biofilm in Moving Bed Biofilm Process for Wastewater Treatment. https://doi.org/10.5772/intechopen.88520

Wang, S., Zhong, J., 2007. Chapter 6 . Bioreactor Engineering. Science (80-.). 131–161.

Wang, S.J., Zhong, J.J., 2007a. Bioreactor Engineering, in: Bioprocessing for Value-Added Products from Renewable Resources. Elsevier, pp. 131–161. https://doi.org/10.1016/B978-044452114-9/50007-4

Wang, S.J., Zhong, J.J., 2007b. Bioreactor Engineering. Bioprocess. Value-Added Prod. from Renew. Resour. 131–161. https://doi.org/10.1016/B978-044452114-9/50007-4

Wang, X., Cheng, X., Sun, D., Qi, H., 2008. Biodecolorization and partial mineralization of Reactive Black 5 by a strain of *Rhodopseudomonas palustris*. J. Environ. Sci. 20, 1218–1225. https://doi.org/10.1016/S1001-0742(08)62212-3

Wang, X., Liu, Z., Ye, X., Hu, K., Zhong, H., Yu, J., Jin, M., Guo, Z., 2014. A facile one-step approach to functionalized graphene oxide-based hydrogels used as effective adsorbents toward anionic dyes. Appl. Surf. Sci. 308, 82–90. https://doi.org/10.1016/j.apsusc.2014.04.103

Wang, Y., Wang, H., Wang, X., Xiao, Y., Zhou, Y., Su, X., Cai, J., Sun, F., 2020. Resuscitation, isolation and immobilization of bacterial species for efficient textile wastewater treatment: A critical review and update. Sci. Total Environ. 730. https://doi.org/10.1016/j.scitotenv.2020.139034

Wu, K., Zhou, Q., Li, Y., Hu, X., Ouyang, S., 2023. Integrating FTIR 2D correlation analyses, regular and omics analyses studies on the interaction and algal toxicity mechanisms between graphene oxide and cadmium. J. Hazard. Mater. 443, 130298. https://doi.org/10.1016/j.jhazmat.2022.130298

Xiao, D., He, M., Liu, Y., Xiong, L., Zhang, Q., Wei, L., Li, L., Yu, X., 2020. Strong alginate/reduced graphene oxide composite hydrogels with enhanced dye adsorption performance. Polym. Bull. 77, 6609–6623. https://doi.org/10.1007/s00289-020-03105-7

Xu, W., Jin, Z., Pang, X., Zeng, Y., Jiang, X., Lu, Y., Shen, L., 2020. Interaction between Biocompatible Graphene Oxide and Live *Shewanella* in the Self-Assembled Hydrogel: The Role of Physicochemical Properties. ACS Appl. Bio Mater. 3, 4263–4272. https://doi.org/10.1021/acsabm.0c00327

Yadav, M., Srivastva, N., Singh, R.S., Upadhyay, S.N., Dubey, S.K., 2014. Biodegradation of chlorpyrifos by *Pseudomonas* sp. in a continuous packed bed bioreactor. Bioresour. Technol. 165, 265–269. https://doi.org/10.1016/j.biortech.2014.01.098

Yang, H.Y., Jia, R.B., Chen, B., Li, L., 2014. Degradation of recalcitrant aliphatic and aromatic hydrocarbons by a dioxin-degrader *Rhodococcus* sp. strain p52. Environ. Sci.

Pollut. Res. 21, 11086–11093. https://doi.org/10.1007/S11356-014-3027-0

Yaseen, D.A., Scholz, M., 2019. Textile dye wastewater characteristics and constituents of synthetic effluents: a critical review. Int. J. Environ. Sci. Technol. https://doi.org/10.1007/s13762-018-2130-z

Yilmaz, M., Mengelizadeh, N., Saloot, M. khodadadi, shahbaksh, S., Balarak, D., 2022. Facile synthesis of Fe_3O_4/ZnO/GO photocatalysts for decolorization of acid blue 113 under solar, visible and UV lights. Mater. Sci. Semicond. Process. 144, 106593. https://doi.org/10.1016/j.mssp.2022.106593

Yu, M., Wang, J., Tang, L., Feng, C., Liu, H., Zhang, H., Peng, B., Chen, Z., Xie, Q., 2020. Intimate coupling of photocatalysis and biodegradation for wastewater treatment: Mechanisms, recent advances and environmental applications. Water Res. 175. https://doi.org/10.1016/j.watres.2020.115673

Yuan, J., Zhu, J., Bi, H., Zhang, Z., Chen, S., Liang, S., Wang, X., 2013. Self-assembled hydrothermal synthesis for producing a $MnCO_3$/graphene hydrogel composite and its electrochemical properties. RSC Adv. 3, 4400–4407. https://doi.org/10.1039/c3ra23477k

Yurtsever, A., Calimlioglu, B., Sahinkaya, E., 2017. Impact of SRT on the efficiency and microbial community of sequential anaerobic and aerobic membrane bioreactors for the treatment of textile industry wastewater. Chem. Eng. J. 314, 378–387. https://doi.org/10.1016/j.cej.2016.11.156

Zabłocka-Godlewska, E., Przystaś, W., 2020. Fed-Batch Decolourization of Mixture of Brilliant Green and Evans Blue by Bacteria Species Applied as Pure and Mixed Cultures: Influence of Growth Conditions. Water. Air. Soil Pollut. 231. https://doi.org/10.1007/s11270-020-4441-1

Zablocka-Godlewska, E., Przystas, W., Grabinska-Sota, E., 2015. Dye decolourisation using two *Klebsiella* strains. Water. Air. Soil Pollut. 226. https://doi.org/10.1007/s11270-014-2249-6

Zayani, G., Bousselmi, L., Pichat, P., Mhenni, F., Ghrabi, A., 2008. Photocatalytic degradation of the Acid Blue 113 textile azo dye in aqueous suspensions of four commercialized TiO_2 samples. J. Environ. Sci. Heal. - Part A Toxic/Hazardous Subst.

Environ. Eng. 43, 202–209. https://doi.org/10.1080/10934520701781608

Zeng, M., 2013. Influence of TiO_2 surface properties on water pollution treatment and photocatalytic activity. Bull. Korean Chem. Soc. 34, 953–956. https://doi.org/10.5012/bkcs.2013.34.3.953

Zhang, C., Li, Y., Shen, H., Shuai, D., 2021. Simultaneous coupling of photocatalytic and biological processes: A promising synergistic alternative for enhancing decontamination of recalcitrant compounds in water. Chem. Eng. J. 403. https://doi.org/10.1016/j.cej.2020.126365

Zhang, F., Yang, K., Liu, G., Chen, Y., Wang, M., Li, S., Li, R., 2022. Recent advances on graphene: Synthesis, properties and applications. Compos. Part A Appl. Sci. Manuf. 160. https://doi.org/10.1016/j.compositesa.2022.107051

Zhang, H., Lv, Y., Liu, F., Zhang, D., 2008. Degradation of C.I. Acid Orange 7 by ultrasound enhanced ozonation in a rectangular air-lift reactor. Chem. Eng. J. 138, 231–238. https://doi.org/10.1016/j.cej.2007.06.031

Zhang, Q., Bao, N., Wang, X., Hu, X., Miao, X., Chaker, M., Ma, D., 2016. Advanced Fabrication of Chemically Bonded Graphene/TiO_2 Continuous Fibers with Enhanced Broadband Photocatalytic Properties and Involved Mechanisms Exploration. Sci. Reports 2016 61 6, 1–15. https://doi.org/10.1038/srep38066

Zhong, J.J., 2011. Bioreactor Engineering, in: Comprehensive Biotechnology, Second Edition. Elsevier Inc., pp. 165–177. https://doi.org/10.1016/B978-0-08-088504-9.00097-0

Zolfaghari, P., Aghbolaghy, M., Karimi, A., Khataee, A., 2019. Continuous degradation of an organic pollutant using heterogeneous magnetic biocatalyst and CFD analysis of the process. Process Saf. Environ. Prot. 121, 338–348. https://doi.org/10.1016/j.psep.2018.11.004

Zubair, M., Aziz, H.A., Ihsanullah, I., Ahmad, M.A., Al-Harthi, M.A., 2022. Enhanced removal of Eriochrome Black T from water using biochar/layered double hydroxide/chitosan hybrid composite: Performance evaluation and optimization using BBD-RSM approach. Environ. Res. 209, 112861.

https://doi.org/10.1016/j.envres.2022.112861

Zur, J., Wojcieszyńska, D., Guzik, U., 2016. Metabolic Responses of Bacterial Cells to Immobilization. Molecules 21. https://doi.org/10.3390/molecules21070958

APPENDIX

Appendix

Appendix A-1. Sequence of isolated bacterial species

> *Enterobacter asburiae* strain SG43 _BGT1 (KR856388)

ATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAACGTCGCAAGA
CCAAAGAGGGGGACCTTCGGGCCTCTTGCCATCAGATGTGCCCAGATGGGATTA
GCTAGTAGGTGGGGTAACGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGA
GGATGACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAG
CAGTGGGGAATATTGCACAATGGGCGCAAGCCTGATGCAGCCATGCCGCGTGTA
TGAAGAAGGCCTTCGGGTTGTAAAGTACTTTCAGCGGGGAGGAAGGTGTTGTGG
TTAATAACCACAGCAATTGACGTTACCCGCAGAAGAAGCACCGGCTAACTCCGT
GCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGTTAATCGGAATTACTGGGCG
TAAAGCGCACGCAGGCGGTCTGTCAAGTCGGATGTGAAATCCCCGGGCTCAACC
TGGGAACTGCATTCGAAACTGGCAGGCTGGAGTCTTGTAGAGGGGGGTAGAATT
CCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGC
GGCCCCCTGGACAAAGACTGACGCTCATGTGCGAAAGCGTGGGGAGCAAACAGG
ATTAGATACCCTGGTAGTCCACGCCGTAAACGATGTCGATTTGGAGGTTGTGCCC
TTGAGCGTGGCTTCCGGAGCTAACGCGTTAAATCGACCGCCTGGGGAGTACGGC
CGCAAAGGTTAAAACTCAAATGAATTGACGGGGGCCCGCACAA

> *Alcaligenes sp.* SY1_BGT2 (KP162176)

TCGATCGGCAGCACGGACTTCGGTCTGGTGGCGAGTGGCGAACGGGTGAGTAAT
GTATCGGAACGTGCCCAGTAGCGGGGGATAACTACGCGAAAGCGTAGCTAATAC
CGCATACGCCCTACGGGGGAAAGCAGGGGATCTTCGGACCTTGCACTATTGGAG
CGGCCGATATCGGATTAGCTAGTTGGTGGGGTAACGGCCTACCAAGGCGACGAT
CCGTAGCTGGTTTGAGAGGACGACCAGCCACACTGGGACTGAGACACGGCCCAG
ACTCCTACGGGAGGCAGCAGTGGGGAATTTTGGACAATGGGGGAAACCCTGATC
CAGCCATCCCGCGTGTGCGATGAAGGCCTTCGGGTTGTAAAGCACTTTTGGCAGG
AAAGAAACGTCGCGGGCTAATACCTCGCGAAACTGACGGTACCTGCAGAATAAG
CACCGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGGTGCAAGCGTTAA
TCGGAATTACTGGGCGTAAAGCGTGCGCAGGCGGTTCGGAAAGAAAGATGTGAA
ATCCCAGAGCTTAACTTTGGAACTGCATTTTTAACTACCGGGCTAGAGTGTGTCA
GAGGGAGGTGGAATTCCGCGTGTAGCAGTGAAATGCGTAGATATGCGGAGGAAC
ACCGATGGCGAAGGCAGCCTCCTGGGATAACACTGACGCTCATGCACGAAAGCG
TGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCACGCCCTAAACGATGTCAA
CTAGCTGTTGGGGTCTTCGGGACCTTGGTAGCGCAGCTAACGCGTGAAAGTTGAC
CGCCTGGGGGGAGTACGGTCGCAA

Appendix A-2. Sequence of *Klebsiella michiganensis* (ABT1) (MH972172)

AGGTTAAGCTACCTACTTCTTTTGCAACCCACTCCCATGGTGTGACGGGCGGTGT
GTACAAGGCCCGGGAACGTATTCACCGTGGCATTCTGATCCACGATTACTAGCGA
TTCCGACTTCATGGAGTCGAGTTGCAGACTCCAATCCGGACTACGACATACTTTA
TGAGGTCCGCTTGCTCTCGCGAGGTCGCTTCTCTTTGTATATGCCATTGTAGCACG
TGTGTAGCCCTACTCGTAAGGGCCATGATGACTTGACGTCATCCCCACCTTCCTC
CAGTTTATCACTGGCAGTCTCCTTTGAGTTCCCGGCCGGACCGCTGGCAACAAAG
GATAAGGGTTGCGCTCGTTGCGGGACTTAACCCAACATTTCACAACACGAGCTG
ACGACAGCCATGCAGCACCTGTCTCAGAGTTCCCGAAGGCACCAAAGCATCTCT
GCTAAGTTCTCTGGATGTCAAGAGTAGGTAAGGTTCTTCGCGTTGCATCGAATTA
AACCACATGCTCCACCGCTTGTGCGGGCCCCCGTCAATTCATTTGAGTTTTAACC
TTGCGGCCGTACTCCCCAGGCGGTCGACTTAACGCGTTAGCTCCGGAAGCCACTC
CTCAAGGGAACAACCTCCAAGTCGACATCGTTTACAGCGTGGACTACCAGGGTA
TCTAATCCTGTTTGCTCCCCACGCTTTCGCACCTGAGCGTCAGTCTTTGTCCAGGG
GGGCCGCCTTCGCCACCGGTATTCCTCCAGATCTCTACGCATTTCACCGCTACAC
CTGGGAATTCTACCCCCCCTCTACAAGACTCCAGCCTGCCAGTTTCGAATGCA

Appendix A-3. Sequence of *Klebsiella grimontii* (ABT2) (CP067391)

AACCCACTCCCATGGTGTGACGGGCGGTGTGTACAAGGCCCGGGAACGTATTCA
CCGTGGCATTCTGATCCACGATTACTAGCGATTCCGACTTCATGGAGTCGAGTTG
CAGACTCCAATCCGGACTACGACATACTTTATGAGGTCCGCTTGCTCTCGCGAGG
TCGCTTCTCTTTGTATATGCCATTGTAGCACGTGTGTAGCCCTACTCGTAAGGGCC
ATGATGACTTGACGTCATCCCCACCTTCCTCCAGTTTATCACTGGCAGTCTCCTTT
GAGTTCCCGGCCGAACCGCTGGCAACAAAGGATAAGGGTTGCGCTCGTTGCGGG
ACTTAACCCAACATTTCACAACACGAGCTGACGACAGCCATGCAGCACCTGTCTC
AGAGTTCCCGAAGGCACCAAAGCATCTCTGCTAAGTTCTCTGGATGTCAAGAGTA
GGTAAGGTTCTTCGCGTTGCATCGAATTAAACCACATGCTCCACCGCTTGTGCGG
GCCCCCGTCAATTCATTTGAGTTTTAACCTTGCGGCCGTACTCCCCAGGCGGTCG
ACTTAACGCGTTAGCTCCGGAAGCCACTCCTCAAGGGAACAACCTCCAAGTCGA
CATCGTTTACAGCGTGGACTACCAGGGTATCTAATCCTGTTTGCTCCCCACGCTTT
CGCACCTGAGCGTCAGTCTTTGTCCAGGGGGCCGCCTTCGCCACCGGTATTCCTC
CAGATCTCTACGCATTTCACCGCTACACCTGGAATTCTACCCCCCTCTACAAGAC
TCCAGCCTGCCAGTTTCGAATGCAGTTCCCAGGTTGAGCCCGGGGATTTCACATC
CGACTTGACAGACCGCCTGCG

Appendix B

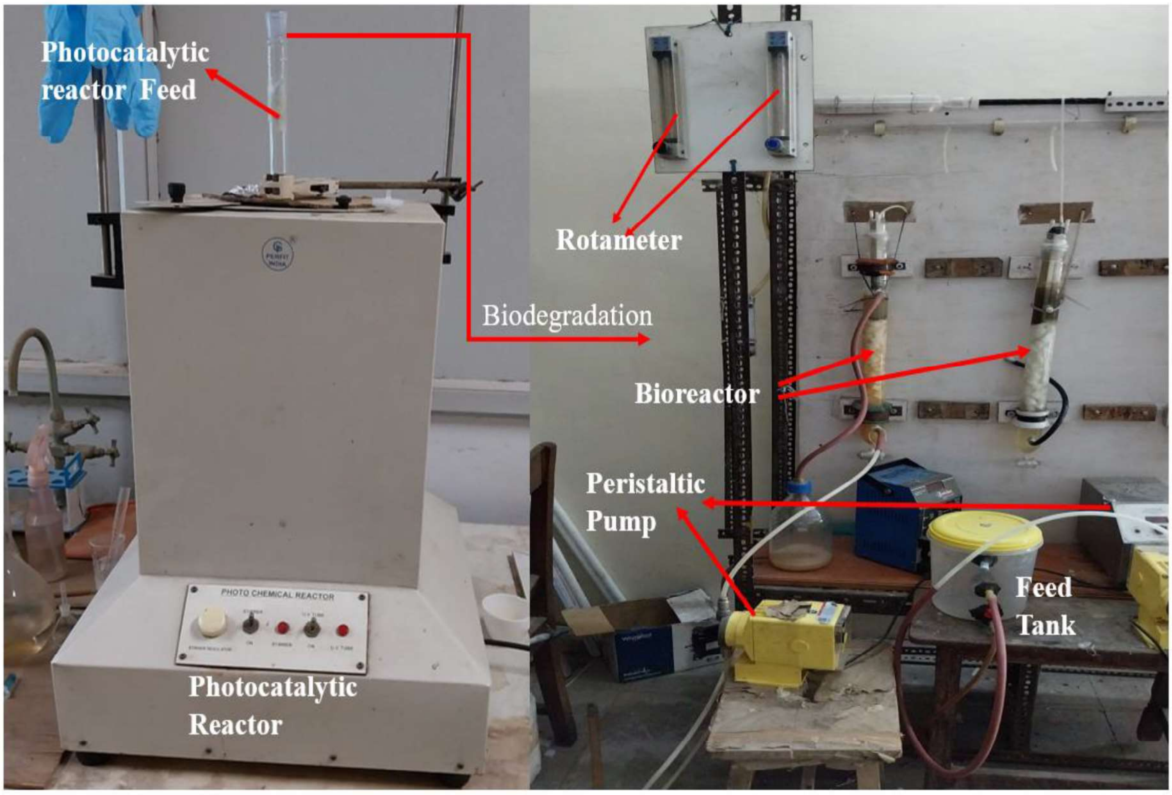

Figure B-1. A typical laboratory-scale experimental setup of Photocatalytic reactor and Fixed-Bed Bioreactor.

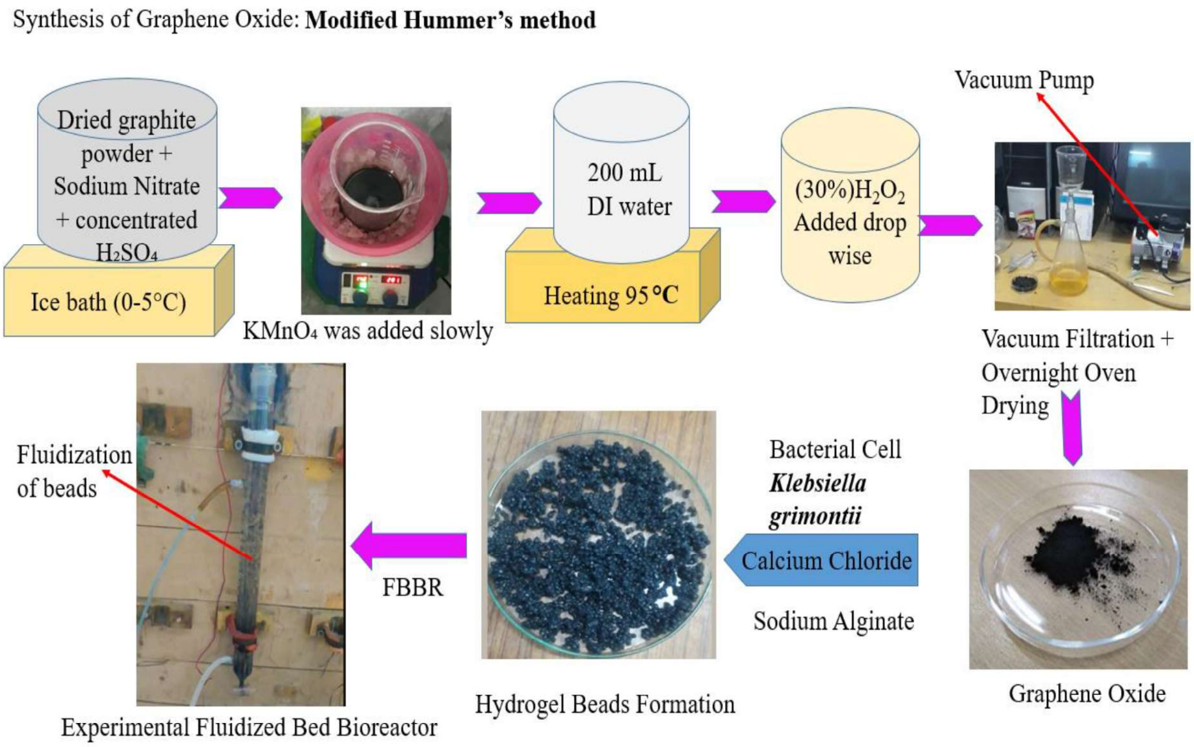

Figure B-2. A schematic layout of Graphene Oxide Preparation strategy with hydrogel beads formation and subsequently AB 113 biodegradation in laboratory-scale Fluidized Bed Bioreactor.

LIST OF RESEARCH PUBLICATIONS

List of Publications

As a First author

- **Himanshu Tiwari**, Pranjal Tripathi, Ravi Kumar Sonwani, and Ram Sharan Singh. "A synergistic approach combining Adsorption and Biodegradation for effective treatment of Acid Blue 113 dye by *Klebsiella grimontii* entrapped Graphene Oxide-Calcium Alginate Hydrogel Beads." Bioresource Technology 387 (2023): 129614. https://doi.org/10.1016/j.biortech.2023.129614
- **Himanshu Tiwari**, Ravi Kumar Sonwani, and Ram Sharan Singh. "Bioremediation of dyes: a brief review of bioreactor performance." Environmental Technology Reviews 12, no. 1 (2023): 83-128. https://doi.org/10.1080/21622515.2023.2184276
- **Himanshu Tiwari,** Ravi Kumar Sonwani, and Ram Sharan Singh. "A comprehensive evaluation of the integrated photocatalytic-fixed bed bioreactor system for the treatment of Acid Blue 113 dye." Bioresource Technology 364 (2022): 128037. https://doi.org/10.1016/j.biortech.2022.128037
- **Himanshu Tiwari,** Ravi Kumar Sonwani, and Ram Sharan Singh. "Biodegradation and detoxification study of triphenylmethane dye (Brilliant green) in a recirculating packed-bed bioreactor by bacterial consortium." Environmental Technology (2022): 1-13. https://doi.org/10.1080/09593330.2022.2131469
- **Himanshu Tiwari** and Ram Sharan Singh. "Biotechnological Approaches for Microbial Treatment of Textile Wastewater and Resource Recovery: Opportunities, Challenges, and Future Perspectives." Microbial Technologies for Wastewater Recycling and Management (2022): 269-279. https://doi.org/10.1201/9781003231738-19

List of Publications (Group)

- Vikash Bharti, Kumar Vikrant, Mandavi Goswami, **Himanshu Tiwari**, Ravi Kumar Sonwani, Jechan Lee, Daniel CW Tsang et al. "Biodegradation of methylene blue dye in a batch and continuous mode using biochar as packing media." Environmental research 171 (2019): 356-364. https://doi.org/10.1016/j.envres.2019.01.051
- Kumar Vikrant, Kangkan Roy, Mandavi Goswami, **Himanshu Tiwari**, Balendu Shekher Giri, Ki-Hyun Kim, Yui Fai Tsang, and Ram Sharan Singh. "The potential application of biochars for dyes with an emphasis on azo dyes: analysis through an experimental case study utilizing fruit-derived biochar for the abatement of congo red as the model pollutant." Biochar Applications in Agriculture and Environment Management (2020): 53-76. https://doi.org/10.1007/978-3-030-40997-5_3

List of conferences/Workshops

- International Conference on " New Horizons in Biotechnology" & 16th Convention of Biotech Research Society, India (**NHBT 2019**).
- International Webinar on Advances in Physics, Chemistry, Mathematics, Computer Sciences & Biological Sciences (**CONIAPS XXVI- 2020**)
- International Conference on Biotechnology for Sustainable Agriculture, Environment and Health (**BSAEH-2021**)
- International Conference on Advances in Sustainable Research for Energy and Environmental Management (**ASREEM-2021**)
- Training Programme on Wastewater Characterization, Treatment and Reuse (**WCTR - 2023**) Indian Institute of Petroleum and Energy, Visakhapatnam-530003.