

Supplementary File 1 References used for data collection.

- [1] Zhang L, Yang Y, Bao Z, Zhang X, Yao S, et al. 2024. Plant-derived biochar amendment for compost maturity improvement and gaseous emission reduction in food waste composting: Insight from bacterial community and functions. *Chemosphere* 352:141457 <http://dx.doi.org/10.1016/j.chemosphere.2024.141457>
- [2] Zhang DL, Zhou HB, Ding JT, Shen YJ, Zhang YH, et al. 2024. Potential of novel iron 1,3,5-benzene tricarboxylate loaded on biochar to reduce ammonia and nitrous oxide emissions and its associated biological mechanism during composting. *Bioresource Technology* 396:9 <http://dx.doi.org/10.1016/j.biortech.2024.130424>
- [3] Zhao XY, Xu KL, Wang JW, Wang ZQ, Pan RK, et al. 2022. Potential of biochar integrated manganese sulfate for promoting pig manure compost humification and its biological mechanism. *Bioresource Technology* 357:10 <http://dx.doi.org/10.1016/j.biortech.2022.127350>
- [4] Wu X, Zhao XY, Wu WL, Hou JW, Zhang WQ, et al. 2024. Biotic and abiotic effects of manganese salt and apple branch biochar co-application on humification in the co-composting of hog manure and sawdust. *Chemical Engineering Journal* 482:11 <http://dx.doi.org/10.1016/j.cej.2024.149077>
- [5] Wang WS, Wang X, Zhang XY, Bai ZH, Ma L. 2024. Modified lignin can achieve mitigation of ammonia and greenhouse gas emissions simultaneously in composting. *Bioresource Technology* 402:10 <http://dx.doi.org/10.1016/j.biortech.2024.130840>
- [6] Stegenta-Dabrowska S, Sygula E, Bednik M, Rosik J. 2024. Effective Carbon Dioxide Mitigation and Improvement of Compost Nutrients with the Use of Composts' Biochar. *Materials* 17:24 <http://dx.doi.org/10.3390/ma17030563>
- [7] Shin Y, Iwabuchi K, Itoh T. 2024. Low-temperature biochars are more effective in reducing ammonia emissions through various mechanisms during manure composting. *Journal of Material Cycles and Waste Management* 26:138-48 <http://dx.doi.org/10.1007/s10163-023-01808-3>
- [8] Chung WJ, Shim J, Chang SW, Ravindran B. 2023. Effect of Biochar Amendments on the Co-Composting of Food Waste and Livestock Manure. *Agronomy-Basel* 13:12 <http://dx.doi.org/10.3390/agronomy13010035>
- [9] Liu ZZ, Cao SH, He X, Liu G, Yao H, et al. 2024. Effects of crayfish shell powder and bamboo-derived biochar on nitrogen conversion, bacterial community and nitrogen functional genes during pig manure composting. *Bioresource Technology* 402:11 <http://dx.doi.org/10.1016/j.biortech.2024.130783>
- [10] Liu J, Hu YL, Gu SJ, Li XM, Ji ZL, et al. 2024. Insight into mitigation mechanisms of N₂O emission by biochar during agricultural waste composting. *Bioresource Technology* 406:10 <http://dx.doi.org/10.1016/j.biortech.2024.130970>
- [11] Liu H, Awasthi MK, Zhang ZQ, Syed A, Bahkali AH. 2024. Evaluation of gases emission and enzyme dynamics in sheep manure compost occupying with peach shell biochar. *Environmental Pollution* 351:11 <http://dx.doi.org/10.1016/j.envpol.2024.124065>
- [12] He XQ, Peng ZH, Zhu YX, Chen YF, Huang YP, et al. 2024. Wheat straw biochar as an additive in swine manure Composting: An in-depth analysis of mixed material particle characteristics and interface interactions. *Waste Management* 176:41-51 <http://dx.doi.org/10.1016/j.wasman.2024.01.017>
- [13] Harrison BP, Moo Z, Perez-Agredano E, Gao S, Zhang X, Ryals R. 2024. Biochar-composting substantially reduces methane and air pollutant emissions from dairy manure. *Environmental Research Letters* 19:13 <http://dx.doi.org/10.1088/1748-9326/ad1ad2>
- [14] Harrison BP, Gao S, Thao T, Gonzales ML, Williams KL, et al. 2024. Methane and nitrous oxide emissions during biochar-composting are driven by biochar application rate and aggregate formation. *Global Change Biology Bioenergy* 16:14 <http://dx.doi.org/10.1111/gcbb.13121>

- [15] Geng XY, Yang HY, Gao WF, Yue JY, Mu DC, Wei ZM. 2024. Greenhouse gas emission characteristics during kitchen waste composting with biochar and zeolite addition. *Bioresource Technology* 399:10 <http://dx.doi.org/10.1016/j.biortech.2024.130575>
- [16] Firmino MV, Trémier A, Couvert A, Szymczyk A. 2024. New insights into biochar ammoniacal nitrogen adsorption and its correlation to aerobic degradation ammonia emissions. *Waste Management* 178:257-66 <http://dx.doi.org/10.1016/j.wasman.2024.02.032>
- [17] Agyarko-Mintah E, Cowie A, Singh BP, Joseph S, Van Zwieten L, et al. 2017. Biochar increases nitrogen retention and lowers greenhouse gas emissions when added to composting poultry litter. *Waste Management* 61:138-49
- [18] Dang RJ, Cai Y, Li JM, Kong YL, Jiang T, et al. 2024. Biochar reduces gaseous emissions during poultry manure composting: Evidence from the evolution of associated functional genes. *Journal of Cleaner Production* 452:12 <http://dx.doi.org/10.1016/j.jclepro.2024.142060>
- [19] Zhou YT, Zhao HR, Lu ZH, Ren XA, Zhang ZQ, Wang Q. 2023. Synergistic effects of biochar derived from different sources on greenhouse gas emissions and microplastics mitigation during sewage sludge composting. *Bioresource Technology* 387:9 <http://dx.doi.org/10.1016/j.biortech.2023.129556>
- [20] Zhou Q, Liu GY, Hu ZB, Zheng YK, Lin ZS, Li PY. 2023. Impact of different structures of biochar on decreasing methane emissions from sewage sludge composting. *Waste Management & Research* 41:723-32 <http://dx.doi.org/10.1177/0734242x221122586>
- [21] Yang XY, Duan PP, Cao YB, Wang KL, Li DJ. 2023. Mechanisms of mitigating nitrous oxide emission during composting by biochar and calcium carbonate addition. *Bioresource Technology* 388:9 <http://dx.doi.org/10.1016/j.biortech.2023.129772>
- [22] Yan HL, Yang HX, Li KC, Zhu PF, Li XL, Li QL. 2023. Biochar Addition Modified Carbon Flux and Related Microbiota in Cow Manure Composting. *Waste and Biomass Valorization* 14:847-58 <http://dx.doi.org/10.1007/s12649-022-01896-6>
- [23] Wu YP, Li QF, Zheng Y, Xiong XJ, Chen YF, et al. 2023. Optimizing biochar addition for vermicomposting: a comprehensive evaluation of earthworms' activity, N₂O emissions and compost quality. *Biochar* 5:12 <http://dx.doi.org/10.1007/s42773-022-00203-9>
- [24] Weldon S, Rivier PA, Joner EJ, Coutiris C, Budai A. 2023. Co-composting of digestate and garden waste with biochar: effect on greenhouse gas production and fertilizer value of the matured compost. *Environmental Technology* 44:4261-71 <http://dx.doi.org/10.1080/09593330.2022.2089057>
- [25] Wang Z, Xu YL, Yang T, Liu YQ, Zheng TT, Zheng CL. 2023. Effects of biochar carried microbial agent on compost quality, greenhouse gas emission and bacterial community during sheep manure composting. *Biochar* 5:17 <http://dx.doi.org/10.1007/s42773-022-00202-w>
- [26] Wang HH, Shao TY, Zhou YJ, Long XH, Rengel Z. 2023. The effect of biochar prepared at different pyrolysis temperatures on microbially driven conversion and retention of nitrogen during composting. *Heliyon* 9:15 <http://dx.doi.org/10.1016/j.heliyon.2023.e13698>
- [27] Jiang JS, Cui HL, Bhople P, Chater CCC, Yu FQ, Liu D. 2024. Biochar Combined with Garbage Enzyme Enhances Nitrogen Conservation during Sewage Sludge Composting: Evidence from Microbial Community and Enzyme Activities Related to Ammoniation. *Agronomy-Basel* 14:15 <http://dx.doi.org/10.3390/agronomy14061162>
- [28] Pang YW, Zhen F, Wang DH, Luo ZF, Huang JF, Zhang YL. 2024. Effects of biochar combined with MgO desulfurization waste residue on nitrogen conversion and odor emission in chicken manure composting. *Environmental Technology* 45:4779-90 <http://dx.doi.org/10.1080/09593330.2023.2283086>

- [29] Ottani F, Parenti M, Santunione G, Moscatelli G, Kahn R, et al. 2023. Effects of different gasification biochar grain size on greenhouse gases and ammonia emissions in municipal aerated composting processes. *Journal of Environmental Management* 331:13 <http://dx.doi.org/10.1016/j.jenvman.2023.117257>
- [30] Nguyen MK, Lin CT, Hoang HG, Bui XT, Ngo HH, et al. 2023. Investigation of biochar amendments on odor reduction and their characteristics during food waste co-composting. *Science of The Total Environment* 865:9 <http://dx.doi.org/10.1016/j.scitotenv.2022.161128>
- [31] Liu ZZ, Yan ZW, Liu G, Wang XY, Fang J. 2023. Impacts of adding FeSO₄ and biochar on nitrogen loss, bacterial community and related functional genes during cattle manure composting. *Bioresource Technology* 379:11 <http://dx.doi.org/10.1016/j.biortech.2023.129029>
- [32] Li DY, Manu MK, Varjani S, Wong JWC. 2023. Role of tobacco and bamboo biochar on food waste digestate co-composting: Nitrogen conservation, greenhouse gas emissions, and compost quality. *Waste Management* 156:44-54 <http://dx.doi.org/10.1016/j.wasman.2022.10.022>
- [33] Gong XQ, Zou L, Wang L, Zhang B, Jiang JX. 2023. Biochar improves compost humification, maturity and mitigates nitrogen loss during the vermicomposting of cattle manure-maize straw. *Journal of Environmental Management* 325:11 <http://dx.doi.org/10.1016/j.jenvman.2022.116432>
- [34] Feng MT, Wu XY, Qiu XW, Wang HJ. 2023. Influence of Peat and Biochar on Gas Emissions and Microbial Metabolism During Co-composting of Chicken Manure and Maize Straw. *Waste and Biomass Valorization* 14:197-208 <http://dx.doi.org/10.1007/s12649-022-01857-z>
- [35] Castro-Herrera D, Prost K, Kim DG, Yimer F, Tadesse M, et al. 2023. Biochar addition reduces non-CO₂ greenhouse gas emissions during composting of human excreta and cattle manure. *Journal of Environmental Quality* 52:814-28 <http://dx.doi.org/10.1002/jeq2.20482>
- [36] Alarefee HA, Ishak CF, Othman R, Karam DS. 2023. Effectiveness of mixing poultry litter compost with rice husk biochar in mitigating ammonia volatilization and carbon dioxide emission. *Journal of Environmental Management* 329:14 <http://dx.doi.org/10.1016/j.jenvman.2022.117051>
- [37] Zhou SX, Li Y, Jia PY, Wang X, Kong FL, Jiang ZX. 2022. The co-addition of biochar and manganese ore promotes nitrous oxide reduction but favors methane emission in sewage sludge composting. *Journal of Cleaner Production* 339:10 <http://dx.doi.org/10.1016/j.jclepro.2022.130759>
- [38] Zhang BX, Fan BB, Hassan I, Peng YT, Ma RN, et al. 2022. Effects of bamboo biochar on nitrogen conservation during co-composting of layer manure and spent mushroom substrate. *Environmental Technology* 43:3861-69 <http://dx.doi.org/10.1080/09593330.2021.1936201>
- [39] Yan HL, Huang YT, Li KC, Zhu PF, Li XL, Li QL. 2022. Insights into influences of bamboo biochar on nitrous oxide emission and diazotrophs during cow manure and bagasse composting. *Biomass Conversion and Biorefinery* 12:4637-48 <http://dx.doi.org/10.1007/s13399-022-03072-1>
- [40] Wang XZ, Liu X, Wang ZQ, Sun GT, Li JM. 2022. Greenhouse gas reduction and nitrogen conservation during manure composting by combining biochar with wood vinegar. *Journal of Environmental Management* 324:10 <http://dx.doi.org/10.1016/j.jenvman.2022.116349>
- [41] Wang PC, Huang QY, Xiao HL, Zhang Z, Qiao Y, et al. 2022. The effect of carbonate and biochar on carbon and nitrogen losses during composting. *Journal of Material Cycles and Waste Management* 24:1485-93 <http://dx.doi.org/10.1007/s10163-022-01405-w>
- [42] Wang NY, Awasthi MK, Pan JT, Jiang SL, Wan FC, et al. 2022. Effects of biochar and biogas residue amendments on N₂O emission, enzyme activities and functional genes related with nitrification and denitrification during rice straw composting. *Bioresource Technology* 357:8 <http://dx.doi.org/10.1016/j.biortech.2022.127359>

- [43] Wang JW, Pan JT, Ma XZ, Li SL, Chen X, et al. 2022. Solid digestate biochar amendment on pig manure composting: Nitrogen cycle and balance. *Bioresource Technology* 349:10 <http://dx.doi.org/10.1016/j.biortech.2022.126848>
- [44] Zhang BX, Xu ZC, Jiang T, Huda N, Li GX, Luo WH. 2020. Gaseous emission and maturity in composting of livestock manure and tobacco wastes: Effects of aeration intensities and mitigation by physiochemical additives. *Environmental Technology & Innovation* 19:9 <http://dx.doi.org/10.1016/j.eti.2020.100899>
- [45] Jiang JS, Wang Y, Yu D, Hou R, Ma XA, et al. 2022. Combined addition of biochar and garbage enzyme improving the humification and succession of fungal community during sewage sludge composting. *Bioresource Technology* 346:9 <http://dx.doi.org/10.1016/j.biortech.2021.126344>
- [46] Lin X, Wang NY, Li FH, Yan BH, Pan JT, et al. 2022. Evaluation of the synergistic effects of biochar and biogas residue on CO₂ and CH₄ emission, functional genes, and enzyme activity during straw composting. *Bioresource Technology* 360:8 <http://dx.doi.org/10.1016/j.biortech.2022.127608>
- [47] Li YC, Ma J, Yong XY, Luo LW, Wong JWC, et al. 2022. Effect of biochar combined with a biotrickling filter on deodorization, nitrogen retention, and microbial community succession during chicken manure composting. *Bioresource Technology* 343:9 <http://dx.doi.org/10.1016/j.biortech.2021.126137>
- [48] Li X, Zhao Y, Xu AK, Chang HM, Lin G, Li R. 2022. Conductive biochar promotes oxygen utilization to inhibit greenhouse gas emissions during electric field-assisted aerobic composting. *Science of The Total Environment* 842:8 <http://dx.doi.org/10.1016/j.scitotenv.2022.156929>
- [49] Zhang FS, Wei Z, Wang JJ. 2021. Integrated application effects of biochar and plant residue on ammonia loss, heavy metal immobilization, and estrogen dissipation during the composting of poultry manure. *Waste Management* 131:117-25 <http://dx.doi.org/10.1016/j.wasman.2021.05.037>
- [50] Xue SD, Zhou LA, Zhong MZ, Awasthi MK, Mao H. 2021. Bacterial agents affected bacterial community structure to mitigate greenhouse gas emissions during sewage sludge composting. *Bioresource Technology* 337:8 <http://dx.doi.org/10.1016/j.biortech.2021.125397>
- [51] Wang YC, Akdeniz N, Yi SQ. 2021. Biochar-amended poultry mortality composting to increase compost temperatures, reduce ammonia emissions, and decrease leachate's chemical oxygen demand. *Agriculture Ecosystems & Environment* 315:9 <http://dx.doi.org/10.1016/j.agee.2021.107451>
- [52] Wang HX, Lu Y, Xu JL, Liu XJ, Sheng LX. 2021. Effects of additives on nitrogen transformation and greenhouse gases emission of co-composting for deer manure and corn straw. *Environmental Science and Pollution Research* 28:13000-20 <http://dx.doi.org/10.1007/s11356-020-11302-0>
- [53] Manu MK, Wang C, Li DY, Varjani S, Xu YJ, et al. 2021. Biodegradation kinetics of ammonium enriched food waste digestate compost with biochar amendment. *Bioresource Technology* 341:11 <http://dx.doi.org/10.1016/j.biortech.2021.125871>
- [54] Huang W, Sun XL, Sun HJ, Feng YF, Gong XL, et al. 2024. Effects of biochar and wood vinegar co-application on composting ammonia and nitrous oxide losses and fertility. *Bioresource Technology* 412:11 <http://dx.doi.org/10.1016/j.biortech.2024.131388>
- [55] He XQ, Yin HJ, Fang C, Xiong JP, Han LJ, et al. 2021. Metagenomic and q-PCR analysis reveals the effect of powder bamboo biochar on nitrous oxide and ammonia emissions during aerobic composting. *Bioresource Technology* 323:9 <http://dx.doi.org/10.1016/j.biortech.2020.124567>
- [56] Chung WJ, Chang SW, Chaudhary DK, Shin J, Kim H, et al. 2021. Effect of biochar amendment on compost quality, gaseous emissions and pathogen reduction during in-vessel composting of chicken manure. *Chemosphere* 283:8 <http://dx.doi.org/10.1016/j.chemosphere.2021.131129>

- [57] Zhang HD, Marchant-Forde JN, Zhang XY, Wang Y. 2020. Effect of Cornstalk Biochar Immobilized Bacteria on Ammonia Reduction in Laying Hen Manure Composting. *Molecules* 25:24 <http://dx.doi.org/10.3390/molecules25071560>
- [58] Yang YJ, Awasthi MK, Du W, Ren XN, Lei T, Lv JL. 2020. Compost supplementation with nitrogen loss and greenhouse gas emissions during pig manure composting. *Bioresource Technology* 297:7 <http://dx.doi.org/10.1016/j.biortech.2019.122435>
- [59] Liu Y, Ma RN, Li DY, Qi CR, Han LN, et al. 2020. Effects of calcium magnesium phosphate fertilizer, biochar and spent mushroom substrate on compost maturity and gaseous emissions during pig manure composting. *Journal of Environmental Management* 267:10 <http://dx.doi.org/10.1016/j.jenvman.2020.110649>
- [60] Hestrin R, Enders A, Lehmann J. 2020. Ammonia volatilization from composting with oxidized biochar. *Journal of Environmental Quality* 49:1690-702 <http://dx.doi.org/10.1002/jeq2.20154>
- [61] Awasthi MK, Duan YM, Awasthi SK, Liu T, Zhang ZQ, et al. 2020. Effect of biochar on emission, maturity and bacterial dynamics during sheep manure composting. *Renewable Energy* 152:421-29 <http://dx.doi.org/10.1016/j.renene.2020.01.065>
- [62] Harrison BP, Gao S, Gonzales M, Thao T, Bischak E, et al. 2022. Dairy Manure Co-composting with Wood Biochar Plays a Critical Role in Meeting Global Methane Goals. *Environmental Science & Technology* 56:10987-96 <http://dx.doi.org/10.1021/acs.est.2c03467>
- [63] Rong R, Zheng YS, Zhang FS, Yang LS, Li ZM. 2019. The Effects of Different Types of Biochar on Ammonia Emissions during Co-composting Poultry Manure with a Corn Leaf. *Polish Journal of Environmental Studies* 28:3837-43 <http://dx.doi.org/10.15244/pjoes/95179>
- [64] Mao H, Zhang HY, Fu Q, Zhong MZ, Li RH, et al. 2019. Effects of four additives in pig manure composting on greenhouse gas emission reduction and bacterial community change. *Bioresource Technology* 292:8 <http://dx.doi.org/10.1016/j.biortech.2019.121896>
- [65] Wang SP, Wang L, Sun ZY, Wang ST, Shen CH, et al. 2021. Biochar addition reduces nitrogen loss and accelerates composting process by affecting the core microbial community during distilled grain waste composting. *Bioresource Technology* 337:10 <http://dx.doi.org/10.1016/j.biortech.2021.125492>
- [66] Jiang JS, Wang Y, Yu D, Zhu GF, Cao ZG, et al. 2021. Comparative evaluation of biochar, pelliculic acid, and garbage enzyme on nitrogenase and nitrogen-fixing bacteria during the composting of sewage sludge. *Bioresource Technology* 333:10 <http://dx.doi.org/10.1016/j.biortech.2021.125165>
- [67] Qu JS, Zhang LJ, Zhang X, Gao LH, Tian YQ. 2020. Biochar combined with gypsum reduces both nitrogen and carbon losses during agricultural waste composting and enhances overall compost quality by regulating microbial activities and functions. *Bioresource Technology* 314:10 <http://dx.doi.org/10.1016/j.biortech.2020.123781>
- [68] Wang Q, Awasthi MK, Ren XN, Zhao JC, Li RH, et al. 2018. Combining biochar, zeolite and wood vinegar for composting of pig manure: The effect on greenhouse gas emission and nitrogen conservation. *Waste Management* 74:221-30 <http://dx.doi.org/10.1016/j.wasman.2018.01.015>
- [69] Mao H, Lv ZY, Sun HD, Li RH, Zhai BN, et al. 2018. Improvement of biochar and bacterial powder addition on gaseous emission and bacterial community in pig manure compost. *Bioresource Technology* 258:195-202 <http://dx.doi.org/10.1016/j.biortech.2018.02.082>
- [70] Awasthi MK, Wang MJ, Pandey A, Chen HY, Awasthi SK, et al. 2017. Heterogeneity of zeolite combined with biochar properties as a function of sewage sludge composting and production of nutrient-rich compost. *Waste Management* 68:760-73 <http://dx.doi.org/10.1016/j.wasman.2017.06.008>

- [71] He XQ, Yin HJ, Sun XX, Han LJ, Huang GQ. 2018. Effect of different particle-size biochar on methane emissions during pig manure/wheat straw aerobic composting: Insights into pore characterization and microbial mechanisms. *Bioresource Technology* 268:633-37 <http://dx.doi.org/10.1016/j.biortech.2018.08.047>
- [72] Febrisiantosa A, Ravindran B, Choi HL. 2018. The Effect of Co-Additives (Biochar and FGD Gypsum) on Ammonia Volatilization during the Composting of Livestock Waste. *Sustainability* 10:18 <http://dx.doi.org/10.3390/su10030795>
- [73] Awasthi MK, Wang Q, Chen HY, Wang MJ, Awasthi SK, et al. 2018. In-vessel co-composting of biosolid: Focusing on mitigation of greenhouse gases emissions and nutrients conservation. *Renewable Energy* 129:814-23 <http://dx.doi.org/10.1016/j.renene.2017.02.068>
- [74] Awasthi MK, Duan YM, Awasthi SK, Liu T, Zhang ZQ. 2020. Effect of biochar and bacterial inoculum additions on cow dung composting. *Bioresource Technology* 297:10 <http://dx.doi.org/10.1016/j.biortech.2019.122407>
- [75] Wang Q, Awasthi MK, Ren XN, Zhao JC, Li RH, et al. 2017. Comparison of biochar, zeolite and their mixture amendment for aiding organic matter transformation and nitrogen conservation during pig manure composting. *Bioresource Technology* 245:300-08 <http://dx.doi.org/10.1016/j.biortech.2017.08.158>
- [76] Liu N, Zhou JL, Han LJ, Ma SS, Sun XX, Huang GQ. 2017. Role and multi-scale characterization of bamboo biochar during poultry manure aerobic composting. *Bioresource Technology* 241:190-99 <http://dx.doi.org/10.1016/j.biortech.2017.03.144>
- [77] Janczak D, Malinska K, Czekala W, Cáceres R, Lewicki A, Dach J. 2017. Biochar to reduce ammonia emissions in gaseous and liquid phase during composting of poultry manure with wheat straw. *Waste Management* 66:36-45 <http://dx.doi.org/10.1016/j.wasman.2017.04.033>
- [78] He XQ, Chen LJ, Han LJ, Liu N, Cui RX, et al. 2017. Evaluation of biochar powder on oxygen supply efficiency and global warming potential during mainstream large-scale aerobic composting. *Bioresource Technology* 245:309-17 <http://dx.doi.org/10.1016/j.biortech.2017.08.076>
- [79] Chen W, Liao XD, Wu YB, Liang JB, Mi JD, et al. 2017. Effects of different types of biochar on methane and ammonia mitigation during layer manure composting. *Waste Management* 61:506-15 <http://dx.doi.org/10.1016/j.wasman.2017.01.014>
- [80] Awasthi MK, Wang MJ, Chen HY, Wang Q, Zhao JC, et al. 2017. Heterogeneity of biochar amendment to improve the carbon and nitrogen sequestration through reduce the greenhouse gases emissions during sewage sludge composting. *Bioresource Technology* 224:428-38 <http://dx.doi.org/10.1016/j.biortech.2016.11.014>
- [81] Agyarko-Mintah E, Cowie A, Van Zwieten L, Singh BP, Smillie R, et al. 2017. Biochar lowers ammonia emission and improves nitrogen retention in poultry litter composting. *Waste Management* 61:129-37 <http://dx.doi.org/10.1016/j.wasman.2016.12.009>
- [82] López-Cano I, Roig A, Cayuela ML, Albuquerque JA, Sánchez-Monedero MA. 2016. Biochar improves N cycling during composting of olive mill wastes and sheep manure. *Waste Management* 49:553-59 <http://dx.doi.org/10.1016/j.wasman.2015.12.031>
- [83] Li SQ, Song LN, Jin YG, Liu SW, Shen QR, Zou JW. 2016. Linking N₂O emission from biochar-amended composting process to the abundance of denitrify (nirK and nosZ) bacteria community. *AMB Express* 6:9 <http://dx.doi.org/10.1186/s13568-016-0208-x>
- [84] You XX, Wang S, Chen JH. 2024. Magnetic biochar accelerates microbial succession and enhances assimilatory nitrate reduction during pig manure composting. *Environment International* 184:12 <http://dx.doi.org/10.1016/j.envint.2024.108469>
- [85] Awasthi MK, Wang Q, Huang H, Li RH, Shen F, et al. 2016. Effect of biochar amendment on greenhouse gas emission and bio-availability of heavy metals during sewage sludge co-composting. *Journal of Cleaner Production* 135:829-35 <http://dx.doi.org/10.1016/j.jclepro.2016.07.008>

- [86] Malinska K, Zabochnicka-Swiatek M, Dach J. 2014. Effects of biochar amendment on ammonia emission during composting of sewage sludge. *Ecological Engineering* 71:474-78 <http://dx.doi.org/10.1016/j.ecoleng.2014.07.012>
- [87] Lin X, Al-Dhabi NA, Li FH, Wang NY, Peng H, et al. 2023. Relative contribution of ammonia-oxidizing bacteria and denitrifying fungi to N₂O production during rice straw composting with biochar and biogas residue amendments. *Bioresource Technology* 390:11 <http://dx.doi.org/10.1016/j.biortech.2023.129891>
- [88] Steiner C, Melear N, Harris K, Das KC. 2011. Biochar as bulking agent for poultry litter composting. *Carbon Management* 2:227-30 <http://dx.doi.org/10.4155/cmt.11.15>
- [89] Chowdhury MA, de Neergaard A, Jensen LS. 2014. Composting of solids separated from anaerobically digested animal manure: Effect of different bulking agents and mixing ratios on emissions of greenhouse gases and ammonia. *Biosystems Engineering* 124:63-77 <http://dx.doi.org/10.1016/j.biosystemseng.2014.06.003>
- [90] Chowdhury MA, de Neergaard A, Jensen LS. 2014. Potential of aeration flow rate and bio-char addition to reduce greenhouse gas and ammonia emissions during manure composting. *Chemosphere* 97:16-25 <http://dx.doi.org/10.1016/j.chemosphere.2013.10.030>
- [91] Wang C, Lu HH, Dong D, Deng H, Strong PJ, et al. 2013. Insight into the Effects of Biochar on Manure Composting: Evidence Supporting the Relationship between N₂O Emission and Denitrifying Community. *Environmental Science & Technology* 47:7341-49 <http://dx.doi.org/10.1021/es305293h>
- [92] Sánchez-García M, Alburquerque JA, Sánchez-Monedero MA, Roig A, Cayuela ML. 2015. Biochar accelerates organic matter degradation and enhances N mineralisation during composting of poultry manure without a relevant impact on gas emissions. *Bioresource Technology* 192:272-79 <http://dx.doi.org/10.1016/j.biortech.2015.05.003>
- [93] Czekala W, Malinska K, Cáceres R, Janczak D, Dach J, Lewicki A. 2016. Co-composting of poultry manure mixtures amended with biochar - The effect of biochar on temperature and C-CO₂ emission. *Bioresource Technology* 200:921-27 <http://dx.doi.org/10.1016/j.biortech.2015.11.019>
- [94] Vandecasteele B, Sinicco T, D'Hose T, Vanden Nest T, Mondini C. 2016. Biochar amendment before or after composting affects compost quality and N losses, but not P plant uptake. *Journal of Environmental Management* 168:200-09 <http://dx.doi.org/10.1016/j.jenvman.2015.11.045>
- [95] Jia X, Wang M, Yuan W, Shah S, Shi W, et al. 2016. N₂O Emission and nitrogen transformation in chicken manure and biochar co-composting *Transactions of the Asabe* 59:1277-83 <http://dx.doi.org/10.13031/trans.59.11685>
- [96] Yan HL, Niu QQ, Zhu QH, Wang SS, Meng QR, et al. 2021. Biochar reinforced the populations of cbbL-containing autotrophic microbes and humic substance formation via sequestering CO₂ in composting process. *Journal of Biotechnology* 333:39-48 <http://dx.doi.org/10.1016/j.jbiotec.2021.04.011>
- [97] Wang N, Huang DD, Bai XY, Lin YQ, Miao QM, et al. 2022. Mechanism of digestate-derived biochar on odorous gas emissions and humification in composting of digestate from food waste. *Journal of Hazardous Materials* 434:13 <http://dx.doi.org/10.1016/j.jhazmat.2022.128878>
- [98] Awasthi MK, Duan YM, Awasthi SK, Liu T, Zhang ZQ. 2020. Influence of bamboo biochar on mitigating greenhouse gas emissions and nitrogen loss during poultry manure composting. *Bioresource Technology* 303:10 <http://dx.doi.org/10.1016/j.biortech.2020.122952>
- [99] Liu H, Awasthi MK, Zhang ZQ, Syed A, Bahkali AH, et al. 2023. Evaluation of fungal dynamics during sheep manure composting employing peach shell biochar. *Bioresource Technology* 386:9 <http://dx.doi.org/10.1016/j.biortech.2023.129559>
- [100] 王义祥, 叶菁, 林怡, 刘岑薇, 李艳春. 2021. 花生壳生物炭用量对猪粪堆肥温室气体和 NH₃ 排放的影响. *中国农业大学学报* 26:114-25

- [101] 李思敏, 张义竞, 唐锋兵, 李思雨, 王彦飞, 许铮. 2022. 生物炭添加对污泥堆肥腐殖化和氨气排放的影响. *科学技术与工程* 22:14057-64
- [102] Awasthi MK, Wang Q, Chen HY, Wang MJ, Ren XN, et al. 2017. Evaluation of biochar amended biosolids co-composting to improve the nutrient transformation and its correlation as a function for the production of nutrient-rich compost. *Bioresource Technology* 237:156-66 <http://dx.doi.org/10.1016/j.biortech.2017.01.044>
- [103] 向秋洁, 杨雨滢, 张成, 相欣奕, 木志坚. 2017. 不同用量竹炭对污泥堆肥过程温室气体排放的影响. *环境科学* 38:4390-97 <http://dx.doi.org/10.13227/j.hjhx.201703224>
- [104] Steiner C, Das KC, Melear N, Lakly D. 2010. Reducing Nitrogen Loss during Poultry Litter Composting Using Biochar. *Journal of Environmental Quality* 39:1236-42 <http://dx.doi.org/10.2134/jeq2009.0337>
- [105] Guo HH, Gu J, Wang XJ, Song ZL, Yu J, Lei LS. 2021. Microbial mechanisms related to the effects of bamboo charcoal and bamboo vinegar on the degradation of organic matter and methane emissions during composting. *Environmental Pollution* 272:10 <http://dx.doi.org/10.1016/j.envpol.2020.116013>
- [106] Cao Z, Zhu R, Li Y, Kakade A, Zhang SY, et al. 2024. Mitigation of ammonia and hydrogen sulfide emissions during aerobic composting of laying hen waste through NaOH-modified biochar. *Journal of Environmental Management* 365:13 <http://dx.doi.org/10.1016/j.jenvman.2024.121634>
- [107] Li RH, Wang Q, Zhang ZQ, Zhang GJ, Li ZH, et al. 2015. Nutrient transformation during aerobic composting of pig manure with biochar prepared at different temperatures. *Environmental Technology* 36:815-26 <http://dx.doi.org/10.1080/09593330.2014.963692>
- [108] Wu X, Zhao XY, Yi GR, Zhang WQ, Gao RY, et al. 2024. Promoting nitrogen conversion in aerobic biotransformation of swine slurry with the co-application of manganese sulfate and biochar. *Journal of Environmental Management* 356:12 <http://dx.doi.org/10.1016/j.jenvman.2024.120604>
- [109] Barthod J, Rumpel C, Paradelo R, Dignac MF. 2016. The effects of worms, clay and biochar on CO₂ emissions during production and soil application of co-composts. *Soil* 2:673-83 <http://dx.doi.org/10.5194/soil-2-673-2016>
- [110] Duan YM, Awasthi SK, Liu T, Zhang ZQ, Awasthi MK. 2019. Evaluation of integrated biochar with bacterial consortium on gaseous emissions mitigation and nutrients sequestration during pig manure composting *Bioresource Technology* 291:8 <http://dx.doi.org/10.1016/j.biortech.2019.121880>
- [111] Wu X, Gao RY, Tian XR, Hou JW, Wang Y, et al. 2024. Co-composting of dewatered sludge and wheat straw with newly isolated *Xenophilus azovorans*: Carbon dynamics, humification, and driving pathways. *Journal of Environmental Management* 365:13 <http://dx.doi.org/10.1016/j.jenvman.2024.121613>
- [112] Duan YM, Yang JF, Guo YR, Wu XP, Tian YL, et al. 2021. Pollution control in biochar-driven clean composting: Emphasize on heavy metal passivation and gaseous emissions mitigation. *Journal of Hazardous Materials* 420:10 <http://dx.doi.org/10.1016/j.jhazmat.2021.126635>
- [113] Wang XQ, Zhao Y, Wang H, Zhao XY, Cui HY, Wei ZM. 2017. Reducing nitrogen loss and phytotoxicity during beer vinasse composting with biochar addition. *Waste Management* 61:150-56 <http://dx.doi.org/10.1016/j.wasman.2016.12.024>
- [114] Chen ML, Huang YM, Wang C, Gao H. 2020. The conversion of organic nitrogen by functional bacteria determines the end-result of ammonia in compost. *Bioresource Technology* 299:8 <http://dx.doi.org/10.1016/j.biortech.2019.122599>
- [115] Wang SP, Sun ZY, Wang ST, Tang YQ. 2024. Microbial mechanisms of biochar addition on carbon and nitrogen synergistic retention during distilled grain waste composting: Insights from metagenomic analysis. *Bioresource Technology* 411:10 <http://dx.doi.org/10.1016/j.biortech.2024.131346>

- [116] Chen PZ, Zheng XQ, Cheng WM. 2022. Biochar combined with ferrous sulfate reduces nitrogen and carbon losses during agricultural waste composting and enhances microbial diversity. *Process Safety and Environmental Protection* 162:531-42 <http://dx.doi.org/10.1016/j.psep.2022.04.042>
- [117] Firmino MV, Tremier A. 2024. Investigation of Biochar Ratio, Pyrolysis Temperature and Digestate Type Impact Over Nitrogen Losses Along Digestate Composting. *Waste and Biomass Valorization* 15:4807-21 <http://dx.doi.org/10.1007/s12649-024-02516-1>
- [118] Tu ZN, Ren XN, Zhao JC, Awasthi SK, Wang Q, et al. 2019. Synergistic effects of biochar/microbial inoculation on the enhancement of pig manure composting. *Biochar* 1:127-37 <http://dx.doi.org/10.1007/s42773-019-00003-8>
- [119] Mondini C, Sinicco T, Vandecasteele B, D'Hose T. 2016. Potential of biochar in composting: effect on process performance and greenhouse gas emissions. *Proc. 3rd International Symposium on Organic Matter Management and Compost Use in Horticulture, Murcia, SPAIN, 2015*, 1146:251-56. LEUVEN 1: Int Soc Horticultural Science
- [120] Liu Y, Pan J, Wang J, Yang X, Zhang W, et al. 2024. Insight into the humification and carbon balance of biogas residual biochar amended co-composting of hog slurry and wheat straw. *Environmental science and pollution research international* <http://dx.doi.org/10.1007/s11356-024-33110-6>
- [121] Royeonhee, woojin c, Chung S, Jung I-H, Na H-S, et al. 2020. Characteristics of Greenhouse Gas Emissions with Different Combination Rates of Activated Rice Hull Biochar during Aerobic Digestion of Cow Manure. *Korean Journal of Environmental Agriculture* 39:222-27 <http://dx.doi.org/10.5338/kjea.2020.39.3.26>
- [122] Ravindran B, Karmegam N, Awasthi MK, Chang SW, Selvi PK, et al. 2022. Valorization of food waste and poultry manure through co-composting amending saw dust, biochar and mineral salts for value-added compost production. *Bioresource Technology* 346:8 <http://dx.doi.org/10.1016/j.biortech.2021.126442>
- [123] Ravindran B, Nguyen DD, Chaudhary DK, Chang SW, Kim J, et al. 2019. Influence of biochar on physico-chemical and microbial community during swine manure composting process. *Journal of Environmental Management* 232:592-99 <http://dx.doi.org/10.1016/j.jenvman.2018.11.119>