

Shailendra Kumar Arya

Professor

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Summary Statement

Dr. Shailendra Kumar Arya presently holds the position of Professor at the Department of Biotechnology Engineering within the University Institute of Engineering & Technology, Panjab University, Chandigarh, India. He attained his doctoral degree in Biotechnology from the esteemed Indian Institute of Technology, Banaras Hindu University, Varanasi, in 2010. With an affiliation dating back to 2006, Dr. Arya has been a dedicated member of Panjab University. His primary focus lies in the realm of Enzyme Engineering and Bioremediation, showcasing a profound expertise in enzymes, wastewater treatment, and sustainable development. Dr. Arya boasts an extensive publication record, contributing over 80 research articles to prestigious international journals. Furthermore, he has actively engaged in numerous international and national conferences, where he has featured as a distinguished speaker. Leading a dynamic research group, Dr. Arya mentors both PhD and Masters students, guiding them in diverse projects encompassing Enzyme Engineering, Wastewater Treatment, Algal Studies, and Bioremediation. The collaborative efforts of his research team contribute significantly to advancing knowledge and innovation in these critical areas.

Core Qualifications

- Student records management
- Lesson planning
- Discussion facilitation
- Presentations
- Online learning tools
- MS Office
- Research management
- Time management
- Attention to detail

Education

- **Ph.D. Biotechnology**
Indian Institute of Technology, Banaras Hindu University, Varanasi, Uttar Pradesh, India
- **M. Tech. Biotechnology**
Indian Institute of Technology, Banaras Hindu University, Varanasi, Uttar Pradesh, India
- **B. Tech. Biotechnology**
Harcourt Butler Technical University, Kanpur, Uttar Pradesh, India

Work Experience

July 2022 – Present

Professor, University Institute of Engineering and Technology, Panjab University, Chandigarh, India
Mentored more than 10 PhD scholars and more than 30 Masters students.

- Teach courses in Biotechnology, to students at both undergraduate and graduate levels.
- Prepare syllabi, curricula, reading materials, tests and quizzes.
- Regularly meet with students during office hours to address concerns and offer feedback.
- Keep thorough records of student scores and attendance.
Grade exams and papers, giving detailed feedback.

July 2016 – July 2019

Associate Professor, University Institute of Engineering and Technology, Panjab University, Chandigarh, India

- Deliver lectures to facilitate classroom discussions on analysis, rhetoric, critical theory, structure and style.
- Arranged syllabus and designed and distributed lecture handouts to round out material and increase student understanding.
- Graded assignments according to strict institutional policies and upheld guidelines for academic integrity.
- Mentored undergraduate and graduate students in effective next steps for education and career preparedness.
- Held weekly office hours to work with struggling students one-on-one and increase GPAs.

June 2006 – July 2019

Assistant Professor, University Institute of Engineering and Technology, Panjab University, Chandigarh, India

- Led discussion groups for students taking lecture courses.
- Dispersed, collected and graded all assignments, including papers, quizzes and tests.
- Met regularly with other teaching assistants and lecturers to discuss progress and address concerns.

Research Experience

He has over 17 years of research experience in the field of enzyme engineering, waste water engineering, and bioremediation.

Publications

1. Kaushal, J., Singh, G., & **Arya, S. K.** (2021). Emerging trends and future prospective in enzyme technology. In *Value-Addition in Food Products and Processing Through Enzyme Technology* (pp. 491–503). doi:10.1016/B978-0-323-89929-1.00036-6
2. Sharma, S., Gupta, S., **Arya, S. K.**, & Kaur, A. (2022). Enzyme immobilization: Implementation of nanoparticles and an insight into polystyrene as the contemporary immobilization matrix. *Process Biochemistry*, 120, 22–34. doi:10.1016/j.procbio.2022.05.022
3. Sahu, S., Kaur, A., Singh, G., & **Arya, S. K.** (2023). Harnessing the potential of microalgae-bacteria interaction for eco-friendly wastewater treatment: A review on new strategies involving

machine learning and artificial intelligence. *Journal of Environmental Management*, 346, 119004.

4. Singh, J., Mirza, A., Kaur, S., **Arya, S. K.**, & Singh, G. (2022). Application of microbial antagonists for the preservation of fruits: An effective strategy to inhibit the postharvest disease. In *Relationship between Microbes and the Environment for Sustainable Ecosystem Services: Microbial Tools for Sustainable Ecosystem Services: Volume 3* (Vol. 3, pp. 261–288). doi:10.1016/B978-0-323-89936-9.00018-7
5. Singh, G., & **Arya, S. K.** (2019b). Utility of laccase in pulp and paper industry: A progressive step towards the green technology. *International Journal of Biological Macromolecules*, 134, 1070–1084. doi:10.1016/j.ijbiomac.2019.05.168
6. Kaushal, J., **Arya, S. K.**, Khatri, M., Singh, G., Izyan Wan Azelee, N., Rajagopal, R., ... Kumar Awasthi, M. (2022). Efficacious bioconversion of waste walnut shells to xylotetrose and xylopentose by free xylanase (Xy) and MOF immobilized xylanase (Xy-Cu-BTC). *Bioresource Technology*, 357. doi:10.1016/j.biortech.2022.127374
7. Kaushal, J., Khatri, M., & **Arya, S. K.** (2022). Microbial treatment of food processing wastewater and recovery of value-added bioactive compounds: Current scenario, challenges, and future prospects. In *Microbial Technologies for Wastewater Recycling and Management: Recent Trends, Challenges, and Perspectives* (pp. 221–237). doi:10.1201/9781003231738-16
8. Sharma, A., Singh, G., & **Arya, S. K.** (2021). Biofuel cell nanodevices. *International Journal of Hydrogen Energy*, 46(4), 3270–3288. doi:10.1016/j.ijhydene.2020.02.164
9. Mehandia, S., Ahmad, S., Sharma, S. C., & **Arya, S. K.** (2022). Decolorization and detoxification of textile effluent by immobilized laccase-ACS into chitosan-clay composite beads using a packed bed reactor system: An ecofriendly approach. *Journal of Water Process Engineering*, 47. doi:10.1016/j.jwpe.2022.102662
10. Sharma, A., & **Arya, S. K.** (2022b). The application of biosurfactant for the modification of the rheological properties of wheat dough. In *Applications of Next Generation Biosurfactants in the Food Sector* (pp. 171–186). doi:10.1016/B978-0-12-824283-4.00016-2
11. Kaushal, J., Khatri, M., Singh, G., & **Arya, S. K.** (2024). Xylanase enzyme from novel strain and its immobilization onto metal organic framework MOF for fruit juice clarification. *Biotechnology and Bioprocess Engineering*, 29(1), 197–210. doi:10.1007/s12257-024-00007-7
12. Bhardwaj, P., Sharma, S., Khatri, M., Singh, G., & **Arya, S. K.** (2023). Eradication of ibuprofen and diclofenac via in situ synthesized and immobilized bacterial laccase to Cu-based metal organic framework. *Journal of Water Process Engineering*, 54. doi:10.1016/j.jwpe.2023.104023
13. Thakur, K., Kuthiala, T., Singh, G., **Arya, S. K.**, Iwai, C. B., Ravindran, B., ... Awasthi, M. K. (2023). An alternative approach towards nitrification and bioremediation of wastewater from aquaponics using biofilm-based bioreactors: A review. *Chemosphere*, 316. doi:10.1016/j.chemosphere.2023.137849
14. Kuthiala, T., Thakur, K., Sharma, D., Singh, G., Khatri, M., & **Arya, S. K.** (2022). The eco-friendly approach of cocktail enzyme in agricultural waste treatment: A comprehensive review. *International Journal of Biological Macromolecules*, 209, 1956–1974. doi:10.1016/j.ijbiomac.2022.04.173
15. Chaudhary, R., Kuthiala, T., Singh, G., Rarotra, S., Kaur, A., **Arya, S. K.**, & Kumar, P. (2023). Current status of xylanase for biofuel production: a review on classification and characterization. *Biomass Conversion and Biorefinery*, 13(10), 8773–8791. doi:10.1007/s13399-021-01948-2

16. Kaushal, J., Khatri, M., Singh, G., & **Arya, S. K.** (2021). A multifaceted enzyme conspicuous in fruit juice clarification: An elaborate review on xylanase. *International Journal of Biological Macromolecules*, 193, 1350–1361. doi:10.1016/j.ijbiomac.2021.10.194
17. Sharma, A., Kaur, P., Singh, G., & **Arya, S. K.** (2021). Economical concerns of lignin in the energy sector. *Cleaner Engineering and Technology*, 4. doi:10.1016/j.clet.2021.100258
18. Kaur, N., Bhardwaj, P., Singh, G., & **Arya, S. K.** (2021). Applicative Insights on Nascent Role of Biochar Production, Tailoring and Immobilization in Enzyme Industry -A Review. *Process Biochemistry*, 107, 153–163. doi:10.1016/j.procbio.2021.05.017
19. Srivastava, B., Khatri, M., Singh, G., & **Arya, S. K.** (2020). Microbial keratinases: An overview of biochemical characterization and its eco-friendly approach for industrial applications. *Journal of Cleaner Production*, 252. doi:10.1016/j.jclepro.2019.119847
20. Kad, A., Pundir, A., **Arya, S. K.**, Bhardwaj, N., & Khatri, M. (2022). An Elucidative Review to Analytically Sieve the Viability of Nanomedicine Market. *Journal of Pharmaceutical Innovation*, 17(1), 249–265. doi:10.1007/s12247-020-09495-5
21. Singh, G., **Arya, S. K.**, Bibra, M., Bhalla, A., Aggarwal, A., & Singh, J. (2022). Antimicrobial potential of ozone for the storage of grains: special focus on inhibition of bacterial contamination. *Archives of Phytopathology and Plant Protection*. doi:10.1080/03235408.2022.2111246
22. Singh, H., Bhardwaj, N., **Arya, S. K.**, & Khatri, M. (2020). Environmental impacts of oil spills and their remediation by magnetic nanomaterials. *Environmental Nanotechnology, Monitoring and Management*, 14. doi:10.1016/j.enmm.2020.100305
23. Kaur, J., Sood, K., Bhardwaj, N., **Arya, S. K.**, & Khatri, M. (2020). *Nanomaterial loaded chitosan nanocomposite films for antimicrobial food packaging* (Vol. 28). Presented at the Materials Today: Proceedings. doi:10.1016/j.matpr.2020.05.309
24. Sharma, A., & **Arya, S. K.** (2022a). Ecological and environmental services of microalgae. In *Valorization of Microalgal Biomass and Wastewater Treatment* (pp. 261–315). doi:10.1016/B978-0-323-91869-5.00007-7
25. Singh, H., Jain, A., Kaur, J., **Arya, S. K.**, & Khatri, M. (2020). Adsorptive removal of oil from water using SPIONs–chitosan nanocomposite: kinetics and process optimization. *Applied Nanoscience (Switzerland)*, 10(4), 1281–1295. doi:10.1007/s13204-019-01195-y
26. Sharma, V., Singh, H., Guleria, S., Bhardwaj, N., Puri, S., **Arya, S. K.**, & Khatri, M. (2022). Application of superparamagnetic iron oxide nanoparticles (SPIONs) for heavy metal adsorption: A 10-year meta-analysis. *Environmental Nanotechnology, Monitoring and Management*, 18. doi:10.1016/j.enmm.2022.100716
27. Sharma, A., Thatai, K. S., Kuthiala, T., Singh, G., & **Arya, S. K.** (2021). Employment of polysaccharides in enzyme immobilization. *Reactive and Functional Polymers*, 167. doi:10.1016/j.reactfunctpolym.2021.105005
28. Chaudhary, R., Kaushal, J., Singh, G., Kaur, A., & **Arya, S. K.** (2023). Melioration of enzymatic ethanol production from alkali pre-treated paddy straw promoted by addition of surfactant. *Biocatalysis and Biotransformation*, 41(5), 322–331. doi:10.1080/10242422.2022.2055469
29. Kaushal, J., Singh, G., & **Arya, S. K.** (2018). Immobilization of catalase onto chitosan and chitosan–bentonite complex: A comparative study. *Biotechnology Reports*, 18. doi:10.1016/j.btre.2018.e00258
30. Sahu, S., Kaur, A., Khatri, M., Singh, G., & **Arya, S. K.** (2023). A review on cutinases enzyme in degradation of microplastics. *Journal of Environmental Management*, 347. doi:10.1016/j.jenvman.2023.119193

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33. Sharma, A., Sahu, S., Sharma, S., Singh, G., & **Arya, S. K.** (2023). Valorization of agro-industrial wastes into vanillin: A sustainable and bio-economical step towards the indigenous production of flavors. *Biocatalysis and Agricultural Biotechnology*, 54. doi:10.1016/j.bcab.2023.102904
34. Kaushal, J., Mehandia, S., Singh, G., Raina, A., & **Arya, S. K.** (2018). Catalase enzyme: Application in bioremediation and food industry. *Biocatalysis and Agricultural Biotechnology*, 16, 192–199. doi:10.1016/j.bcab.2018.07.035
35. Guleria, S., Singh, H., Sharma, V., Bhardwaj, N., **Arya, S. K.**, Puri, S., & Khatri, M. (2022). Polyhydroxyalkanoates production from domestic waste feedstock: A sustainable approach towards bio-economy. *Journal of Cleaner Production*, 340. doi:10.1016/j.jclepro.2022.130661
36. Dhiman, S., Srivastava, B., Singh, G., Khatri, M., & **Arya, S. K.** (2020). Immobilization of mannanase on sodium alginate-grafted- β -cyclodextrin: An easy and cost effective approach for the improvement of enzyme properties. *International Journal of Biological Macromolecules*, 156, 1347–1358. doi:10.1016/j.ijbiomac.2019.11.175
37. Singh, S., **Arya, S. K.**, & Krishania, M. (2024). Bioprocess optimization for enhanced xylitol synthesis by new isolate *Meyerozyma caribbica* CP02 using rice straw. *Biotechnology for Biofuels and Bioproducts*, 17(1). doi:10.1186/s13068-024-02475-8
38. Kaur, P., Singh, G., & **Arya, S. K.** (2024). Tandem catalytic approaches for lignin depolymerization: a review. *Biomass Conversion and Biorefinery*, 14(5), 6143–6154. doi:10.1007/s13399-022-02980-6
39. Jain, A., Singh, S. K., **Arya, S. K.**, Kundu, S. C., & Kapoor, S. (2018). Protein Nanoparticles: Promising Platforms for Drug Delivery Applications. *ACS Biomaterials Science and Engineering*, 4(12), 3939–3961. doi:10.1021/acsbiomaterials.8b01098
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41. Singh, H., Sharma, A., Bhardwaj, S. K., **Arya, S. K.**, Bhardwaj, N., & Khatri, M. (2021). Recent advances in the applications of nano-agrochemicals for sustainable agricultural development. *Environmental Science: Processes and Impacts*, 23(2), 213–239. doi:10.1039/d0em00404a
42. Singh, G., Bhadange, S., Bhawna, F., Shewale, P., Dahiya, R., Aggarwal, A., ... **Arya, S. K.** (2023). Phytoremediation of radioactive elements, possibilities and challenges: special focus on agricultural aspects. *International Journal of Phytoremediation*, 25(1), 1–8. doi:10.1080/15226514.2022.2043239
43. Sharma, A., & **Arya, S. K.** (2021). Bio-inspired self-healable materials. In *Self-Healing Smart Materials* (pp. 435–474). doi:10.1002/9781119710219.ch18
44. Singh, S., Singh, G., Khatri, M., Kaur, A., & **Arya, S. K.** (2019). Thermo and alkali stable β -mannanase: Characterization and application for removal of food (mannans based) stain. *International Journal of Biological Macromolecules*, 134, 536–546. doi:10.1016/j.ijbiomac.2019.05.067
45. Handa, V., Sharma, D., Kaur, A., & **Arya, S. K.** (2020). Biotechnological applications of microbial phytase and phytic acid in food and feed industries. *Biocatalysis and Agricultural Biotechnology*, 25. doi:10.1016/j.bcab.2020.101600

46. Kaur, S., Khatri, M., **Arya, S. K.**, & Singh, G. (2019). Stimulating effect of nanoparticles and salts on thermo and halo-tolerant cell-bonded laccase synthesis in *Acinetobacter* sp. UIETPU. *Biocatalysis and Agricultural Biotechnology*, 18. doi:10.1016/j.bcab.2019.101085
47. Gupta, A., Tandon, M., **Arya, S. K.**, & Kaur, A. (2022). Synthesis of metal and metal oxide nanoparticles based on marine antioxidants from seaweeds: An insight. In *Marine Antioxidants: Preparations, Syntheses, and Applications* (pp. 265–271). doi:10.1016/B978-0-323-95086-2.00018-7
48. Singh, G., & **Arya, S. K.** (2021). A review on management of rice straw by use of cleaner technologies: Abundant opportunities and expectations for Indian farming. *Journal of Cleaner Production*, 291. doi:10.1016/j.jclepro.2020.125278
49. Babbar, N., Sharma, G., & **Arya, S. K.** (2022). Effective degradation of chicken feather waste by keratinase enzyme with triton X-100 additive. *Biocatalysis and Agricultural Biotechnology*, 44. doi:10.1016/j.bcab.2022.102447
50. Sahu, S., Kaushal, J., Baidwan, A., Singh, G., & **Arya, S. K.** (2024). Refining fruit juice clarity: Integrating metal-organic frameworks and enzymatic strategies for sustainable solutions. *Bioresource Technology Reports*, 25. doi:10.1016/j.biteb.2024.101801
51. Srivastava, B., Singh, H., Khatri, M., Singh, G., & **Arya, S. K.** (2020). Immobilization of keratinase on chitosan grafted- β -cyclodextrin for the improvement of the enzyme properties and application of free keratinase in the textile industry. *International Journal of Biological Macromolecules*, 165, 1099–1110. doi:10.1016/j.ijbiomac.2020.10.009
52. Kaushal, J., **Arya, S. K.**, & Khatri, M. (2023). Biomass-derived additives as blends in fuels. In *Nanotechnology for Advanced Biofuels: Fundamentals and Applications* (pp. 85–96). doi:10.1016/B978-0-323-91759-9.00010-1
53. Gautam, R., & **Arya, S. K.** (2022). Production of α , β , and γ -Cyclodextrin Gluconotransferase (CGTase) and Their Applications in Food Industry. In *Novel Food Grade Enzymes: Applications in Food Processing and Preservation Industries* (pp. 107–138). doi:10.1007/978-981-19-1288-7_4
54. Sharma, A., & **Arya, S. K.** (2022c). The potential of biosurfactant for improving the bioavailability of nutrient for beneficial plant-associated microbes. In *Applications of Biosurfactant in Agriculture* (pp. 181–226). doi:10.1016/B978-0-12-822921-7.00013-1
55. Handa, V., Thakur, K., & **Arya, S. K.** (2021). Exploit of oxalate and phytate from the oilseeds with phytase treated seeds for dietary improvement. *Biocatalysis and Agricultural Biotechnology*, 37. doi:10.1016/j.bcab.2021.102168
56. Kad, A., Pundir, A., **Arya, S. K.**, Puri, S., & Khatri, M. (2022). Meta-analysis of in-vitro cytotoxicity evaluation studies of zinc oxide nanoparticles: Paving way for safer innovations. *Toxicology in Vitro*, 83. doi:10.1016/j.tiv.2022.105418
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61. Kaushal, J., Raina, A., Singh, G., Khatri, M., **Arya, S. K.**, Karmegam, N., ... Awasthi, M. K. (2022). Methodical study implicating the effectiveness of Microbial treatment over Xylanase Enzymatic treatment for Pulp Bio-bleaching. *Environmental Technology and Innovation*, 28. doi:10.1016/j.eti.2022.102731
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69. Singh, G., Kaur, S., Khatri, M., & **Arya, S. K.** (2019). Biobleaching for pulp and paper industry in India: Emerging enzyme technology. *Biocatalysis and Agricultural Biotechnology*, 17, 558–565. doi:10.1016/j.bcab.2019.01.019
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83. Sharma, D., Chaudhary, R., Kaur, J., & **Arya, S. K.** (2020). Greener approach for pulp and paper industry by Xylanase and Laccase. *Biocatalysis and Agricultural Biotechnology*, 25. doi:10.1016/j.bcab.2020.101604

Profession Relevant Skills

- Strong critical and analytical skills in reading, writing and comprehension.
- Passion for connecting students to learning modalities that incite their interest in the Sciences and Engineering.
- Skilled at explaining and illustrating material in a manner that students of varying levels can understand.
- Pleasant personality to connect with students and colleagues.
- Great interest in increased knowledge and passion for fostering academic development and success for every student.