

CURRICULUM VITAE

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Academic Qualifications

- 2011 *Ph.D.*, Biotechnology, Council of Scientific & Industrial Research (CSIR)-Institute of Genomics & Integrative Biology (IGIB), Delhi (Registered at University of Pune, Pune) India
- 2005 *M.Sc.*, Biotechnology, Himachal Pradesh University, Shimla, India
- 2003 *B.Sc.*, Chemistry (Hons), Banaras Hindu University, Varanasi, India

Professional Position

- Mar 2024 – Till date Associate Professor, Dept. of Biotechnology, Hemvati Nandan Bahuguna Garhwal University (A Central University) Srinagar, Uttarakhand, India
- Mar 2017 – Feb 2024 Sr. Assistant Professor, Dept. of Chemical Engineering, Konkuk University (KU), Seoul, Republic of Korea
- Mar 2016 – Feb 2017 Post-doctoral Fellow, Dept. of Chemical Engineering, KU, Seoul, Republic of Korea
- Mar 2014 – Feb 2016 Assistant Professor, Dept. of Chemical Engineering, KU, Seoul, Republic of Korea
- Jan 2013 – Feb 2014 Postdoc/Brain Pool Fellow, Dept. of Chemical Engineering, KU, Seoul, Republic of Korea
- Apr 2012 – Jan 2013 CSIR-RA Fellow, CSIR-IGIB, Delhi, India
- Sep 2011 – Apr 2012 Project Assistant (Post-doc), CSIR-IGIB, Delhi, India

Research Interests

- Waste management & bioactive molecules.
- Renewable energy – biohydrogen, biomethane, biomethanol, biodiesel, & bioethanol production
- Enzymology, artificial intelligence & protein engineering.
- Biopolymers (polyhydroxyalkanoates) production.
- Biodiversity, bioremediation, antimicrobials & biosensors.
- Biocatalyst immobilization – Industrially important enzymes & microbes.
- Nanomaterial synthesis, acute toxicity, and nano-biocatalysts
- Multi-enzymes cascade system & metal-protein hybrids
- Microbial fuel cells
- Quorum sensing (QS) and QS inhibition

Research Project

- Project Investigator (PI) for the project “Development of biocatalyst for the production of formaldehyde from greenhouse gas” by the Korean Research Foundation (Grant of **500000 USD** for 5 years, 2019-2024).
- Project Investigator (*period of 01/09/2023 to 28/02/2024*) for project “Development of cellulose and lignin based nano bio-composite from agrowaste by Gujarat State Biotechnology Mission (GSBTM) (**Rs. 56 lakhs**, 21/05/2022 to 20/05/2025)
- Project Investigator (*period of 01/09/2023 to 28/02/2024*) for the project “Hybrid Process for bio-hydrogen production from rice straw: A circular economy approach” by CRP_EA (01/04/2023 to 31/03/2025) (**Rs. 24 lakhs**, 21/05/2022 to 20/05/2025)
- Co-Project Investigator (*period of 01/09/2023 to 28/02/2024*) for the project “Development of advanced biofuels and bio lubricants from high lipid producing microalgae strain through HTL and Co-HTL process” by Gujarat State Biotechnology Mission (GSBTM) (**Rs. 93 lakhs**, 01/11/2022 to 31/10/2025).

List International (SCI/SCIE) Publications

1. Porwal S, Kumar T, Lal S, Rani A, Kumar S, Cheema S, Purohit HJ, Sharma R, **Patel SKS**, Kalia VC (2008). 6.4. *Bioresource Technology* 99 (13) 5444-5451 (IF: 11.4).
2. Singh M, **Patel SKS**, Kalia VC (2009). *Bacillus subtilis* as potential producer for polyhydroxyalkanoates. *Microbial Cell Factories* 8, 38 (IF: 6.4).
3. **Patel SKS**, Purohit HJ, Kalia VC (2010). Dark fermentative hydrogen production by defined mixed microbial cultures immobilized on ligno-cellulosic waste materials. *International Journal of Hydrogen Energy* 35 (19) 10674-10681 (IF: 7.2).
4. **Patel SKS**⁺, Singh M⁺, Kalia VC (2011). Hydrogen and polyhydroxybutyrate producing abilities of *Bacillus* spp. from glucose in two stage system. *Indian Journal of Microbiology* 51 (4) 418-423 (IF: 3.0).
5. **Patel SKS**, Singh M, Kumar P, Purohit HJ, Kalia VC (2012). Exploitation of defined microbial biodiversity for producing hydrogen and polyhydroxybutyrate from pea-shells. *Biomass & Bioenergy* 36, 218-225 (IF: 6.0).
6. **Patel SKS**, Kumar P, Kalia VC (2012). Enhancing biological hydrogen production through complementary microbial metabolisms. *International Journal of Hydrogen Energy* 37 (14) 10590-10603 (IF: 7.2).
7. **Patel SKS**⁺, Kalia VC (2013). Integrative biological hydrogen production: An overview. *Indian Journal of Microbiology* 53 (1) 3-10 (IF: 3.0).
8. Singh M, Kumar P, **Patel SKS**⁺, Kalia VC (2013). Production of polyhydroxyalkanoate co-polymer by *Bacillus thuringiensis*. *Indian Journal of Microbiology* 53 (1) 77-83 (IF: 3.0).
9. Kumar P, **Patel SKS**, Lee J-K, Kalia VC (2013). Extending the limits of *Bacillus* for novel biotechnological applications. *Biotechnology Advances* 31 (8) 1543-1561 (IF: 16.0).
10. **Patel SKS**, Kalia VC, Choi JH, Haw J-R, Kim IW, Lee J-K (2014). Immobilization of laccase on SiO₂ nanocarriers improves its stability and reusability. *Journal of Microbiology and Biotechnology* 24 (5) 639-647 (IF: 2.8).
11. Kumar P, Singh M, Mehariya S, **Patel SKS**, Lee J-K, Kalia VC (2014). Ecobiotechnological approach for exploiting the abilities of *Bacillus* to produce co-polymer of polyhydroxyalkanoate. *Indian Journal of Microbiology* 54 (2) 151-157 (IF: 3.0).
12. **Patel SKS**, Kumar P, Mehariya S, Purohit HJ, Lee J-K, Kalia VC (2014). Enhancement in hydrogen production by co-cultures of *Bacillus* and *Enterobacter*. *International Journal of Hydrogen Energy* 39 (27) 14663-14668 (IF: 7.2).
13. **Patel SKS**⁺, Kumar P⁺, Singh M, Lee J-K, Kalia VC (2015). Integrative approach to produce hydrogen and polyhydroxybutyrate from biowaste using defined bacterial cultures. *Bioresource Technology* 176, 136-141 (IF: 11.4).
14. Kumar P, Sharma R, Ray S, Mehariya S, **Patel SKS**, Lee J-K, Kalia VC (2015). Dark fermentative bioconversion of glycerol to hydrogen by *Bacillus thuringiensis*. *Bioresource Technology* 182, 383-388 (IF: 11.4).

15. Kumar P, Ray S, **Patel SKS**, Lee J-K, Kalia VC (2015). Bioconversion of crude glycerol to polyhydroxyalkanoate by *Bacillus thuringiensis* under non-limiting nitrogen conditions. *International Journal of Biological Macromolecules* 78, 9-16 (IF: 8.2).
16. **Patel SKS**⁺, Mardina P⁺, Kim SY, Lee J-K, Kim IW (2016). Biological methanol production by a type II methanotroph *Methylocystis bryophila*. *Journal of Microbiology and Biotechnology* 26 (4) 717-724 (IF: 2.8).
17. **Patel SKS**⁺, Choi SH⁺, Kang YC, Lee J-K (2016). Large-scale aerosol-assisted synthesis of biofriendly Fe₂O₃ yolk-shell particles: a promising support for enzyme immobilization. *Nanoscale* 8 (12) 6728-6738 (IF: 6.7).
18. **Patel SKS**, Selvaraj C, Mardina P, Jeong JH, Kalia VC, Kang YC, Lee J-K (2016). Enhancement of methanol production from synthetic gas mixture by *Methylosinus sporium* through covalent immobilization. *Applied Energy* 171, 383-391 (IF: 11.2).
19. Mardina P⁺, Li J⁺, **Patel SKS**⁺, Kim IW, Lee J-K, Selvaraj C (2016). Potential of immobilized whole-cell *Methylocella tundrae* as biocatalyst for methanol production from methane. *Journal of Microbiology and Biotechnology* 26 (7) 1234-1241 (IF: 2.8).
20. Ramachandran P, Jagtap SS, **Patel SKS**, Li J, Kang YC, Lee J-K (2016). Role of the non-conserved amino acid Asparagine 285 in the glycone-binding pocket of *Neosartorya fischeri* β-glucosidase. *RSC Advances* 6 (53) 48137-48144 (IF: 3.9).
21. **Patel SKS**, Lee JK, Kalia VC (2016). Integrative approach for producing hydrogen and polyhydroxyalkanoate from mixed wastes of biological origin. *Indian Journal of Microbiology* 56 (3) 293-300 (IF: 3.0).
22. **Patel SKS**, Mardina P, Kim D, Kim S-Y, Kalia VC, Kim I-W, Lee J-K (2016). Improvement in methanol production by regulating the composition of synthetic gas mixture and raw biogas. *Bioresource Technology* 218, 202-208 (IF: 11.4).
23. Selvaraj C, Krishnasamy G, Jagtap SS, **Patel SKS**, Dhiman SS, Kim T-S, Singh SK, Lee J-K (2016). Structural insights into the binding mode of D-sorbitol with sorbitol dehydrogenase using QM-polarized ligand docking and molecular dynamics simulations. *Biochemical Engineering Journal* 114, 244-256 (IF: 3.9).
24. Kim T-S⁺, **Patel SKS**⁺, Selvaraj C, Jung WS, Pan CH, Kang YC, Lee J-K (2016). A highly efficient sorbitol dehydrogenase from *Gluconobacter oxydans* G624 and improvement of its stability through immobilization. *Scientific Reports* 6, 33438 (IF: 4.6).
25. Otari S, **Patel SKS**, Jeong J-H, Lee JH, Lee J-K (2016). A green chemistry approach for synthesizing thermostable antimicrobial peptide-coated gold nanoparticles immobilized in alginate biohydrogel. *RSC Advances* 6 (90) 86808-86816 (IF: 3.9).
26. **Patel SKS**⁺, Jeong JH⁺, Mehariya S, Otari SV, Madan B, Haw JR, Lee J-K, Zhang L, Kim I-W (2016). Production of methanol from methane by encapsulated *Methylosinus sporium*. *Journal of Microbiology and Biotechnology* 26 (12) 2098-2105 (IF: 2.8).
27. **Patel SKS**⁺, Choi SH⁺, Kang YC, Lee J-K (2017). Eco-friendly composite of Fe₃O₄-reduced graphene oxide particles for efficient enzyme immobilization. *ACS Applied Materials & Interfaces* 9 (3) 2213-2222 (IF: 9.5).
28. **Patel SKS**, Otari SV, Kang YC, Lee JK (2017). Protein-inorganic hybrid system for efficient his-tagged enzymes immobilization and its application in L-xylulose production. *RSC Advances* 7, 3488-3494 (IF: 3.9).
29. Otari SV, Pawar SH, **Patel SKS**, Singh RK, Kim S-Y, Lee JH, Zhang L, Lee J-K (2017) *Canna edulis* leaf extract-mediated preparation of stabilized silver nanoparticles: Characterization, antimicrobial activity, and toxicity studies. *Journal of Microbiology and Biotechnology* 27 (4) 731-738 (IF: 2.8).
30. **Patel SKS**⁺, Lee J-K, Kalia VC (2017). Dark-fermentative biological hydrogen production from mixed biowastes using defined mixed cultures. *Indian Journal of Microbiology* 57 (2) 171-176 (IF: 3.0).
31. **Patel SKS**, Singh R, Kumar A, Jeong JH, Jeong SH, Kalia VC, Kim I-W, Lee J-K (2017). Biological methanol production by immobilized *Methylocella tundrae* using simulated biohythane as a feed. *Bioresource Technology* 241, 922-927 (IF: 11.4).
32. Otari SV, Kumar M, Anwar MZ, Thorat ND, **Patel SKS**, Lee D, Lee JH, Lee J-K, Kang YC, Zhang L (2017). Rapid synthesis and decoration of reduced graphene oxide with gold nanoparticles by thermostable peptides for memory device and photothermal applications. *Scientific Reports* 7, 10980 (IF: 4.6).
33. Anwar MZ, Kim DJ, Kumar A, **Patel SKS**, Otari S, Mardina P, Jeong J-H, Sohn J-H, Kim JH, Park JT, Lee J-K (2017). SnO₂ hollow nanotubes: a novel and efficient support matrix for enzyme immobilization. *Scientific Reports* 7, 15333 (IF: 4.6).
34. **Patel SKS**⁺, Lee JK, Kalia VC (2018). Nanoparticles in biological hydrogen production: An overview. *Indian Journal of Microbiology* 58 (1) 8-18 (IF: 3.0).
35. **Patel SKS**, Anwar MZ, Kumar A, Otari SV, Pagolu R, Kim SY, Kim IW, Lee J-K (2018). Fe₂O₃ yolk-shell particles-based laccase biosensor for efficient detection of 2,6-dimethoxyphenol. *Biochemical Engineering Journal* 132, 1-8 (IF: 3.9).

36. **Patel SKS**, Kondaveeti S, Otari SV, Pagolu RT, Jeong SH, Kim SC, Cho BK, Kang YC, Lee J-K (2018). Repeated batch methanol production from a simulated biogas mixture using immobilized *Methylocystis bryophila*. *Energy* 145, 477-485 (IF: 9.0).
37. Kumar A, Kim IW, **Patel SKS***, Lee J-K* (2018). Synthesis of protein-inorganic nanohybrids with improved catalytic properties using $\text{Co}_3(\text{PO}_4)_2$. *Indian Journal of Microbiology* 58 (1) 100-104 (IF: 3.0).
38. **Patel SKS**, Otari SV, Li J, Kim DR, Kim SC, Cho BK, Kalia VC, Kang YC, Lee J-K (2018). Synthesis of cross-linked protein-metal hybrid nanoflowers and its application in repeated batch decolorization of synthetic dyes. *Journal of Hazardous Materials* 347, 442-450 (IF: 13.6).
39. Kumar A, **Patel SKS**, Madan B, Haw JR, Kim SY, Kim IW, Lee J-K (2018). Immobilization of xylanase using a protein-inorganic hybrid system. *Journal of Microbiology and Biotechnology* 28 (4) 638-644 (IF: 2.8).
40. **Patel SKS**, Kumar V, Mardina P, Li J, Lestari R, Kalia VC, Lee JK (2018). Methanol production from simulated biogas mixtures by co-immobilized *Methylomonas methanica* and *Methylocella tundrae*. *Bioresource Technology* 263, 25-32 (IF: 11.4).
41. Prakash J, Sharma R, **Patel SKS**, Kim IW, Kalia VC (2018). Bio-hydrogen production by co-digestion of domestic wastewater and biodiesel industry effluent. *PLoS ONE* 13 (7) e0199059 (IF: 3.7).
42. **Patel SKS**, Lee J-K, Kalia VC (2018). Beyond the theoretical yields of dark-fermentative biohydrogen. *Indian Journal of Microbiology* 58 (4) 529-530 (IF: 3.0).
43. **Patel SKS**, Kim JH, Kalia VC, Lee J-K (2019). Antimicrobial activity of amino-derivatized cationic polysaccharides. *Indian Journal of Microbiology* 59(1) 96-99 (IF: 3.0).
44. Kumar A⁺, Park GD⁺, **Patel SKS⁺**, Kondaveeti S, Otari S, Anwar MZ, Kalia VC, Singh Y, Kim SC, Cho BK, Sohn JH, Kim DR, Kang YC, Lee J-K (2019). SiO_2 microparticles with carbon nanotube-derived mesopores as an efficient support for enzyme immobilization. *Chemical Engineering Journal* 359, 1252-1264 (IF: 15.1).
45. Gao H, Li J, Sivakumar D, Kim TS, **Patel SKS**, Kalia VC, Kim IW, Zhang YW, Lee J-K (2019). NADH oxidase from *Lactobacillus reuteri*: A versatile enzyme for oxidized cofactor regeneration. *International Journal of Biological Macromolecules* 123, 629-636 (IF: 8.2).
46. Kalia VC, **Patel SKS**, Kang YC, Lee J-K (2019). Quorum sensing inhibitors as antipathogens: biotechnological applications. *Biotechnology Advances* 37, 68-90 (IF: 16.0).
47. Otari SV, **Patel SKS**, Kim SY, Haw JR, Kalia VC, Kim IW, Lee J-K (2019). Copper ferrite magnetic nanoparticles for the immobilization of enzyme. *Indian Journal of Microbiology* 59 (1) 105-108 (IF: 3.0).
48. Otari SV, Shinde VV, Hui G, **Patel SKS**, Kalia VC, Kim IW, Lee J-K (2019). Biomolecule-entrapped SiO_2 nanoparticles for ultrafast green synthesis of silver nanoparticle-decorated hybrid nanostructures as effective catalysts. *Ceramics International* 45 (5) 5876-5882 (IF: 5.2).
49. **Patel SKS**, Ray S, Prakash J, Wee JH, Kim S-Y, Lee J-K, Kalia CV (2019). Co-digestion of biowastes to enhance biological hydrogen production by defined mixed bacterial cultures. *Indian Journal of Microbiology* 59 (2) 154-160 (IF: 3.0).
50. Kumar V, **Patel SKS**, Gupta RK, Otari SV, Gao H, Lee J-K, Zhang L (2019). Enhanced saccharification and fermentation of rice straw by reducing the concentration of phenolic compounds using an immobilization enzyme cocktail. *Biotechnology Journal* 14 (6) 1800468 (IF: 4.7).
51. **Patel SKS**, Gupta RK, Kumar V, Mardina P, Lestari R, Kalia VC, Choi M-S, Lee J-K (2019). Influence of metal ions on the immobilization of β -glucosidase through protein-inorganic hybrids. *Indian Journal of Microbiology* 59 (3) 370-374 (IF: 3.0).
52. **Patel SKS⁺**, Jeon MS⁺, Gupta RK, Jeon Y, Kalia VC, Kim SC, Cho BK, Kim DR, Lee J-K (2019). Hierarchical macro-porous particles for efficient whole-cell immobilization: application in bioconversion of greenhouse gases to methanol. *ACS Applied Materials & Interfaces* 11 (21) 18968-18977 (IF: 9.5).
53. Otari SV, **Patel SKS**, Kalia VC, Kim IW, Lee J-K (2019). Antimicrobial activity of biosynthesized silver nanoparticles decorated silica nanoparticles. *Indian Journal of Microbiology* 59 (3) 379-382 (IF: 3.0).
54. **Patel SKS**, Choi H, Lee J-K (2019). Multi-metal based inorganic-protein hybrid system for enzyme immobilization. *ACS Sustainable Chemistry & Engineering* 7 (16) 13633-13638 (IF: 8.4).
55. Kondaveeti S, Kim IW, Otari S, **Patel SKS**, Pagolu R, Losetty V, Kalia VC, Lee J-K (2019). Co-generation of hydrogen and electricity from biodiesel process effluents. *International Journal of Hydrogen Energy* 44 (50) 27285-27296 (IF: 7.2).
56. Kondaveeti S⁺, **Patel SKS⁺**, Pagolu R, Li J, Kalia VC, Choi M-S, Lee J-K (2019). Conversion of simulated biogas to electricity: Sequential operation of methanotrophic reactor effluents in microbial fuel cell. *Energy* 189, 116309 (IF: 9.0).
57. Pandey D, **Patel SKS**, Singh R, Kumar P, Thakur V, Chand D (2019). Solvent-tolerant acyltransferase from *Bacillus* sp. APB-6: Purification and characterization. *Indian Journal of Microbiology* 59 (4) 500-507 (IF: 3.0).

58. Kondaveeti S, Pagolu R, **Patel SKS**, Kumar A, Bisht A, Das D, Kalia VC, Kim IW, Lee J-K (2019). Bioelectrochemical detoxification of phenolic compounds during enzymatic pre-treatment of rice straw. *Journal of Microbiology and Biotechnology* 29 (11) 1760-1768 (IF: 2.8).
59. Lee J-K, **Patel SKS**, Sung BH, Kalia VC (2020). Biomolecules from municipal and food industry wastes: An Overview. *Bioresource Technology* 298, 122346 (IF: 11.4).
60. **Patel SKS**, Kalia VC, Joo JB, Kang YC, Lee J-K (2020). Biotransformation of methane into methanol by methanotrophs immobilized on coconut coir. *Bioresource Technology* 297, 122433 (IF: 11.4).
61. Otari SV, **Patel SKS**, Kalia VC, Lee J-K (2020). One-step hydrothermal synthesis of magnetic rice straw for effective lipase immobilization and its application in esterification reaction. *Bioresource Technology* 302, 122887 (IF: 11.4).
62. **Patel SKS**, Shanmugam R, Kalia VC, Lee J-K (2020). Methanol production by polymer-encapsulated methanotrophs from simulated biogas in the presence of methane vector. *Bioresource Technology* 304, 123022 (IF: 11.4).
63. Kondaveeti S, **Patel SKS**, Woo J, Wee JH, Kim SY, Al-Raoush RI, Kim IW, Kalia VC, Lee J-K (2020). Characterization of cellobiohydrolases from *Schizophyllum commune* KMJ820. *Indian Journal of Microbiology* 60 (2) 160-166 (IF: 3.0).
64. Parasuraman P, Devadatha B, Sarma VV, Ranganathan S, Ampasala DR, Reddy D, Kumavath RN, **Patel SKS**, Kalia VC, Lee J-K, Siddhardha B (2020). Inhibition of microbial quorum sensing mediated virulence factors by *Pestalotiopsis sydowiana*. *Journal of Microbiology and Biotechnology* 30 (4) 571-582 (IF: 2.8).
65. **Patel SKS**, Lee J-K, Kalia VC (2020). Deploying biomolecules as anti-COVID-19 agents. *Indian Journal of Microbiology* 60 (3) 263-268 (IF: 3.0).
66. **Patel SKS**, Gupta RK, Kumar V, Kondaveeti S, Kumar A, Das D, Kalia VC, Lee J-K (2020). Biomethanol production from methane by immobilized co-cultures of methanotrophs. *Indian Journal of Microbiology* 60 (3) 318-324 (IF: 3.0).
67. **Patel SKS**, Gupta RK, Kondaveeti S, Otari SV, Kumar A, Kalia VC, Lee J-K (2020). Conversion of biogas to methanol by methanotrophs immobilized on chemically modified chitosan. *Bioresource Technology* 315, 123791 (IF: 11.4).
68. Rishi P, Thakur K, Vij S, Rishi L, Singh A, Kaur IP, **Patel SKS**, Lee J-K, Kalia VC (2020). Diet, gut microbiota and COVID-19. *Indian Journal of Microbiology* 60 (4) 420-429 (IF: 3.0).
69. Kim J-S⁺, **Patel SKS**⁺, Tiwari MK⁺, Lai C, Kumar A, Kim YS, Kalia VC, Lee J-K (2020). Phe-140 determines the catalytic efficiency of arylacetone nitrilase from *Alcaligenes faecalis*. *International Journal of Molecular Sciences* 21 (21) 7859 (IF: 5.6).
70. **Patel SKS**, Gupta RK, Kalia VC, Lee J-K (2021). Integrating anaerobic digestion of potato peels to methanol production by methanotrophs immobilized on banana leaves. *Bioresource Technology* 323, 124550 (IF: 11.4).
71. **Patel SKS**, Gupta RK, Kim S-Y, Kim I-W, Kalia VC, Lee J-K (2021). *Rhus vernicifera* laccase immobilization on magnetic nanoparticles to improve stability and its potential application in bisphenol A degradation. *Indian Journal of Microbiology* 61 (1) 45-54 (IF: 3.0).
72. **Patel SKS**, Gupta RK, Das D, Lee J-K, Kalia VC (2021). Continuous biohydrogen production from poplar biomass hydrolysate by a defined bacterial mixture immobilized on lignocellulosic materials under non-sterile conditions. *Journal of Cleaner Production* 323, 125037 (IF: 11.1).
73. Kalia VC⁺, **Patel SKS**⁺, Shanmugam R, Lee J-K (2021). Polyhydroxyalkanoates: Trends and advances toward biotechnological applications. *Bioresource Technology* 326, 124737 (IF: 11.4).
74. Arora K, Kaur P, Kumar P, Singh A, **Patel SKS**, Li X, Yang, Y-H, Bhatia SK, Kulshrestha S (2021) Valorization of wastewater resources into biofuels and value-added products using microalgal system. *Frontiers in Energy Research* 9, 646571 (IF: 3.4).
75. Pagolu R, Singh R, Shanmugam R, Kondaveeti S, **Patel SKS**, Kalia VC, Lee J-K (2021). Site-directed lysine modification of xylanase for oriented immobilization onto silicon dioxide nanoparticles. *Bioresource Technology* 331, 125063 (IF: 11.4).
76. Kalia VC, Gong C, **Patel SKS**, Lee J-K (2021). Regulation of plant mineral nutrition by signal molecules. *Microorganisms* 9 (4) 774 (IF: 4.5).
77. Muneeswaran G⁺, **Patel SKS**⁺, Kondaveeti S, Shanmugam R, Gopinath K, Kumar V, Kim S-Y, Lee J-K, Kalia VC, Kim IW (2021). Biotin and Zn²⁺ increase xylitol production by *Candida tropicalis*. *Indian Journal of Microbiology* 61 (3) 331-337 (IF: 3.0).
78. **Patel SKS**, Das D, Kim SC, Cho B-K, Lee J-K, Kalia VC (2021). Integrating strategies for sustainable conversion of waste biomass into dark-fermentative hydrogen and value-added products. *Renewable & Sustainable Energy Reviews* 150, 111491 (IF: 15.9).

79. **Patel SKS***, Kalia VC (2021). Advancements in the nanobiotechnological applications. *Indian Journal of Microbiology* 61 (4) 401-403 (IF: 3.0).
80. **Patel SKS**, Shanmugam R, Lee J-K, Kalia VC, Kim I-W (2021). Biomolecules production from greenhouse gases by methanotrophs. *Indian Journal of Microbiology* 61 (4) 449-457 (IF: 3.0).
81. Kondaveeti S, Park GD, Shanmugam R, Pagolu R, **Patel SKS**, Bisht A, Kim DR, Kang YC, Lee J-K (2022). Investigating the role of metals loaded on nitrogen-doped carbon-nanotube-based electrodes in electroenzymatic alcohol dehydrogenation. *Applied Catalysis B: Environmental* 307, 121195 (IF: 22.1).
82. Devi N, **Patel SKS**, Kumar P, Singh A, Thakur N, Lata J, Pandey D, Thakur V, Chand D (2022). Bioprocess scale-up for acetohydroxamic acid production by hyperactive acyltransferase of immobilized *Rhodococcus pyridinivorans*. *Catalysis Letters* 152 (4) 944-953 (IF: 2.8).
83. Thakur V, Bhola S, Thakur P, **Patel SKS**, Kulshrestha S, Ratho RK, Kumar P (2022). Waves and Variants of SARS-CoV-2: Understanding the causes and effect for COVID-19 catastrophe. *Infection* 50, 309-325 (IF: 7.5).
84. Zhu C-Y, Li F-L, Zhang Y-W, Gupta RK, **Patel SKS***, Lee J-K* (2022). Recent strategies for immobilization of therapeutic enzymes. *Polymers* 14 (7) 1409 (IF: 5.0).
85. **Patel SKS**, Kalia VC, Kim S-Y, Lee J-K, Kim, I-W (2022). Immobilization of laccase through inorganic-protein hybrids using various metal ions. *Indian Journal of Microbiology* 62 (2) 312-316 (IF: 3.0).
86. Kalia VC, Shim WY, **Patel SKS**, Gong C, Lee J-K (2022). Recent developments in antimicrobial growth promoters in chicken health: Opportunities and challenges. *Science of the Total Environment* 834, 155300 (IF: 9.8).
87. Thakur P, Thakur V, Kumar P, **Patel SKS*** (2022). Emergence of Novel Omicron Hybrid Variants: BA(x), XE, XD, XF more than just alphabet. *International Journal of Surgery* 104, 106727 (IF: 15.3).
88. **Patel SKS**, Gupta RK, Kalia VC, Lee J-K (2022). Synthetic design of methanotroph co-cultures and their immobilization within polymers containing magnetic nanoparticles to enhance methanol production from wheat straw-based biogas. *Bioresource Technology* 364, 128032 (IF: 11.4).
89. Lokender K, Bisen M, Khan A, Kumar P, **Patel SKS*** (2022). Role of matrix metalloproteases in musculoskeletal diseases. *Biomedicines* 10 (10) 2477 (IF: 4.7).
90. Thakur N, **Patel SKS**, Kumar P, Singh A, Devi N, Sandeep K, Pandey D, Chand D (2022). Bioprocess for hyperactive thermotolerant *Aspergillus fumigatus* phytase and its application in dephytinization of wheat flour. *Catalysis Letters* 152 (11) 3220-3232 (IF: 2.8).
91. Kalia VC, **Patel SKS**, Cho B-K, Wood TK, Lee J-K (2022). Emerging applications of bacteria as anti-tumor agents. *Seminars in Cancer Biology* 86, 1014-1025 (IF: 14.5).
92. Lokender K, **Patel SKS***, Rajnish K, Kumar P, Jessica P, Kulshrestha S, Kusum H, Chhibber S (2022). Molecular mechanisms and applications of N-acyl homoserine lactone-mediated quorum sensing in bacteria. *Molecules* 27 (21) 7584 (IF: 4.6).
93. **Patel SKS**, Lee J-K (2022). Plastic eating enzymes: A step towards sustainability. *Indian Journal of Microbiology* 62 (4) 658-661 (IF: 3.0).
94. **Patel SKS**, Kalia VC, Lee J-K (2023). Laccase immobilization on copper-magnetic nanoparticles for efficient bisphenol degradation. *Journal of Microbiology and Biotechnology* 33 (1) 127-134 (IF: 2.8).
95. **Patel SKS**, Kalia VC, Lee J-K (2023). Integration of biogas derived from dark fermentation and anaerobic digestion of biowaste to enhance methanol production by methanotrophs. *Bioresource Technology* 367, 128427 (IF: 11.4).
96. Chanana I, Sharma A, Kumar P, Kumar L, Kulshrestha S, Kumar S, **Patel SKS*** (2023). Combustion and stubble burning: a major concern for environment and human health. *Fire* 6 (2) 79 (IF: 3.2).
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98. Kalia VC, **Patel SKS**, Lee J-K (2023). Exploiting polyhydroxyalkanoates for biomedical applications. *Polymers* 15 (8) 1937 (IF: 5.0).
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111. Chaudhary S, Varma A, Jha S, **Patel SKS***, Porwal S (2024). Production, purification, and characterization of recombinant *Bhargavaea beijingensis* laccase for potential lignin degradation and dyes decolorization. *Catalysis Letters* 154, 1537–1546 (IF: 2.8).
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113. **Patel SKS**, Gupta RK, Karthikeyan KK, Padhi, DK, Ranganathan S, Paramanantham P, Lee J-K (2024). *Trametes versicolor* laccase-based magnetic inorganic-protein hybrid nanobiocatalyst for efficient decolorization of dyes in presence of inhibitors. *Materials* 17, 1790 (IF: 3.4).
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Book Chapter

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121. Ray S, **Patel SKS**, Singh M, Singh GP, Kalia VC (2019). Exploiting polyhydroxyalkanoates for tissue engineering. In: Kalia VC (ed) *Biotechnological Applications of Polyhydroxyalkanoates*: Springer, Singapore, pp 271-282.

International Patents

1. Lee J-K, Kang, YC, **Patel SKS**, Kim TS, Choi SH (2014). Immobilization of methanotrophs onto macro-porous Fe₂O₃ carrier and its application. Korean Patent, **Registration No. 1016945850000 (2017.01.03)**.
2. Lee J-K, Kang, YC, **Patel SKS**, Kim TS, Choi SH (2014). Fe₂O₃ yolk shell nano structure and enzyme immobilization using the same. Korean Patent, **Registration No. 1017178180000 (2017.03.13)**.
3. Lee J-K, Kang, YC, **Patel SKS**, Kim TS, Choi SH (2014). Fe₃O₄ oxidized graphene nano-structure and its use in biocatalyst immobilization. Korean Patent, **Registration No. 1017159990000 (2017.03.07)**.
4. Lee J-K, Kang, YC, Kim TS, **Patel SKS** (2014). A high yield of methanol production method using *Methylosinus sporium* and a composition therefor. Korean Patent, **Registration No. 1018956830000 (2018.08.30)**.
5. Lee J-K, **Patel SKS**, Kang, YC, Mardina P, Jeahoon J (2016). A high yield of methanol production method using covalent immobilized *Methylosinus sporium* on the chitosan composite therefor. Korean Patent, **Registration No. 1019115760000 (2018.10.18)**.
6. Lee J-K, **Patel SKS**, Jeahoon J (2016). Method for methanol production using *Methylocystis bryophila*. Korean Patent, **Registration No. 1019364720000 (2019.01.02)**.
7. Lee J-K, **Patel SKS**, Rim HJ, Won KI, Jeahoon J (2016). Method for methanol production using encapsulated *Methylosinus sporium*. Korean Patent, **Registration No. 1019364730000 (2019.01.02)**.
8. Lee J-K, **Patel SKS**, Pagolu RT, Anwar MZ (2017). Biosensor using enzyme-iron oxide yolk-shell nanocomplex for detecting phenolic compounds. Korean Patent, **Registration No. 1019896830000 (2019.06.10)**.
9. Lee J-K, Kim IW, **Patel SKS**, Kumar A, Jeong JH, Jeong SH (2017). A high yield methanol production method using *Methylocella tundrae*. Korean Patent, **Registration No. 1019639690000 (2019.03.25)**.
10. Lee J-K, Li J, **Patel SKS**, Choi H (2018). Enzyme based metal-protein hybrid catalyst for producing methanol. Korean Patent, **Registration No. 1020837360000 (2020.02.25)**.
11. Lee J-K, Kim DR, Jeon MS, **Patel SKS**, Jeon Y, Jeong SH (2018). Macro-porous particles for immobilization of methanotrophs and methode for production of methanol using the same. Korean Patent, **Registration No. 1020913130000 (2020.03.13)**.
12. Lee J-K, Kumar V, Gupta RK, Otari S, **Patel SKS** (2018). Method of saccharification and fermentation of biomass using an immbilized enzyme cocktail. Korean Patent, **Registration No. 1021020630000 (2020.04.10)**.
13. Lee J-K, Otari SV, Kalia VC, **Patel SKS**, Choi H (2019). Magnetic nanoparticle for immobilization of enzyme. Korean Patent, **Registration No. 1021753900000 (2020.11.02)**.
14. **Patel SKS**, Jeong SH, Li J, Lee J-K (2019). Enzyme-metal hybrid nanoflowers and its application in repeated batch decolorization of dyes. Korean Patent **Registration No. 1022185200000 (2021.02.16)**.
15. Lee J-K, **Patel SKS**, Choi H, Joo JB (2020). Multi-metal based Cu/Zn-enzyme hybrid system for enzyme immobilization. Korean Patent, **Registration No. 1024914830000 (2023.01.18)**.
16. Lee J-K, **Patel SKS**, Choi H, Joo JB (2020). A composition and method for producing methanol from carbon dioxide using multi-enzymes based Mn-enzymes hybrid cascade reaction. Korean Patent, **Registration No. 1023646040000 (2022.02.15)**.
17. Lee J-K, **Patel SKS**, Choi H, Joo JB (2020). Methanotrophs immobilized on coconut coir and method for production of methanol using the same. Korean Patent, **Registration No. 1025485680000 (2023.06.23)**.
18. Lee J-K, **Patel SKS** (2020). Method for producing hierarchically ordered macro-porous silica. Korean Patent, **Application No. 1020200157517 (2020.11.23)**.
19. Lee J-K, Park J-T, Kondaveeti S, Rowina L, **Patel SKS** (2022). Electroenzymatic CO₂ reduction system based on FDH-immobilized on ordered mesoporous carbon. Korean Patent, **Application No. 1020220004240 (2022.01.11)**.
20. Lee J-K, **Patel SKS**, Gupta RK, Joo, JB (2022). Protein-inorganic hybrid based multi-enzymes cascade system for efficient conversion of carbon dioxide to methanol. Korean Patent, **Application No. 1020220178847 (2022.12.20)**.
21. Lee J-K, **Patel SKS**, Kalia VC (2022). Inorganic-protein hybrids for RvIac immobilization and method for producing the same. Korean Patent, **Application No. 1020220178846 (2022.12.20)**.

Poster Presentations/Abstract

1. Pandey D, Chand D, Verma N, **Patel SKS**, Dubey NK, Tyagi N, Bhalla TC (2005). Presented in 46th Annual conference of AMI, 8th-10th December 2005, Osmania University, Hyderabad, India, entitled "Purification and characterization of acyltransferase from *Nocardia globerulea*", p-75.
2. **Patel SKS**, Chand D, Pandey D, Verma N, Kumar D, Tyagi N, Bhalla TC (2005). Presented in 46th Annual conference of AMI, 8th-10th December 2005, Osmania University, Hyderabad, India, entitled "Isolation and screening of acyltransferase producing bacterial strains and optimization of production and reaction conditions" p-75.

3. Tyagi N, Chand D, Pandey D, Verma N, **Patel SKS**, Kumar D, Bhalla TC. (2005). Presented in 46th Annual conference of AMI, 8th-10th December 2005, Osmania University, Hyderabad, India, entitled "Purification and characterization of amidase from *Nocardia globerula* NHB-2" p-47.
4. **Patel SKS**, Kalia VC (2008). Presented in 49th Annual Conference of AMI, 18th-20th November 2008, University of Delhi, Delhi, India, entitled "Microbial consortia for hydrogen production via dark fermentative process".
5. **Patel SKS**, Singh M, Kalia VC (2010). Presented in VIIth Convention of The Biotech Research Society, India (BRSI), 12th-14th November 2010, Madurai Kamraj University, Madurai, India, entitled "Co-operation of metabolic abilities of *Bacillus* spp. to produce hydrogen and polyhydroxybutyrate".
6. Singh M, **Patel SKS**, Kumar P, Kalia VC (2010). Presented in 51st Annual Conference of AMI, 14th-17th December 2010, Birla Institute of Technology, Mesra, Ranchi, India, entitled "Functional complementation of phylogenetically diverse bacteria for producing hydrogen and bioplastic from renewable raw material".
7. Kumar P, Singh M, **Patel SKS**, Kalia VC (2011). Presented in 52nd Annual Conference of AMI, 3rd-6th November 2011, Punjab University, Chandigarh, India, entitled "Defined mixed bacterial cultures for hydrolysis of biowaste and production of polyhydroxyalkanoates".
8. **Patel SKS**, Singh M, Kalia VC (2011). Presented in 52nd Annual Conference of AMI, 3rd-6th November 2011, Punjab University, Chandigarh, India, entitled "Hydrogen and polyhydroxybutyrate producing abilities of *Bacillus* spp. from glucose in two stage system".
9. Kumar P, Singh M, **Patel SKS**, Kalia VC (2012). Presented in 53rd Annual Conference of AMI, 22nd-25th November 2012, KIIT University, Bhubaneswar, Odisha, India, entitled "Integrative approach for the production of hydrogen and polyhydroxyalkanoate by *Bacillus* spp.".
10. **Patel SKS**, Singh M, Kumar P, Kalia VC (2012). Presented in 53rd Annual Conference of AMI, 22nd-25th November 2012, KIIT University, Bhubaneswar, Odisha, India, entitled "Novel defined mixed cultures for the sustainable biohydrogen production from biowastes".
11. **Patel SKS**, Jeong SH, Kim T, Lee J-K (2017). Presented in 2017 KSBB Fall Meeting and International Symposium, 11th-13th October 2017, BEXCO, Busan, South Korea, entitled "Protein-inorganic hybrid system for efficient his-tagged enzymes immobilization and its application in L-xylulose production".
12. **Patel SKS**, Jeong SH, Jeong SH, Lee J-K (2017). Presented in 2017 KSBB Fall Meeting and International Symposium, 11th-13th October 2017, BEXCO, Busan, South Korea, entitled "Biological methanol production by immobilized *Methylocella tundrae* using simulated biohythane as a feed".
13. **Patel SKS**, Pagolu R, Bhol D, Lee J-K (2017). Presented in 2017 KSBB Fall Meeting and International Symposium, 11th-13th October 2017, BEXCO, Busan, South Korea, entitled "Eco-friendly composite of Fe₃O₄-reduced graphene oxide particles for efficient enzyme immobilization".
14. Lestari R, **Patel SKS**, Lee J-K (2018). Presented in KMB 45th Annual Meeting & International Symposium, 27th-29th June 2018, Yeosu EXPO Convention Center, South Korea, entitled "Biological methanol production by immobilized *Methylocella tundrae* using simulated biohythane as a feed".
15. Mardina P, **Patel SKS**, Lee J-K (2018). Presented in KMB 45th Annual Meeting & International Symposium, 27th-29th June 2018, Yeosu EXPO Convention Center, South Korea, entitled "Methanol production from simulated biogas mixtures by co-immobilization *Methylomonas methanica* and *Methylocella tundrae*".
16. Choi HS, **Patel SKS**, Otari SV, Lee J-K (2018). Presented in KMB 45th Annual Meeting & International Symposium, 27th-29th June 2018, Yeosu EXPO Convention Center, South Korea, entitled "Synthesis of cross-linked protein-metal hybrid nanoflowers and its application in repeated batch decolorization of synthetic dyes".
17. **Patel SKS**, Kalia VC, Lee J-K (2018). Presented in ASBA Asian Synthetic Biology Association, 22nd-25th November 2018, Hyatt Regency, JEJU, South Korea, entitled "Insights into cell-free conversion of CO₂ to chemicals by a multienzyme cascade reaction".
18. **Patel SKS**, Lee J-K, Kalia VC (2018). Presented in KRF & BP workshop on research achievements, 18th December 2018, ChangJo Hall, aT Center, Seoul, South Korea, entitled "Immobilization of xylanase using a protein-inorganic hybrid system".
19. **Patel SKS**, Singh RK, Lee YJ, Lee J-K (2019). Presented in Biosystems Design 5.0 conference, 16th-17th May 2019, Exploration @ Matrix Level 4, Biopolis, Singapore, entitled "Conversion of CO₂ to chemicals by a multienzyme cascade reaction".
20. **Patel SKS**, Bisht A, Choi HS, Gupta RK, Lee J-K (2019). Presented in KMB 46th Annual Meeting & International Symposium, 23rd-25th June 2019, ICC, Jeju, South Korea, entitled "Hierarchical macroporous particles for efficient whole-cell immobilization: application in bioconversion of greenhouse gases to methanol".
21. Lee YJ, **Patel SKS**, Das D, Lee J-K (2019). Presented in KMB 46th Annual Meeting & International Symposium, 23rd-25th June 2019, ICC, Jeju, South Korea, entitled "A multi-metal based inorganic-protein hybrid system for enzyme immobilization".

22. Pogolu R, Lee J-K, Kalia VC, **Patel SKS*** (2019). Presented in 60th Annual Conference of AMI, 15th-18th November 2019, Central University of Haryana, Mahendergarh, Haryana, India, "Hierarchical macroporous particles for efficient whole-cell immobilization: application in bioconversion of greenhouse gases to methanol".
23. **Patel SKS***, Kalia VC, Lee J-K (2021). Presented in 6th Annual Conference of Indian Network for Soil Contamination Research (INSCR), 15th-18th November 2021, University of Delhi, Delhi, India, "Biomethane and biomethanol production through the integrative process from biowaste".
24. **Patel SKS***, Kalia VC, Lee J-K (2022). Presented in International Conference on Biotechnology, Sustainable Bioresources and Bioeconomy (BSBB-2022), 7th-11th December 2022, Integrative bioprocesses of hydrogen and methane production from biowaste and its combination to generate methanol by greenhouse gases mitigation".

Invited National/International Talk

1. National Workshop on "**Application of bioinformatics in the exploitation of microbial diversity**" organized by Bioinformatics Centre, Himachal Pradesh University, Shimla, India, 15-17th October 2011.
2. Global Frontier Workshop on "**Biocatalyst-based methanol production from CO₂**" Suanbo Park Hotel, Choong Buk, Suanbo, South Korea, 26-27th July 2018.
3. Talk on "**Greenhouse gases as next-generation feedstock for biochemicals**" organized by the Department of Biotechnology, Himachal Pradesh University, Shimla, India, 12th September 2019.

Professional Community Service

- **Associate Editor:** Frontiers in Catalysis
- **Associate Editor:** SN Applied Sciences
- **Associate Editor:** Frontiers in Bioengineering and Biotechnology
- **Academic Editor:** PLoS ONE (2021-2022)
- **Editor:** Scientific Reports
- **Editor:** Indian Journal of Microbiology
- **Review Editor:** Frontiers in Microbiology (Microbiotechnology).
- **Reviewer Board:** International Journal of Molecular Sciences (MDPI).
- **Topic Advisory Panel:** International Journal of Molecular Sciences.
- **Guest Editor:** Frontiers in Microbiology
- **Guest Editor:** International Journal of Molecular Sciences.
- **Editors:** Current Biotechnology, Current Alternative Energy, and Recent Innovations in Chemical Engineering
- **Reviewer of peer-reviewed Journals:** 3Biotech; Agriculture; Antibiotics; Appl. Sci.; **Biomass Convers. Biorefinery;** Biomedicines; Bioproc. Biosyst. Eng.; **Bioresour. Technol.;** **Biotechnol. Adv.;** Biotechnol. Appl. Biochem.; Biocatal. Agr. Biotechnol.; Cancers; **Catalysts;** **Chem. Eng. J.;** **Chem. Commun.;** **Chemosphere;** Compl. Ther. Clin. Pract.; Comput. Biol. Chem.; **Coord. Chem. Rev.;** **Colloids Surf, B Biointerfaces;** **Crit. Rev. Biotechnology;** Discov. Mater.; **Ecotoxicol. Environ. Saf.;** **Environ. Technol. Innov.;** **Energies;** Eng. Life Sci.; **Enzyme Microb. Technol.;** **Fermentation;** **Front. Microbiol.;** **Front. Bioeng. Biotechnol.;** Front. Catal.; Indian J. Microbiol.; Inf. Dis. Rep.; **Int. J. Biol. Macromol.;** **Int. J. Hydrogen Energy;** Int. Food Res. J.; **Int. J. Mol. Sci.;** **J. Environ. Manage.;** J. Biosci. Bioeng.; J. Microbiol. Biotechnol.; **J. Agric. Food Chem.;** **J. Fungi;** J. Korean Soc. Appl. Biol. Chem.; **Materials;** **Mater. Today Commun.;** **Membranes;** **Microorganisms;** **Mol. Catal.;** **Molecules;** **Nanomaterials;** **Nutrients;** Pharmaceuticals; **Plants;** **PLoS ONE;** **Polymers;** **Processes;** **Process Biochem.;** React. Func. Pol.; **Semin. Cancer Biol.;** Springer Plus; **Sustain. Energy Technol. Assess.;** Waste; and **Waste Biomass Valor** and others.

Awards and Honors

- **List as the TOP 2% of World Scientists** by Stanford University (PLOS Biology study, 2019) from 2020 onwards.
- **AMI-Alembic Award** (Dec 2023).
- Certificate of record marathon performance (11.8 km in 01:14:21:02) (Nov 2022).
- Certificate of record marathon performance (5.0 km in 00:30:50:15) (Sep 2022).
- Dr. J. V. Bhat Award for best research paper published in Indian J. Microbiol. 2020 (23 Sep 2022).
- Dr. J. V. Bhat Award for best review paper published in Indian J. Microbiol. 2020 (23 Sep 2022).
- Dr. J. V. Bhat Award for best research paper published in Indian J. Microbiol. 2019 (Feb 2021).

- **Grant of 500000 USD** as Project Investigator by National Research Foundation, Republic of Korea (2019).
- Dr. J. V. Bhat Award for best research paper published in Indian J. Microbiol. 2018 (18 Nov 2019).
- Dr. J. V. Bhat Award for best review paper published in Indian J. Microbiol. 2018 (Nov 2019).
- Best Poster award KMB 2018, 45th Annual Meeting & International Symposium (29 June 2018).
- Dr. J. V. Bhat Award for best research paper published in Indian J. Microbiol. 2014 (Dec 2015).
- KU-Brain Pool Fellowship, Konkuk University, Seoul, Republic of Korea (Mar 2013).
- Dr. J. V. Bhat Award for best research paper published in Indian J. Microbiol. 2011 (Nov 2012).
- CSIR-Research Associate (CSIR-RA) Fellowship (Apr 2012).
- Senior Research Fellowship (CSIR), (2008-2011).
- Junior Research Fellowship (CSIR), (2006-2008).
- **All India Rank (1st)** in Graduate Aptitude Test in Engineering (GATE- Life Science) by Indian Institute of Technology under IIT fellowship schemes (2004).
- Qualified DBT for the post of Junior Research Fellowship (2005).
- M.Sc., Department of Biotechnology Fellowship (2003-2005).

Member of Professional Organization

- Life member (**LM-1756**), Association of Microbiologists of India (AMI), 2008.
- Life member (**LM-815**), The Biotech Research Society of India (BRSI), 2009.
- Life member (**LM-2021-150**), Indian Network for Soil Contamination Research (INSCR), 2021.
- Life member (**LM-12758**), Indian Society of Agricultural Engineers (ISAE), 2024.
- Member, The Korean Society for Microbiology and Biotechnology (KMB), 2019.
- Member, American Society for Microbiology (ASM), 2008-2009.
- Student member, International Association of Hydrogen Energy (IAHE), 2010.

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Date: 15/03/2024