

Curriculum Vitae

Dr. Shushil Kumar Rai

Post Doctoral Fellow

Center of Innovative and Applied Bioprocessing (CIAB),
Department of Biotechnology (GOI), Mohali, Punjab, INDIA

Joining Date: 13.04.2023

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Date of Birth: November, 24, 1990

Languages known: English, Hindi



Academic Credentials

| Sr. No | Degree | Board/University | Year |
|--------|----------------------------------|--|------|
| 1 | Ph.D. Biotechnology | Panjab University, Chandigarh | 2022 |
| 2 | M.Tech (pharm.) Biotechnology | National Institute of Pharmaceutical Education and Research Mohali, Punjab | 2015 |
| 3 | B. Pharm. | Pandit Ravishankar Shukla University Raipur, Chhattisgarh | 2013 |

**Thesis Title "Development and characterization of nanobiocatalysts for the synthesis of rare sugar D-tagatose"* #Award & Fellowships: DBT-SRF 2018, DBT-JRF 2016, GATE-2015, NIPER-JEE-2013, and GPAT-2013

Research/Teaching Experience

- Assistant Professor:** Shri Rawatpura Sarkar Institute of Pharmacy (SRIP), Kumhari, Durg, Chhattisgarh, INDIA from 04.04.2022 to 08.04.2023.
- Research Associate:** Pharmaceutical technology (process chemistry), *National Institute of Pharmaceutical Education and Research (NIPER), Hyderabad, Telangana, INDIA* from 01.07.2021 to 25.03.2022.
- Senior Research Fellow:** *Center of Innovative and Applied Bioprocessing (CIAB), national institute under Department of Biotechnology (GOI), Mohali, Panjab, INDIA*, from 02.08.2018 to 30.06.2021.
- Junior Research Fellow:** *Center of Innovative and Applied Bioprocessing (CIAB), national institute under Department of Biotechnology (GOI), Mohali, Panjab, INDIA* from 02.08.2016 to 01.08.2018.
- Senior Research Fellow:** Department of Biochemical Engineering and Biotechnology, *Indian Institute of Technology (IIT) Delhi, New Delhi, INDIA* from 03.08.2015 to 02.02.2016.

Research Area /Technical Skills

- Synthesis of metal nanoparticles, magnetic nanoparticles and metal-organic Frameworks.
- Rare sugar, biomass valorization, enzyme production, purification and immobilization.
- Hands on analytical instruments such as HPLC, GC, MS, ICP-MS, PCR, SEM, FT-IR, CLSM, and Bioreactor (14L).
- Experience in software application such as Design of expert, ChemDraw, and Graph Prism, etc.

Research Publications

1. **Rai, S. K.**; Singh, A.; Kauldhar, B. S.; Yadav, S. K. Robust nano-enzyme conjugates for the sustainable synthesis of a rare sugar D-tagatose. *International Journal of Biological Macromolecules*, **2023**, 231, 123406. (IF 8.025)
2. Singh, A.; **Rai, S. K.**; Yadav, S. K. Metal-based micro-composite of L-arabinose isomerase and L-ribose isomerase for the sustainable synthesis of L-ribose and D-talose. *Colloids and Surfaces B: Biointerfaces*, **2022**, 217, 112637. (IF 5.999)
3. **Rai, S. K.**; Kaur, H.; Singh, A.; Kamboj, M.; Jain, G.; Yadav, S. K. Production of d-tagatose in packed bed reactor containing an immobilized l-arabinose isomerase on alginate support. *Biocatalysis and Agricultural Biotechnology*, **2021**, 38, 102227. (IF 3.281)
4. Singh, A.; **Rai, S. K.**; Manisha, M.; Yadav, S. K. Immobilized L-ribose isomerase for the sustained synthesis of a rare sugar D-talose. *Molecular Catalysis*, **2021**, 511, 111723. (IF 5.089)
5. **Rai, S. K.**; Kumar, V.; Yadav, S. K. Development of recyclable magnetic cross linked enzyme aggregates for the synthesis of high value rare sugar d-tagatose in aqueous phase catalysis. *Catalysis Science and Technology*, **2021**, 11, 2186-2194. (IF 6.117)
6. **Rai, S. K.**; Kaur, H.; Kauldhar, B. S.; Yadav, S. K., A dual enzyme metal hybrid crystal for the direct transformation of whey lactose into a high value rare sugar D-tagatose: synthesis, characterization and a sustainable process. *ACS Biomaterial Science and Engineering* **2020**, 6, (12), 6661-6670. (IF 5.395)
7. **Rai, S. K.**; Narnoliya, L. K.; Sangwan, R. S.; Yadav, S. K., Self-Assembled Hybrid Nanoflowers of Manganese Phosphate and l-Arabinose Isomerase: A Stable and Recyclable Nanobiocatalyst for

Equilibrium Level Conversion of d-Galactose to d-Tagatose. *ACS Sustainable Chemistry & Engineering* **2018**, 6 (5), 6296-6304. (IF 9.224)

8. Kauldhar, B.S.; Sooch, B.S.; **Rai, S. K.**; Kumar, V.; Yadav, S. K. Recovery of nanosized silica and lignin from sugarcane bagasse waste and their engineering in fabrication of composite membrane for water purification. *Environment Science and Pollution Research* **2021**, 28, 7491-7502. (IF 4.223)

9. Sucheta, **Rai, S.K.**, Chaturvedi, K., Yadav, S.K. Evaluation of structural integrity and functionality of commercial pectin based edible films incorporated with corn flour, beetroot, orange peel, muesli and rice flour. *Food Hydrocolloids* **2019**, 91, 127-135. (IF 11.504)

10. Purohit, A.; **Rai, S. K.**; Chownk, M.; Sangwan, R. S.; Yadav, S. K., Xylanase from *Acinetobacter pittii* MASK 25 and developed magnetic cross-linked xylanase aggregate produce predominantly xylopentose and xylohexose from agro biomass. *Bioresource Technology* **2017**, 244, 793-799. (IF 11.889)

11. Dwivedee, B. P.; Bhaumik, J.; **Rai, S. K.**; Laha, J. K.; Banerjee, U. C., Development of nanobiocatalysts through the immobilization of *Pseudomonas fluorescens* lipase for applications in efficient kinetic resolution of racemic compounds. *Bioresource Technology* **2017**, 239, 464-471. (IF 11.889)

Indian Patent Applications

1. Kumar S.; Sangwan R. S.; Kumar V.; Sandhu P. P.; Rai S. K.; Narnolia L. K.; Jadaun J. S. Integrated as well as module(s) selective process for production of whey proteins, bacterial cellulose, calcium citrate and D-tagatose from liquid whey. Indian Patent Appl. No. **201711024828**.

2. Yadav S. K.; Purohit A.; Rai S. K.; Manisha; Sangwan R. S. Xylanase and magnetic xylanase-CLEA based process for xylooligosaccharides (xos) production from physically treated agro-biomass and uses thereof. Indian Patent Appl. No. **201711020622**.

Book Chapter

1. **Kumar Rai, Shushil** and Chauhan, Ravishankar. "Chapter 15 Phytochemicals in drug discovery". *Phytochemicals in Medicinal Plants: Biodiversity, Bioactivity and Drug Discovery*, edited by Charu Arora, Dakeshwar Kumar Verma, Jeenat Aslam and Pramod Kumar Mahish, Berlin, Boston: De Gruyter, 2023, pp. 331-346. <https://doi.org/10.1515/9783110791891-015>.

REFERENCES

1. **Dr. Sudesh Kumar**, Director

CSIR-Institute of Himalayan Bioresource Technology (Council of Scientific & Industrial Research)

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2. **Dr. Uttam Chand Banerjee**, Eminent Professor

Dept. of Biotechnology, Amity University, Mohali Campus, Punjab, INDIA-140306.

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3. **Dr. Jayeeta Bhaumik**, Scientist-E

Center of Innovative and Applied Bioprocessing (CIAB), Mohali, Punjab, INDIA-140306.

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Declaration

I, Dr. Shushil Kumar Rai hereby declare that all the details furnished above are true to the best of my knowledge and if found false I am wholly responsible for that.

Place: Mohali

Date: 28.06.2023

Sd/-
Dr. Shushil Kumar Rai