



Dr. Aishwarya Singh

Ph.D. Biotechnology

5+ years of research experience in biocatalysis to synthesize rare sugars (D-tagatose, D-talose, L-ribulose and L-ribose) from agri-residues by developing micro or nano-biocatalyst. Expertise in screening, identification and preservation of bacterial cultures, molecular cloning, protein expression, protein purification, functionalization of nanomaterials and immobilization of enzymes on nanosupports and metal based constructs through various techniques. Technical knowledge on HPLC, UPLC, HPAEC, SEM, FTIR, TGA, BET, affinity chromatography, gel electrophoresis, Kjeldhal protein analyzer and UV spectrophotometer. Knowledge of softwares like Graphpad Prism, Minitab statistics and other protein modelling tools like Gromacs Data analysis. Seeking an entry-level position within the organization to learn new skills and utilize my previous research experience to contribute to the growth and esteem of the organization.

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WORK EXPERIENCE

Senior project associate

CSIR-Institute of Himalayan Bioresource Technology

02/2023 - 08/2024 Palampur, Himachal Pradesh, India

-Process optimization and up-scale production of lignocellulosic extremozymes from Himalayan microbes for biomass valorization and depolymerisation.

Research fellow

Center of Innovative and Applied Bioprocessing

04/2018 - 02/2023, Mohali, Punjab, India

-Development of a sustainable process for the synthesis of rare sugars using immobilized biocatalyst.

-Complete utilization of whey for the production of whey protein hydrolysate, bacterial cellulose and tagatose for various food applications.

-Setting up of secondary agriculture/food processing and entrepreneurial network in Punjab.

EDUCATION

Ph.D. Biotechnology

Regional Centre for Biotechnology (07/2018 - 03/2023) Faridabad, Haryana, India

PhD. Thesis: Enzyme based process for rare sugars production from agro-biomass.

M.Sc Botany

University of Allahabad (07/2015 - 07/2017) Prayagraj, Uttar Pradesh, India

M.Sc. Thesis: Effect on biologically synthesized nanoceria on germination, seedling growth and metabolism of *Solanum lycopersicum* exposed to benzoic acid stress

B.Sc.

University of Allahabad (07/2012 - 06/2015) Prayagraj, Uttar Pradesh, India

HONORS/AWARDS

1. Best Researcher Award

Scientific flash talk on "Sustainable process for the synthesis of rare sugars" presented on 10th foundation day of CIAB -2022

2. Participation in three weeks Faculty Development Programme on "Bioprocess Technology (FDP-2022)

Participation certificate for virtual demonstration on Immobilization of Biocatalyst

PUBLICATIONS

1. Kumar Asheesh, **Aishwarya Singh**, Vijay Kumar Sharma, Akshita Goel, and Arun Kumar. "The upsurge of lytic polysaccharide monoxygenases in biomass deconstruction: characteristic functions and sustainable applications." *The FEBS Journal* (2024). <https://doi.org/10.1111/febs.17063>

2. **Aishwarya Singh**, and Sudesh Kumar Yadav. "Immobilization of L-ribose isomerase on the surface of activated mesoporous MCM41 and SBA15 for the synthesis of L-ribose." *Journal of Biotechnology* 362 (2023): 45-53. <https://doi.org/10.1016/j.jbiotec.2022.12.010>

3. Rai, Shushil Kumar, **Aishwarya Singh**, Baljinder Singh Kauldhar, and Sudesh Kumar Yadav. "Robust nano-enzyme conjugates for the sustainable synthesis of a rare sugar D-tagatose." *International Journal of Biological Macromolecules* 231 (2023): 123406. <https://doi.org/10.1016/j.jbiomac.2023.123406>

4. **Aishwarya Singh**, Shushil Kumar Rai, and Sudesh Kumar Yadav. "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* 217 (2022): 112637. <https://doi.org/10.1016/j.colsurfb.2022.112637>

5. **Aishwarya Singh**, Shushil Kumar Rai, Manisha Manisha, and Sudesh Kumar Yadav. "Immobilized L-ribose isomerase for the sustained synthesis of a rare sugar D-talose." *Molecular Catalysis* 511 (2021): 111723. <https://doi.org/10.1016/j.mcat.2021.111723>

6. Rai, Shushil Kumar, Harpreet Kaur, **Aishwarya Singh**, Mehak Kamboj, Geetika Jain, and Sudesh Kumar Yadav. "Production of d-tagatose in packed bed reactor containing an immobilized l-arabinose isomerase on alginate support." *Biocatalysis and Agricultural Biotechnology* 38 (2021): 102227. <https://doi.org/10.1016/j.bcab.2021.102227>

7. Hussain, Imtiyaz. Ajey, Singh, N. B., Singh, **Aishwarya Singh**, and P. Singh. "Plant nanoceria interaction: Toxicity, accumulation, translocation and biotransformation." *South African Journal of Botany* 121, 239-247 (2019). <https://doi.org/10.1016/j.sajb.2018.11.013>

CONFERENCES

1. International Conference on Food and Nutritional Security (IFANS-2023)

Poster presentation on "Micro-composite prepared by blending enzyme and metal: A sustainable biocatalyst for the synthesis of L-ribose and D-talose"

2. International Conference on Biotechnology for Sustainable Bioresource and Bioeconomy (BSBB-2022)

Poster and flash talk presentation "Synthesis of rare sugars L-ribose and D-talose: a sustainable process based on micro-composite."

3. International Conference on Biotechnology for Sustainable Agriculture, Environment and Health (BSAEH-2021)

Poster presentation "Sustainable process for the synthesis of a rare sugar D-talose."

4. Innovations in Bioprocess Technology (IBT-2019)

Poster presentation "Scale up process of whey protein using membrane filtration technique."