Dr. MUKESH KAPOOR

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IRNIS Profile: https://cftri.irins.org/profile/125933

Educational Qualifications:

S. No.	Degree	Subject	Place	Year
1	BSc (H)	Microbiology	Swami Shradhanand College, University of Delhi, Delhi	1997
2	MSc (H)	Microbiology	Department of Microbiology, Panjab University, Chandigarh	1999
3	Ph.D.	Microbiology	Department of Microbiology, University of Delhi South Campus, New Delhi	2008

Positions Held:

Time Line	Place	Designation
24th August, 2017-Till date	Department of Protein Chemistry and Technology, CSIR-CFTRI, Mysuru, India	**Principal Scientist**
21st January to April 20, 2019	Michael Smith Laboratories, University of British Columbia, Vancouver, British Columbia. Canada. **Mentor: Prof. Harry Brumer**	**CSIR-Raman Research Fellow**
24th August, 2013-23rd August, 2017	Department of Protein Chemistry and Technology, CSIR-CFTRI, Mysuru, India	**Senior Scientist**
24th August, 2009-23rd August, 2013	Department of Protein Chemistry and Technology, CSIR-CFTRI, Mysuru,	**Scientist**

	India	
7th July, 2008 to 18th August, 2009	Reliance Life Sciences, Navi Mumbai, India	**Research Scientist**
3rd May, 2007 to 4th July, 2008	International Centre for Genetic Engineering and Biotechnology (ICGEB), New Delhi, India	**Post Doctoral Fellow**

RESEARCH INTERESTS

- *Understanding the molecular basis of the prebiotic action of small oligosaccharides derived from mannan based gums in candidate probiotics.*

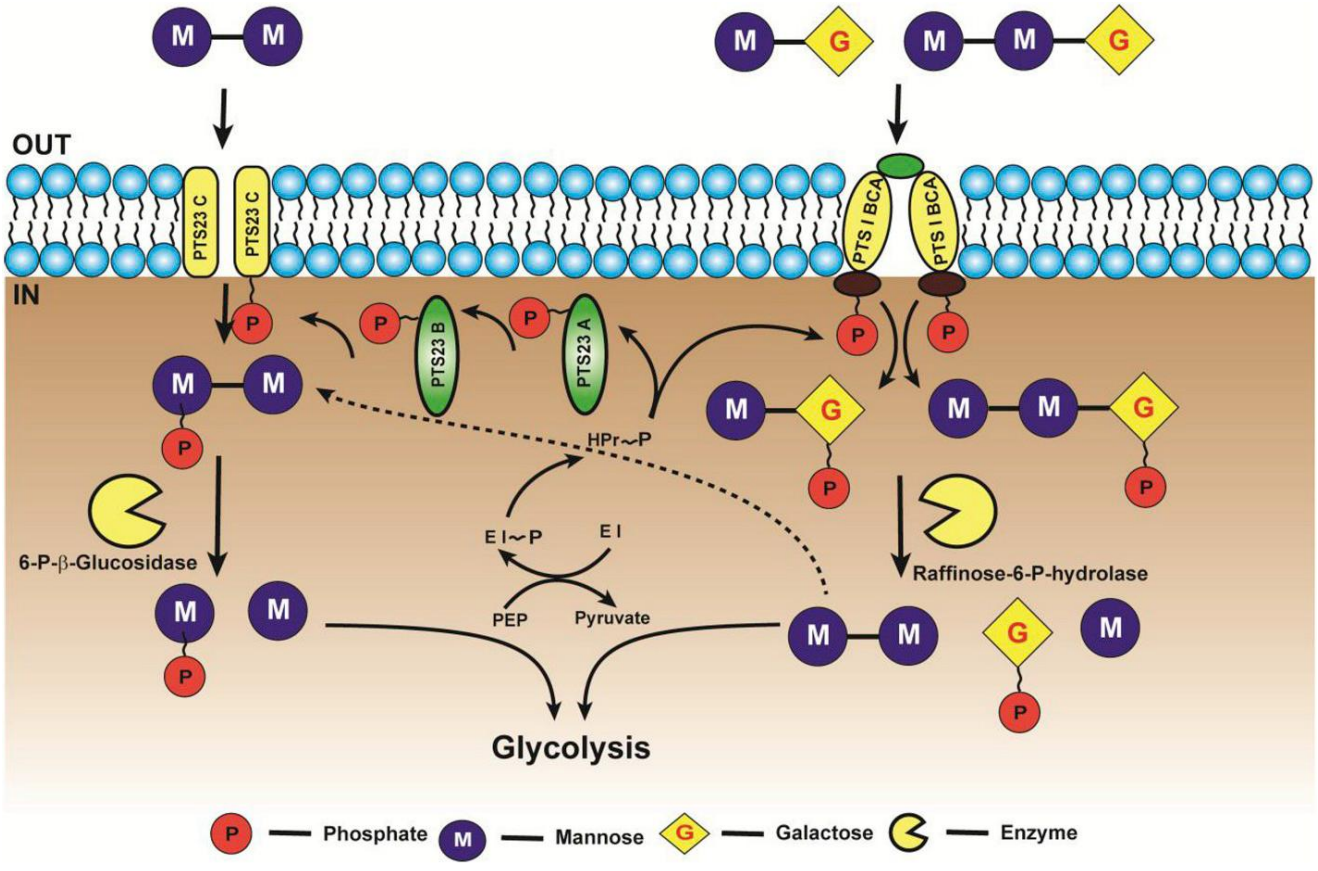


Fig. Pictorial representation of the pathway involved in the uptake and catabolism of short chain GMOS in Lactobacillus plantarum WCFS1. (Panwar et al., 2020 Food Microbiology. 86: 103336)

Molecular engineering of enzymes in order to understand their structure-function relationships

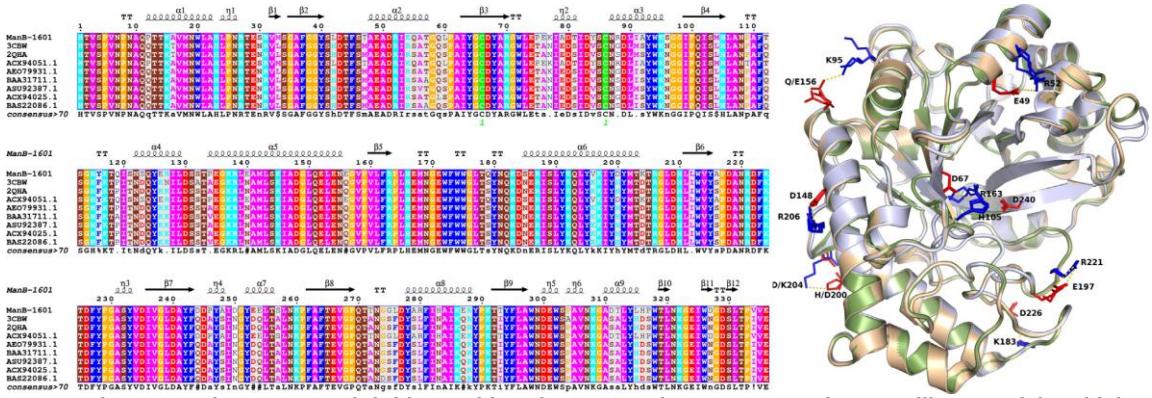


Fig. Degree of conservation among salt bridge residues in GH26 endo-mannanases from Bacillus spp. (A) Multiple sequence alignment of GH26 endo-mannanases. The position of salt bridge residues are indicated with arrow. (B) Superimposition of three-dimensional structure of ManB-1601 (gray) with BCman (green) and BsMan26A (wheat). Amino acid residues participating in salt bridges are highlighted in red (acidic) and blue (basic). All sequences, except ManB-1601, are labeled according to their GenBank accession number and PDB ID. (Kaira et al., 2019, International Journal of Biological Macromolecules. 133, 1236-1241)

- *Unravelling the mechanisms responsible for thermo-stablity in Glycosyl Hydrolases with special focus on metal-protein interactions*.

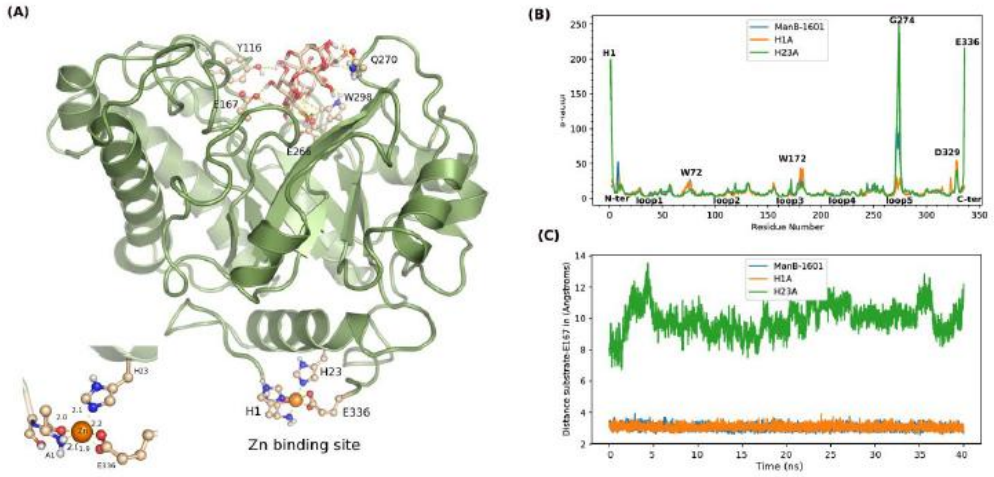


Figure (A) Cartoon representation of ManB-1601 model protein. Metal binding site residues (H1, H23 and E336), catalytic residues (E167 and E266) and some of substrate binding residues (Y116, Q270 and W298) are shown in ball and stick representation. The substrate (G2M4) is embedded in the cavity present in a (α/β)8 catalytic domain region. A inset, H1A in penta coordinated geometry due to loss of coordination of imidazole ring. (B-C) Molecular dynamic simulation analysis of Zn2+ site mutants as compared to ManB-1601 [26]. (B) predicted B-factor per residue with respect to average structure of molecular dynamics run and (C) changes in the distance between the E167 (catalytic acid/base residue) and glycosidic bond of G2M4. (Kaira et al., 2019, Enzyme and Microbial Technology. 133, 1236-1241)

- *Fabrication of nanomaterials as immobilization supports for Glycosyl Hydrolases in order to improve their biochemical properties.*

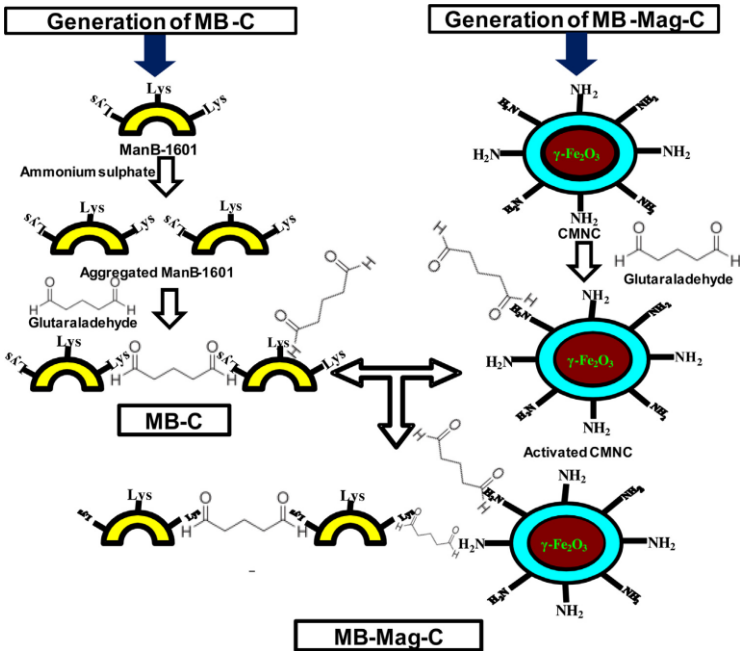


Fig. Schematic representation for the preparation of MB-C and MB-Mag-C. (Panwar et al., 2017 International Journal of Biological Macromolecules. 105(1), 1289-1299.)

- *Industrial application of enzymes in food and related areas*.

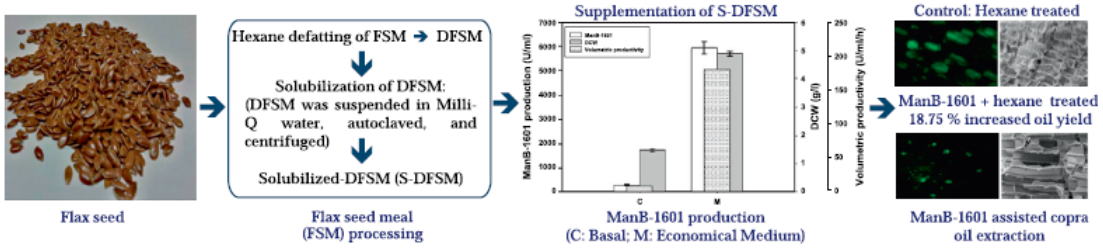
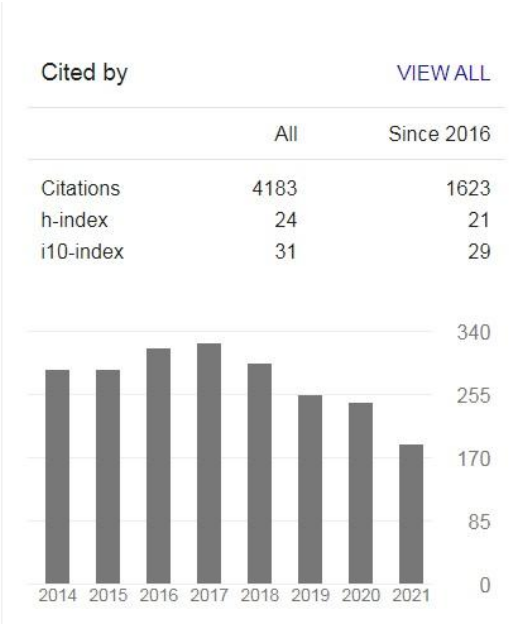


Fig. Extraction of oil from copra using recombinant endo-mannanase (Kaira et al., 2016, Bioresource Technology, 209: 220–227.)

In order to pursue the above-mentioned research interests, my laboratory uses interdisciplinary studies encompassing Biochemistry, Molecular Biology, Microbiology, Biotechnology, Biophysics, Food Science and Carbohydrate Chemistry

Publications

Google Scholar citations



46. A. Shubhashini, Neelam Prabha, P. Monica, Sachin Rama Chaudhari and Mukesh Kapoor (2022). Short-chain β-manno-oligosaccharides from copra meal: structural characterization, prebiotic potential and anti-glycation activity. **Food and Function**. Accepted In Press ***Impact Factor: 5.396*** https://doi.org/10.1039/D2FO00013J

45. P. Monica, \Sarma Mutturi and, Mukesh Kapoor (2022). Truncation of C-terminal amino acids of GH26 endo-mannanase (ManB-1601) affects biochemical properties and stability against anionic surfactants. **Enzyme and Microbial Technology**. 157: 110031. ***Impact Factor: 3.493***

44. Priyanka Rose Mary, Sarma Mutturi, and Mukesh Kapoor (**2022**). Non-enzymatically hydrolyzed guar gum and orange peel fibre together stabilize the low-fat, set-type yogurt: A techno-functional study. **Food Hydrocolloids**. 122: 107100 **https://doi.org/10.1016/j.foodhyd.2021.107100** ***Impact Factor: 9.147***

43. Gaurav Singh Kaira and **Mukesh Kapoor** (**2021**). Molecular advancements on over-expression, stability and catalytic aspects of endo-β-mannanases. **Critical Reviews in Biotechnology. 41:1, 1-15. https://doi.org/10.1080/07388551.2020.1825320**. ***Impact Factor: 8.108***

42. Silpa Vijay, Sruthi Vikraman, Priyanka Rose Mary, Attar Singh Chauhan and Mukesh Kapoor (**2021**). Osmotic infusion of *Lactiplantibacillus plantarum* and

Lacticaseibacillus casei in cut pineapple matrix: Optimization, survival under gastro-intestinal stress and storage stability studies. **Journal of Food Processing and Preservation. 45 (2): e15132. https://doi.org/10.1111/jfpp.15132** ***Impact Factor: 2.190***

41. Monica P and **Mukesh Kapoor** (**2020**). Alkali-stable GH11 endo-β-1,4 xylanase (XynB) from *Bacillus subtilis* strain CAM 21: Application in hydrolysis of agro-industrial wastes, fruit/ vegetable peels and weeds. **Preparative Biochemistry & Biotechnology. https://doi.org/10.1080/10826068.2020.1830416. 51:5, 475-487** ***Impact Factor: 2.162***

40. Juby Elsa Joseph, Priyanka Rose Mary, K. V. Haritha, Deepesh Panwar & **Mukesh Kapoor** (**2020**). Soluble and cross-linked aggregated forms of α-galactosidase from *Vigna mungo* immobilized on magnetic nanocomposites: Improved stability and reusability. **Applied Biochemistry and Biotechnology**, 193:238–256. ***Impact Factor: 2.926.*** **https://doi.org/10.1007/s12010-020-03408-5**

39. Gaurav Singh Kaira, Dandamudi Usharani, **Mukesh Kapoor** (**2020**). Zn^{2+} stapling of N and C-terminal maintains stability and substrate affinity in GH26 endo-mannanase. **Enzyme and Microbial Technology**. **135: 109497.** ***Impact Factor: 3.448***

38. Deepesh Panwar, A. Shubhashini, Sachin Rama Chaudhari, K. V. Harish Prashanth, **Mukesh Kapoor** (**2020**). GH36 α-galactosidase from Lactobacillus plantarum WCFS1 synthesize Gal-α-1,6 linked prebiotic α-galactooligosaccharide by transglycosylation. **International Journal of Biological Macromolecules**. 144: 334-342. ***Impact Factor: 5.162***

36. Deepesh Panwar, **Mukesh Kapoor** (**2020**). Transcriptional analysis of galactomanno-oligosaccharides utilization by *Lactobacillus plantarum* WCFS1. **Food Microbiology.** 86: 103336. ***Impact Factor: 4.155***

37. Priyanka Rose Mary, K. V. Harish Prashanth, Prasanna Vasu, **Mukesh Kapoor** (**2019**). Structural diversity and prebiotic potential of short chain β-manno-oligosaccharides generated from guar gum by endo-β-mannanase (ManB-1601). **Carbohydrate Research**. 486: 107822. ***Impact Factor: 1.841***

35. Deepesh Panwar, Shubhashini A and **Mukesh Kapoor (2019).** Enhanced survival of

Lactobacillus sp. in β-manno-oligosaccharides enriched low-fat ice-cream under simulated gastrointestinal stress. **Journal of Food Processing and Preservation.** 43 (9), e14097. ***Impact Factor: 1.405***

34. Gaurav Singh Kaira, Dandamudi Usharani, **Mukesh Kapoor** (2019). Salt bridges are pivotal for the kinetic stability of GH26 endo-mannanase (ManB-1601). **International Journal of Biological Macromolecules**. 133, 1236-1241. ***Impact Factor: 5.162***

33. Gaurav Singh Kaira, **Mukesh Kapoor** (2019). How substrate subsites in GH26 endo-mannanase contribute towards mannan binding. **Biochemical and Biophysical Research Communications**. 510 (3), 358-363. ***Impact Factor: 2.985***

32. Ramadevi Mutra, Juby Elsa Joseph, Deepesh Panwar, Gaurav Singh Kaira, **Mukesh Kapoor (2018)**. Low molecular weight α-galactosidase from black gram (*Vigna mungo*): Purification and insights towards biochemical and biophysical properties. **International Journal of Biological Macromolecules. 119, 770–778.** ***Impact Factor: 5.162***

31. Preeti Tripathi, Jyothi Lakshmi A, and **Mukesh Kapoor (2018)**. Phytase from *Citrobacter koseri* PM-7: Enhanced production using statistical method and application in ameliorating mineral bioaccessibility and protein digestibility of high-phytate food. **Preparative Biochemistry & Biotechnology. 48(1), 84-91.** ***Impact Factor: 1.415***

30. Deepesh Panwar, Gaurav Singh Kaira, and **Mukesh Kapoor (2017)**. Cross-linked enzyme aggregates (CLEAs) and magnetic nanocomposite grafted CLEAs of GH26 endo-β-1,4-mannanase: Improved activity, stability and reusability. **International Journal of Biological Macromolecules. 105(1), 1289-1299.** ***Impact Factor: 5.162***

29. Praveen Kumar Srivastava, Deepesh Panwar, K. V. Harish Prashanth and **Mukesh Kapoor (2017).** Structural Characterization and *in vitro* Fermentation of β-mannooligosaccharides Produced from Locust bean gum by GH-26 Endo-β-1,4-mannanase (ManB-1601). **Journal of Agricultural and Food Chemistry**. 65 (13), 2827–2838. **DOI:** 10.1021/acs.jafc.7b00123. ***Impact Factor: 4.192***

28. Praveen K Srivastava, **Mukesh Kapoor (2017).** Production, properties and applications of endo-β-mannanases. **Biotechnology Advances**. 35: 1-19. ***Impact Factor: 10.744***

27. Preeti Tripathi, Silvi Garg, Deepesh Panwar, Gaurav Singh Kaira, Rahul Kumar and **Mukesh Kapoor** (2016). Phytase from *Citrobacter koseri* PM-7: Cost-effective

production using agro-industrial residues, biochemical characterization and application in dephytinization. **Waste and Biomass Valorization**. 8(4), 1105-1118. ***Impact Factor: 2.851***

26. Gaurav Singh Kaira, Deepesh Panwar, **Mukesh Kapoor** (**2016)**. Recombinant endo-mannanase (ManB-1601) production using agro-industrial residues: Development of economical medium and application in oil extraction from copra. **Bioresource Technology.** 209: 220–227. ***Impact Factor: 7.539***

25. Praveen Kumar Srivastava, Appu Rao G. Appu Rao, **Mukesh Kapoor** (**2016**). Metal-dependent thermal stability of recombinant endo-mannanase(ManB-1601) belonging to family GH 26 from *Bacillus* sp. CFR1601. **Enzyme and Microbial Technology**. 84: 41–49. ***Impact Factor: 3.448***

24. Praveen Kumar Srivastava and **Mukesh Kapoor** (**2015**). Recombinant GH-26 endo-mannanase from *Bacillus* sp. CFR1601: Biochemical characterization and application in preparation of partially hydrolysed guar gum. **LWT - Food Science and Technology.** 64: 809-816. ***Impact Factor: 4.006***

23. Deepesh Panwar, Praveen Kumar Srivastava, **Mukesh Kapoor** (**2014**). Production, extraction and characterization of alkaline xylanase from *Bacillus* sp. PKD-9 with potential for poultry feed. **Biocatalysis and Agricultural Biotechnology** 3: 118–125.

22. Praveen Kumar Srivastava and **Mukesh Kapoor** (**2014**). Cost-effective endo-mannanase from *Bacillus* sp. CFR1601 and its application in generation of oligosaccharides from guar gum and as detergent additive. **Preparative Biochemistry & Biotechnology**, 44:392–417. ***Impact Factor: 1.415***

21. Praveen Kumar Srivastava and **Mukesh Kapoor** (**2013**). Extracellular endo-mannanase from *Bacillus* sp. CFR1601:Economical production using response surface methodologyand downstream processing using aqueous two phase system. **Food and Bioproducts Processing** 91: 672–681. ***Impact Factor: 3.726***

20. **Mukesh Kapoor** and R. Rajagopal (**2011**). Enzymatic Bioremediation of Organophosphorus Insecticides by Recombinant Organophosphorous Hydrolase. **International Biodeterioration & Biodegradation**. 65: 896-901. ***Impact Factor: 4.074***

19. **Mukesh Kapoor**, Lavanaya M. Nair and Ramesh Chander Kuhad (**2008**).Cost-effective xylanase production from free and immobilized *Bacillus pumilus* strain MK001 and its application in saccharification of *Prosopis juliflora*. **Biochemical Engineering Journal**. 38(1): 88-97. ***Impact Factor: 3.475***

18. Shefali gupta, **Mukesh Kapoor**, Krishna Kant Sharma, Lavanaya M Nair, and

Ramesh Chander Kuhad (**2008**). Production and recovery of an alkaline exo-polygalacturonase from *Bacillus subtilis* RCK under solid-state fermentation using statistical approach. **Bioresource Technology**. 99(5): 937-945. ***Impact Factor: 7.539***

17. Suchita ninawe, **Mukesh Kapoor** and Ramesh Chander Kuhad **(2008).** Purification and characterization of extracellular xylanase from *Streptomyces cyaneus* SN32. **Bioresource Technology** 99(5): 1252-1258. ***Impact Factor: 7.539***

16. **Mukesh Kapoor**, Rajeev Kumar Kapoor and Ramesh Chander Kuhad (**2007**). Differential and synergistic effects of xylanase and laccase mediator system (*LMS*) in bleaching of soda and waste pulps. **Journal of Applied Microbiology**. 103 (2): 305-317. ***Impact Factor: 3.066***

15. **Mukesh Kapoor** and Ramesh Chander Kuhad (**2007**). Immobilization of xylanase from *Bacillus pumilus* strain MK001 and its application in production of xylo-oligosaccharides. **Applied Biochemistry and Biotechnology**. 142 (2): 125-138. ***Impact Factor: 2.277***

14. Smriti Khurana, **Mukesh Kapoor**, Saurabh Gupta, and R.C. Kuhad. (**2007**). Statistical optimization of alkaline xylanase production from *Streptomyces violaceoruber* under submerged fermentation using response surface methodology. **Indian Journal of Microbiology**. (Published by springer). 47 (2): 144-152. ***Impact Factor: 1.830***

13. Ramesh Chander Kuhad, Priyadeep Chopra, Bindu Battan, **Mukesh Kapoor** and Sarika Kuhar (**2006**). Production and partial purification and characterization of a thermo-alkali stable xylanase from *Bacillus* sp. RPP-1 **Indian Journal of Microbiology**. 46 (1): 13-23. ***Impact Factor: 1.830***

12. Ramesh Chander Kuhad, **Mukesh Kapoor**, and Kapila Chaudhary (**2006**). Xylanase production from *Streptomyces* M-83 using cost-effective substrates and its application in improving digestibity of monogastric animal feed. **Indian Journal of Microbiology**. 46 (2): 109-119. ***Impact Factor: 1.830***

11. Krishna Kant Sharma, **Mukesh Kapoor** and Ramesh Chander Kuhad (**2005**). In-vivo enzymatic digestion (IVED), In-vitro xylanase digestion (IVXD), metabolic analogues, surfactants and polyethylene glycol ameliorate laccase production from *Ganoderma* sp. kk-02. **Letters in Applied Microbiology.** 41: 24-31. ***Impact Factor: 2.173***

10. Ramesh Chander Kuhad, **Mukesh Kapoor** and Renuka Rustagi. (**2004**). Improved production and characterisation of an alkalothermostable pectinase from *Streptomyces* sp. RCK-SC. **World Journal of Microbiology and Biotechnology**. 20: 257-263. ***Impact Factor: 2.477***

9. **Mukesh Kapoor** and Ramesh Chander Kuhad. (**2002**). Improved polygalacturonase production from *Bacillus* sp. MG-cp-2 under submerged (SmF) and solid state (SSF) fermentation. **Letters in Applied Microbiology**. 34: 317-322. ***Impact Factor: 2.173***

8. Qasim Khalil Beg, **Mukesh Kapoor**, Lakshana Mahajan and G.S. Hoondal. (**2001**). Microbial xylanases and their industrial applications. **Applied Microbiology and Biotechnology**. 56: 326-338. ***Impact Factor: 3.530***

7. Qasim Khalil Beg, **Mukesh Kapoor**, R.P.Tiwari and G.S. Hoondal. (**2001**). Bleach-boosting of eucalyptus kraft pulp using combination of xylanase and pectinase from *Streptomyces* sp. QG-11-3. **Punjab University Research Bulletin**. 51: 71-78.

6. **Mukesh Kapoor**, Qasim Khalil Beg, Bharat Bhushan, Kamaljit Singh, K.S. Dadhich and G.S. Hoondal. (**2001**). Application of an alkaline and thermostable polygalacturonase from *Bacillus* sp. MG-cp-2 in degumming of ramie (*Boehmeria nivea*) and sunn hemp (*Crotalaria juncea*) bast fibers. **Process Biochemistry**. 37: 803-807. ***Impact Factor: 2.952***

5. Qasim Khalil Beg, Bharat Bhushan, **Mukesh Kapoor** and G.S. Hoondal. (**2000**). Enhanced production of a thermostable xylanase from *Streptomyces* sp. QG-11-3 and its application in biobleaching of eucalyptus kraft pulp. **Enzyme and Microbial Technology.** 27(7): 459-466. ***Impact Factor: 3.448***

4. **Mukesh Kapoor**, Qasim Khalil Beg, Bharat Bhushan, K.S. Dadhich and G.S. Hoondal (**2000**). Production and partial purification and characterisation of a thermo-alkali stable polygalacturonase from *Bacillus* sp. MG-cp-2. **Process Biochemistry**. 36(5): 467-473. ***Impact Factor: 2.952***

3. Sandeep Kaur, R.M. Vohra, **Mukesh Kapoor**, Qasim Khalil Beg and G.S. Hoondal (**2000**). Enhanced production and characterisation of a highly thermostable alkaline protease from *Bacillus* sp. P2. **World Journal of Microbiology and Biotechnology**. 17: 125-129. ***Impact Factor: 2.477***

2. Qasim Khalil Beg, Bharat Bhushan, **Mukesh Kapoor** and G.S. Hoondal. (**2000**). Production and characterization of thermostable xylanase and pectinase from a *Streptomyces* sp. QG-11-3. **Journal of Industrial Microbiology and**

Biotechnology. 24(6): 396-402. ***Impact Factor: 2.824***

1. Qasim Khalil Beg, Bharat Bhushan, **Mukesh Kapoor** and G.S. Hoondal. (**2000**). Effect of amino acids on production of xylanase and pectinase from *Streptomyces* sp. QG-11-3. **World Journal of Microbiology and Biotechnology**. 16, 211-213. ***Impact Factor: 2.477***

Chapters in Books

1. **Mukesh Kapoor**, Deepesh Panwar, Gaurav Singh Kaira (**2016**). Bioprocesses for enzyme production using agro-industrial wastes: Technical challenges and commercialization potential. In: ***Agro-Industrial Wastes as Feedstock for Enzyme Production****:* Apply and Exploit the Emerging and Valuable Use Options of Waste Biomass. Editors: Gurpreet Singh Dhillon and Surinder Kaur. **Published by Academic Press. Pages 61-93**.
2. **Mukesh Kapoor**, Ajay Singh, Ramesh Chander Kuhad (**2007**). Applications of xylanase in the pulp and paper industry: An appraisal. In: **Lignocellulose Biotechnology: Future prospects.** Editors R.C.Kuhad and Ajay Singh. **I.K. International Publishing House Pvt. Ltd, India. Pages 307-332; ISBN: 81-88237-58-2**
3. Sarika Kuhar, **Mukesh Kapoor**, Rajeev Kapoor, Krishna Kant Sharma, Ajay Singh, Ramesh Chander Kuhad (**2007**) Biodiversity of Ligninolytic fungi In: **Lignocellulose Biotechnology: Future prospects**. Editors R.C.Kuhad and Ajay Singh. **I.K. International Publishing House Pvt. Ltd, India. Pages 37-62; ISBN: 81-88237-58-2**
4. R. C. Kuhad, Sarika Kuhar, **Mukesh Kapoor**, Krishna Kant Sharma and Ajay Singh (**2007**). Lignocellulolytic microorganisms, their enzymes and possible biotechnologies based on lignocellulolytic microorganisms and their enzymes. In: **Lignocellulose Biotechnology: Future prospects**. Editors R.C.Kuhad and Ajay Singh. **I.K. International Publishing House Pvt. Ltd, India. Pages 3-22; ISBN: 81-88237-58-2**

Patent granted

1. Ramesh Chander Kuhad and **Mukesh Kapoor** (**2009**). Method of producing alkalo-thermostable xylanase from *Bacillus pumilus* strain MK001 by solid state fermentation.no. Application No. 984/DEL/2008. Date of Grant 18/12/2015.

Patent filed

1. **Mukesh Kapoor**, Deepesh Panwar and Gaurav Singh Kaira (**2016**). A process for preparation of manno-oligosaccharides from galactomannan using immobilized recombinant endo-β-mannanase (ManB-1601). Filed in India vide application no. 201611036490 dated 25.10.2016

Publications as part of conference proceedings

1. Mutra R., Panwar, D. and **Kapoor, M**. (**2015**) Purification, partial biochemical characterization and immobilization of *Vigna mungo* α-galactosidase on magnetic chitosan nanoparticles. *Journal of Biotechnology & Biomaterials*. DOI: 10.4172/2155-952X.C1.044.
2. Kaira, G. S., Panwar, D., & **Kapoor, M.** (**2015**) Utilization of agro/industrial wastes for high-level expression of recombinant endo-mannanase by *Escherichia coli* and its application in oil extraction from Copra. *Journal of Biotechnology & Biomaterials* DOI: 10.4172/2155-952X.C1.044
3. Praveen Srivastava, Appu Rao Appu Rao and **Mukesh Kapoor** (**2014**). Structural insights into the thermal stability of endomannanase belonging to family 26 from *Bacillus* sp. CFR1601. *The FASEB Journal* vol. 28 no. 1 Supplement 580.2.

Research Projects (Currently pursuing and Completed)

Grant-in Aid (GAP)

1. **Evaluating the role of galactomanno-oligosaccharides as potential therapy for inflammatory bowel disease using omics based approaches (GAP 0597).** Funded by Indian Council of Medical Research, New Delhi (Feb, 2021 to Jan, 2024). **Role: Principal Investigator.**
2. **Understanding key proteins/enzymes of probiotic lactobacilli involved in β-manno-oligosaccharides catabolism (GAP0523)**. Funded by Department of Biotechnology, Ministry of Science and Technology, New Delhi (Dec-2017 to Dec, 2020). **Role: Principal Investigator**.
3. **Production, structure-function studies of neutral/alkaline bacterial phytase and assessment of potential in de-phytinization of oil cake rich animal feed (GAP 0431).** Funded by Science and Engineering Research Board, Department of Science and Technology, New Delhi, India. (July, 2013-July, 2016). **Role: Principal Investigator**.

Biological Science Cluster (BSC)

1. **Nano-materials: Applications and Impact on Safety, Health and Environment (NanoSHE)"** under Biological Sciences Cluster. Nodal Lab: CSIR-IITR (BSC0112). Funded by CSIR, New Delhi, India. (April, 2012 to March, 2017). **Role: Principal Investigator.**

2. **A database for the carbohydrate digestive products of Indian Foods 12th-Five year plan project entitled WELFO**" at CSIR-CFTRI (BSC0202). Nodal Lab: CSIR-CFTRI Funded by CSIR, New Delhi, India. (April, 2012 to March, 2017). Role: Member

3. **Anti-microbial agents from natural and synthetic sources for increasing the shelf life of fresh foods under XII FYP - New initiatives to boost agricultural productivity through maximizing pre and post harvest yields (AGROPATHY).** Nodal Lab: CSIR-CFTRI Funded by CSIR, New Delhi, India. (2013 - 2014). Role: Member

Major Laboratory Projects (MLP)

1. Functional ingredients of therapeutic value from protein rich products. Funded by CSIR-CFTRI. Duration: 2010-2012. Role: Principal Investigator.

2. Beneficiation of proteins, enzymes, protein derived products and nutraceuticals from oilseeds and cereals: biochemical and biophysical characterization targeting specific end applications. Funded by CSIR-CFTRI. Duration: 2012-2014. Role: Member

3. Harnessing proteins and micro-constituents of flax (*Linum usitatissimum*) seed and pumpkin (*Cucurbita* sp.) seed and peel for health benefits (MLP 0153). Funded by CSIR-CFTRI. Duration: 2014-2016. Role: Member

Invited talks

1) Talk entitled "Structural diversity and molecular basis for prebiotic potential of short chain β-manno-oligosaccharides in probiotic *Lactobacillus* sp. at the Annual Conference of Association of Microbiologist of India, 2019 at **Central University of Haryana, Mahendergarh, Haryana, India, 15-18th November, 2019**

2) Talk entitled "Rational designing and genetic engineering approaches to understand thermal stability and substrate hydrolysis in ManB-1601: A GH26 endo-mannanase from *Bacillus* sp." **at laboratory of Dr. D. Wade Abbott, Lethbridge Research and Development Centre, Agriculture and Agri-Food Canada, Government of Canada, Lethbridge, Alberta. April 1, 2019.**

3) Talk entitled "β-manno-oligosaccharides from galactomannans: Production, structural characterization and molecular basis of their utilization in probiotic *Lactobacillus* sp" at **the laboratory of Dr. Alisdair Boraston, Associate Professor, Department**

of Biochemistry and Microbiology, University of Victoria, Victoria, British Columbia, Canada. April 11, 2019.

Scholarships & Awards

- SERB Young Scientist start-up grant.
- Young Scientist Award (2005-2006) in Industrial Microbiology from Association of Microbiologist of India (AMI).
- Senior Research Fellowship (SRF) from Council of Scientific and Industrial Research (CSIR), Ministry of Science and Technology, Govt. of India, New Delhi.
- Senior Research Fellowship (SRF) from Ministry of Environment and Forest (MoEF), Govt. of India, New Delhi.
- CSIR-Raman Research Fellowship 2018

Reviewer for Journals

FASEB, Biotechnology Letters, Applied Microbiology and Biotechnology, Bioresource Technology, LWT-Food Science and Technology, Process Biochemistry, Biotechnology for Biofuels, Carbohydrate Polymers, International Journal of Biological Macromolecules, Indian Journal of Microbiology, Annals of Microbiology, Journal of Food Science and Technology, Waste and Biomass Valorisation, Preparative Biochemistry and Biotechnology and FEBS open Bio

Presentation in Conference/Symposia

1. Monica P and **Mukesh Kapoor** (**2019**). Heterologous expression and biochemical characterization of GH11 endo-β-1,4 xylanase from *Bacillus subtilis* for industrial applications. In: 7th Bioprocessing India conference, Dec 14-16, 2019, CSIR-CFTRI, Mysuru, India.
2. Priyanka Rosemary and **Mukesh Kapoor** (**2019**). To understand the catabolism of beta-mannan derived dietary residues in probiotic *Bifdiobacterium adolescentis* (DSM 20083). In: 7th Bioprocessing India conference, Dec 14-16, 2019, CSIR-CFTRI, Mysuru, India.
3. Deepesh Panwar, Shubhashini A and **Mukesh Kapoor** (**2019**). Studies on cloning, heterologous expression and purification of GH1 6-phospho-beta glucosidase (cellobiose utilization operon) and GH13 raffinose-6 phosphate hydrolase (oligosucrose utilization loci) from *Lactobacillus plantarum* WCFS1 In: 7th Bioprocessing India conference, Dec 14-16, 2019, CSIR-CFTRI, Mysuru, India.
4. Priyanka Rose Mary, K. V. Harish Prashanth, Prassana Vasu and **Mukesh Kapoor** (**2018**). Short chain guar gum oligosaccharides synthesized by ManB-1601 vary in structural diversity and have prebiotic potential. 59th Annual Conference of Association of Microbiologist of India and International symposium on host microbe interactions, 9-12 December, 2018, School of Life Sciences, University of Hyderabad in Association with Department of Microbiology, Osmania University, Hyderabad, Telangana, India. (Poster Presentation).

5. Monica P and **Mukesh Kapoor (2018)**. Biochemical characterization of the C-terminal region in recombinant endo-β-mannanase (ManB-1601). 59th Annual Conference of Association of Microbiologist of India and International symposium on host microbe interactions, 9-12 December, 2018, School of Life Sciences, University of Hyderabad in Association with Department of Microbiology, Osmania University, Hyderabad, Telangana, India. (Poster Presentation).
6. Deepesh Panwar, Shubhashini A, **Mukesh Kapoor (2018)** Expression, purification, partial characterization and transglycosylation potential of GH 36 α-galactosidase from probiotic *Lactobacillus plantarum* WCFS1. 59th Annual Conference of Association of Microbiologist of India and International symposium on host microbe interactions, 9-12 December, 2018, School of Life Sciences, University of Hyderabad in Association with Department of Microbiology, Osmania University, Hyderabad, Telangana, India. (Poster Presentation).
7. Haritha K.S., Gaurav Singh Kaira, and **Mukesh Kapoor** (**2016**). Hydrolysis of copra meal by recombinant endo-mannanase (ManB-1601) for its usage in dye removal and production of manno-oligosaccharides. 85th Annual Meeting of Society of Biological Chemist, 21-24th Nov, 2016, CSIR-CFTRI, Mysuru. (Poster Presentation).

8. Haritha Krishna, Deepesh Panwar, Juby Elsa Joseph and **Mukesh Kapoor** (**2016**). Immobilization of cross linked enzyme aggregates of α-galactosidase from *Vigna mungo* on magnetic nanocomposites (α-Gal-mag-CLEAs). 85th Annual Meeting of Society of Biological Chemist, 21-24th Nov, 2016, CSIR-CFTRI, Mysuru. (Poster Presentation).

9. Juby Elsa Joseph, Deepsh Panwar, Ramadevi Mutra and **Mukesh Kapoor** (**2016**). α- galactosidase from *Vigna mungo* partial characterization and application in removal of RFOs from soymilk. 85th Annual Meeting of Society of Biological Chemist, 21-24th Nov, 2016, CSIR-CFTRI, Mysuru. (Poster Presentation).

10. Kaira, G. S., Panwar, D., & **Kapoor, M. (2015).** Utilization of agro/industrial wastes for high-level expression of recombinant endo-mannanase by Escherichia coli and its application in oil extraction from Copra. Poster presentation at Crown plaza, New Delhi at 6th world congress on Biotechnology by Omics group, October 4-7th, 2015. (Poster Presentation).

11. Mutra R., Panwar, D. and **Kapoor, M. (2015).** Purification, partial biochemical characterisation and immobilisation of Vigna mungo α-galactosidase on magnetic chitosan nanoparticles. Poster presentation at Crown plaza, New Delhi at 6th world congress on Biotechnology by Omics group, October 4-7th, 2015. (Poster Presentation).

12. Deepesh Panwar, Gaurav Singh Kaira, **Mukesh Kapoor (2015).** Recombinant endo-manannase (ManB-1601) immobilization through cross-linked enzyme aggregates (CLEAs): Biochemical characterization and its application in food sector. Poster presented at JNU, New Delhi in 56th Annual conference of Association of Microbiologist of India- December 7-10th, 2015. (Poster Presentation).

13. Srivastava, P.K., Appurao, A.G., **Kapoor, M. (2014).** Structural Insights into the thermal stability of endo-mannanase belonging to family 26 from *Bacillus* sp. CFR1601. In: Annual meeting of American Society for Biochemistry and Molecular Biology (ASBMB), Experimental Biology-2014 (EB-2014), San Diego, CA, USA, 24-30th April, 2014. (Poster Presentation).

14. Srivastava, P.K., Panwar, D., Anusha, K., **Kapoor, M. (2014)**. Prebiotic activity of mannooligosaccharides (MOS) derived from hydrolysis of locust bean gum by recombinant endo-mannanase (ManB-1601) from *Bacillus* sp. CFR1601. In: 55th Annual Conference, National Conference on Empowering Mankind with Microbial Technologies (AMI-EMMT-2014), Association of Microbiologists of India, held at Coimbatore, 12-14th November, 2014. (Poster Presentation).

15. Mutra R.D., Kaira, G.S. and **Kapoor, M. (2014).** Improved qualitative assay for detection of bacterial α-galactosidase. In: 55th Annual Conference, National Conference on Empowering Mankind with Microbial Technologies (AMI-EMMT-2014), Association of Microbiologists of India, held at Coimbatore, 12-14th November, 2014. (Poster Presentation).

16. Elaveniya Elancheran, Vivek Mukherjee K, **Mukesh Kapoor (2014).** Anti-bacterial activity of polyphenolic extracts from Niger seed (*Guizotia abyssinica*) meal against *Staphylococcus aureus*. In: 55th Annual Conference, National Conference on Empowering Mankind with Microbial Technologies (AMI-EMMT-2014), Association of Microbiologists of India, held at Coimbatore, 12-14th November, 2014. (Poster Presentation).

17. Sravani G, Kokila, Anusha GA, Praveen Kumar Srivastava and **Mukesh Kapoor (2013).** Glucoamylase from Bacillus sp. CAM-21: Studies on production, immobilization and saccharification of agro/food waste" at the 7th International Food Convention (IFCON-2013) held at CSIR-CFTRI, Mysore during 18-21st December, 2013(Poster Presentation).

18. Srivastava, P.K. and **Kapoor, M. (2012).** Extracellular endo-mannanase from *Bacillus* sp.CFR1601: Economical production under solid state fermentation and downstream processing using aqueous two phase system. National Carbohydrate Conference at CSIR-CFTRI, Mysore to be held during 13-15th Dec, 2012 (Poster Presentation).

19. Srivastava, P.K., Panwar, D., Anusha, K., **Kapoor, M. (2011).** Enhanced production of endo-mannanase, xylanase and glucoamylase from natural wild-type bacterial isolates under dual-phase (biphasic) growth system [DP(B)GS]. *In*: International Conference on Microorganisms in Environmental Management and Biotechnology. Department of Biotechnology & Bioinformatics centre, Barkatullah University, Bhopal, India (Poster Presentation).

20. **Kapoor, M.,** Sharma, K., Kapoor R. K. and Kuhad, R.C. (**2005**) Enhanced xylanase production from *Bacillus pumilus* strain MK001 using In vitro laccase digested cost effective substrate. Annual conference of Association of Microbiologist of India. December 8-10 2005, Hyderabad, India. (Poster Presentation).
21. **Kapoor, M.,** Kapoor, R, K., Sharma, K, K., Gupta, S. and Kuhad, R. C. **(2005).** Statistical medium optimization under SmF and SSF for maximum production of alkalostable xylanase from *Bacillus pumilus* strain MK001. International conference on "Microbial diversity: current perspectives and potential applications". April 14-17, New Delhi, India. (Poster Presentation).
22. Sharma, K, K., Kapoor, R, K., **Kapoor, M.**, Gupta, S. and Kuhad, R. C. (**2005**). Agrobacterium mediated delivery of marker genes to *Phanerochaete chrysosporium*: a lignin degrading model white-rot fungus. International conference on "Microbial diversity: current perspectives and potential applications". April 14-17, New Delhi, India. (Poster Presentation).

23. Gupta, S, Sharma, K, K., Kapoor, R, K., **Kapoor, M**. and Kuhad, R. C. (**2005**). Effect of fungal cell wall disrupting antibiotics on biosorption of heavy metals and laccase production by white-rot fungi. International conference on "Microbial diversity: current perspectives and potential applications". April 14-17, New Delhi, India. (Poster Presentation).
24. Kapoor, R, K., Sharma, K, K., Gupta, S, **Kapoor, M**. and Kuhad, R. C. (**2005**). Functional diversity of laccase from *C. stercoreus*. International conference on "Microbial diversity: current perspectives and potential applications". April 14-17, New Delhi, India. (Poster Presentation).
25. **Kapoor, M**., Beg, Q.K. and Hoondal, G.S. (**2001**). Polygalacturonase and xylanase production from *Bacillus* sp. and *Streptomyces* sp. using SSF and Immobilization on PUF. Biohorizons, IIT Delhi, Feb 23-24. (Poster Presentation).
26. **Kapoor, M**. and Kuhad, R.C. (**2001**). Improved polygalacturonase production from *Bacillus* sp. MG-cp-2 using amino acids, vitamins, and surfactants under submerged (SmF) and solid state (SSF) fermentation. National conference on "National symposium on Lignocellulose Biotechnology: Present and future prospects", Dec 10-11, New Delhi, India. (Oral & Poster Presentation).
27. **Kapoor, M**. and Kuhad, R.C. (**2001**). Xylanase production from alkalophilic bacteria under submerged fermentation. National conference on "National symposium on Lignocellulose Biotechnology: Present and future prospects", Dec 10-11, New Delhi, India. (Poster Presentation).
28. Gupta, S., **Kapoor, M**., Rustagi, R. and Kuhad, R.C. (**2001**). Biodiversity and potentiality of thermophilic actinomycetes. International conference on "Thermophiles: Biology and Biotechnology of Thermophilic Microbes", Dec. 3-7, New Delhi, India. (Poster Presentation).
29. Beg, Q, K., **Kapoor, M**., Singh, K., Bhushan, B. and Hoondal, G.S. (**2000**). Application of xylanases and pectinases in biobleaching of kraft pulp, fruit juice clarification and degumming of ramie and sunn hemp bast fibers. National Conference on "Biotechnological Strategies in Agro-processing" Chandigarh, India. Feb. 9-11, 2000. (Poster Presentation).
30. **Kapoor, M**., Beg, Q, K., Dadhich, K.S, Bhushan, B. and Hoondal G.S. (**1999**). Degumming of ramie (*Boehmeria nivea*) and sunn hemp (*Crotalaria juncea*) bast fibers by pectinases from *Bacillus* sp. and *Streptomyces* sp. 52nd Annual Conference of Indian Institute of Chemical Engineers, "Chemcon-99", Chandigarh, India. Dec. 20-23, 1999. (Oral presentation).

Students pursuing Ph.D. under my guidance

1. **Ms. Priyanka Rose Mary (CSIR-UGC-JRF):** Priyanka joined in Jan, 2017 and is working on understanding the molecular basis for assimilation of substituted manno-oligosaccharides in candidate probiotic cultures
2. **Ms. Monica (DBT-JRF):** Monica joined in Aug, 2017 and is working on chimeric hemicellulases
3. **Ms. Ashwini M (CSIR-UGC-JRF):** Ashwini joined in Jan, 2020 and is working on GH 36 α-galactosidases from probiotic bacteria
4. **Ms. Neelam Prabha (CSIR-UGC-JRF):** Neelam joined in Jan, 2020 and is working on enzymatic hydrolysis of fenugreek gum and its prebiotic potential.
5. **Mr. Ritesh Ranjan (CSIR-JRF).** Ritesh joined in July, 2020
6. **Mr.** Lipesh v Gouda. Lipesh Joined in August, 2021

Students with completed Ph.D.

1. **Dr. Praveen Kumar Srivastava, Degree awarded in 2016**

   Ph.D. Thesis Title: "Characterization of mannanase from *Bacillus* sp. and its biotechnological applications"

   Current address: Research investigator, Syngene Amgen Research and Development Center, Bengaluru, India

2. **Dr. Gaurav Singh Kaira, Degree awarded in 2020**

   Ph.D. Thesis Title: "Understanding the molecular determinants of thermo-stability and substrate hydrolysis in ManB-1601: A GH26 endo-mannanase"

   Current Address: Post-Doctoral Fellow, Mentor: Prof. Nidetzky Bernd, Institute for Biotechnology and Bioprocess Technology, Graz University of Technology, Graz, Austria

3. **Dr. Deepesh Panwar, Degree Awarded in 2020**

   Ph.D. Thesis Title: "Understanding the molecular basis of prebiosis of mannooligosaccharides in probiotic *Lactobacillus* sp.".

   Current address: Post-Doctoral Fellow, Mentor: Prof. A Surolia, Molecular Biophysics Unit, IISc, Bangalore, India

Students with completed MSc/M.Tech dissertation

1. Deepesh Panwar (2011). School of Biosciences and Technology, VIT University, Vellore, Tamil Nadu.
2. Ms. K. Anusha (2011). Glucoamylase production from *Bacillus* sp. CAM-21 under solid state ferementation and its partial biochemical characterization Department of Molecular Biology, Yuvaraja's College, Mysore.
3. Kokila S (2012) Glucoamylase from *Bacillus* sp. CAM-21: Production, immobilization and its application in food/agro-waste saccharification. Department of Bio-medical Sciences, Bharthidasan University, Trichy.
4. Kunal Singh (2012). Studies on production and immobilization of mannanase from *Bacillus* sp. CAM-21 and preparation of β-carotene nanoemulsions. School of Biosciences and Technology, VIT University, Vellore, Tamil Nadu.
5. Sravani G (2012) Production and immobilization of glucoamylase fom *Bacillus* sp. CAM-21 and study of its biochemical properties. Jawahar Lal Nehru Technological University, Kakinada.

6. Nagendra Kumar T. (2012). Xylanase from *Bacillus* sp. PKD-9: Production using statistical method, immobilization and its industrial application. Jawahar Lal Nehru Technological University, Kakinada.
7. Monika Bharti (2013). Screening of α- galactosidase producing microorganisms and immobilization of endo-mannanase from *Bacillus* sp. CAM-21. Department of Biotechnology, School of Science and Technology, Jayoti Vidyapeeth Women's University, Jaipur.
8. Mr. Vivek Mukherjee (2014). Enzyme assisted extraction of polyphenols from oilseed meal and evaluation of their anti-microbial potential B-Tech (Biotechnology), VIII semester, Department of Biotech and Bioinformatics, D.Y. Patil college, CBD Belapur, Navi Mumbai.
9. Ms. Shriya, M.J. (2014) Biochemical characterization of α-galactosidase from *Vigna mungo* M.Sc. (Mol Biol.), Yuvaraja College, Mysore.
10. Mr. Rahul Kumar (2015). Studies on alkaline phytase production from Citrobacter koseri PM-7. Maharishi Markandeshwar University, Ambala, Haryana.
11. Ms. Silvi Garg. (2015). Partial characterization and application of neutral/alkaline phytase in dephytinization of agro-residues. M.Sc. Food Science and Technology, CSIR-CFTRI, Mysore
12. Sheetal Devi (2016 Batch).Optimization and scale-up of soya flour hydrolysis by α-galactosidase from *Vigna mungo* and its application in bakery. M.Sc. Food Science and Technology, CSIR-CFTRI, Mysore.
13. Ms. Sheetal Devi (2016 Batch). Production, biochemical characterization and biotechnological potential of α-galactosidases. M.Sc. Food Science and Technology, CSIR-CFTRI, Mysore.
14. Haritha Krishna V (2016). Immobilization of cross-linked enzyme aggregates of α-galactosidase from Vigna mungo on magnetic nanocomposites (α-gal-mag-CLEAs): Biochemical characterization and application in the removal of RFOs from Soy milk. Dept. of Biotechnology, St. Joseph College, Irinjalakkuda, Calicut University, Kerala.
15. Haritha K S. (2016). Application of ManB-1601 treated copra meal in dye removal. Dept. of Molecular Biology, Kannur University, Dr. P.K. Rajan memorial campus, Kerala.
16. Ranjana Jaiswal (2017). Studies on encapsulation and survival of *Lactobacillus rhamnosus* and *Lactobacillus fermentum*. Center for Food Technology, University of Allahabad, Uttar Pradesh.
17. Smita Singh (2017). Studies on co-encapsulation and survival of *Lactobacillus plantarum* (NCIM 2372) and *Lactobacillus Casei* (NCIM 2123) using alginate and β-

MOS and survival under acid/bile stress conditions. Department of Life Science, Jaipur National University, Rajasthan.

18. Swathi M (2017). Studies on freeze drying of *Lactobacillus plantarum* (NCIM 2372) and survival under acid/bile stress conditions. Department of Food Science and Technology, SAFI-Institute of Advanced Studies, Calicut University, Calicut, Kerala.
19. Shilpa M George (2017). Studies on freeze drying of *Lactobacillus rhamnosus* (NCIM 2125) and survival under acid/bile stress conditions. Mahatama Gandhi University, Kottayam, Kerala.
20. Silpa Vijay (2018). Evaluation of Pineapple matrix for osmotic infusion of probiotic *Lactobacillus casei*: Optimization, characterization and survival studies. St. Berchmans College (Autonomous) Changanacherry, Kottayam, Kerala.
21. Sruthi Vikraman (2018). Studies on optimization of osmotic dehydration for infusion of probiotic *Lactobacillus plantarum* in cut Pineapple. St. Berchmans College (Autonomous) Changanacherry, Kottayam, Kerala.
22. M K Venulekha (2020). Studies on immobilization of α-galactosidase from *Lactobacillus plantarum* WCFS1 (LpαG) and its applications. Sri Padmavathi Visvavidyalayam, Tirupathi.
23. Athul Das H (2020). Encapsulation of *Lactobacillus fermentum* and *Lactobacillus casei* with β-mannooligosaccharides using sodium alginate: studies on viability, storage and gastro-intestinal stress. Rathnavel Subramaniam college of Arts and Science, Coimbatore.
24. Abhinash Kumar Giri (2020). Exploring the microbes associated with different fermented foods pan India. School of applied Science REVA University, Bangalore. Under CSIR-Summer Research Training Programme (ONLINE).
25. Meena chandran (2020). Glycoside hydrolases from Microbial Sources. Under CSIR-Summer Research Training Programme (ONLINE).

Students who have worked earlier in funded projects

1. **Ms. Ramadevi Mutra** (Project Fellow) in NanoSHE, BSC project
2. **Ms. Preeti Tripathi** (Project JRF) in SERB Project
3. **Ms. Ashwini BS** (Project JRF) in SERB Project
4. **Ms. Elaveniya E** (Project Fellow) in Agropathy, BSC Project
5. **Ms. Juby Elsa Joseph** (Project Assistant) in NanoSHE, BSC project
6. **Ms. Subhashini,** JRF in DBT funded project

Prospective Ph.D. students: New students (having national level fellowship) interested in joining my laboratory can contact with their brief CV. The admissions to Ph.D. course under AcSIR happen twice a year (Jan and Aug sessions).

Prospective post-doctoral fellows: Please send your detailed CV having information about your PhD, publications and research interests. The applications for exploring post-doctoral opportunities under various schemes can be forwarded after due discussion

Funding sources

भारतीय आयुर्विज्ञान अनुसंधान परिषद

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