Personal Data:

Name: Dr. Nutan C. Mhetras

Qualifications/Academics: Ph. D in Microbiology.(National Chemical Laboratory)

Email id: dr.nutan.c.mhetras@gmail.com

Membership of Professional societies: Life member of Association of Microbiologists of India (AMI).

Areas of Work/Knowledge:

- Microbiology, Biotechnology, Biochemistry, Enzymology
- Bioprocess Engineering, Industrial microbiology, Fermentation technology

Profile Summary:

- Three year teaching experience in the area of Microbiology, Biotechnology, Bioprocess engineering biochemistry and Fifteen years research experience in protein purification /proteomics, bio-fuel, Enzymology, lignocellulosic conversion to value added products.
- Worked on the 5 major projects sponsored by Government bodies (DBT,CSIR, NCL)

Major Achievements:

- US patent award for the development of the process for the preparation of acidic lipase.
- Total number of Publications: 17.
- Total number of patent : 3 (One US and two Indian)
- Developed low-cost cellulase, lipase-producing strain/process to allow the laboratory to be a leader in the cellulase business. Developed improved Lactic acid strains producing L-lactic acid.
- Indian patent filed for the development of the process for A self-healing bacterial Concrete Composition.
- Different enzymes like lipase, xylanase, β-glucosidase, β-xylosidase have been purified, Characterized, and studied for its application.
- Reviewer for journals such as Biofuels (Future Science Group).

Teaching experience:

Three years teaching experience as faculty and research associate at Symbiosis School of Biological Sciences, Symbiosis International University, Pune. Teaching was conducted for **M.Sc. biotechnology** and **M.Sc. Nutrition and dietetics.**

Highlights of works:

- To improve the teaching, different faculty development programme arranged by university were attended and those methodologies were used in teaching.
- Participated in 'Andragogy and research methodology' ten days workshop arranged by university.
- Always preferred to use modern and advanced tools for the teaching so that students will able to understand the concept in depth.
- Utilized creative and productive learning techniques.
- Encouraged students for the research and developed their interest towards research.
- Strong believes on learning through the experiments/practicals.
- Sound knowledge of microbiology and biotechnology.
- Passion for research and teaching.
- Ability to secure the external fund for research.
- Equally capable of working independently and as an adaptable team member

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Experimental Skills and Proficiency Levels related to research

- Purification of enzymes/proteins by different chromatographic techniques like ion exchange affinity chromatography and size exclusion chromatography, hydrophobic ion-exchange chromatography.
- Native and SDS gel electrophoresis, isoelectric focusing, western blotting.
- 2D-gel electrophoresis and MALDI-TOF mass spectroscopy analysis of proteins.
- Techniques involved in molecular biology such as DNA/plasmid isolation from fungi, bacteria, and yeast, Real-time PCR, primer design, product purification, and DNA sequencing, agarose gel electrophoresis.
- Large-scale production of enzymes/secondary metabolites by 2L, 5L, and 10L fermenter.
- Developed the expertise in shake flasks fermentation and scale up to bench-scale to achieve higher productivity.
- Analysis of esters, sugar, amino acids, and proteins by HPLC and GC.
- Techniques involved in immunology such as ELISA, immuno-electrophoresis, radioimmunoassay.

Industrial training and Dissertation

Two-month training in Hindustan Antibiotics, Pimpri under the guidance of Dr. S.R. Naik (Head of the Research and Development section) on the topic "Qualitative and quantitativeestimation of Protease from *Streptoverticillium* sp."

A project was carried out for completion of M.Sc. degree entitled "Mutagenesis of *Aureobasidium pullulans*." under the guidance of Prof. R. L. Deopurkar (Department of Microbiology, Pune University.)

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Research Experience Overview:

Over 13 year's multidisciplinary research experience worked on various industrially important and applied projects. Details of the research experience and expertise related to each project is as follows.

Designation	Name of the project	Place where work conducted/ Name of Sponsored National body	Duration
Principal investigator and Faculty	Biodiesel production by using lipase from <i>Aspergillus niger</i> from non-edible oil	SSBS/Symbiosis International University, Pune	August 2018- August 2021
Research Associate	Bioconversion of lignocellulosic biomass to value added fine chemicals	National Chemical Laboratory/ CSIR, Pune India	Feb 2013- Sept 2017
Research Associate	Bio-production of lichen metabolites and their cardiovascular-protective, antitumor antimicrobial, antioxidant activities in vitro		April 2008-Nov 2010
Research Scholar	Lipase catalyzed Bioconversion of fusel oi to amyl acetate	National Chemical Laboratory/ DBT, India	May 2003- May 2006
Project Assistant-II	Lactic acid production by mutant of Lactic acid bacteria	National Chemical Laboratory/Cargill and Dow polymer, USA	June 2000- April 2003

National/International symposium attended/ Paper presented at Symposia

 "National conference on harnessing microbial wealth for start-ups in life sciences", held during 29-31th Jan 2020 organized by Savitribai Phule Pune University in collaboration with Association of Microbiologists of India.

2) International conference on the molecular basis of diseases and therapeutics (ICMBT-2019) held during 8-10th 20 March 19 organized by Central University of Rajasthan.

3) The Golden Jubilee Conference of the Association of Microbiologists of India attended which was held on 15-18th December 2009 in National Chemical Laboratory, Pune.

4) "Recent trend in Proteomics" participated in the symposium which was held in the National Chemical Laboratory.

5) Paper presented entitled "Purification and characterization of acidic lipase from *Aspergillus niger* NCIM 1207" in National conference on recent trend and strategic development in biosciences (2009) arranged by SSPU.

6) Paper presented entitled "Cardiovascular –protective and antimicrobial activity of a lichen species *Usnea complanata*" in National seminar on Fungal biodiversity and Bioprospecting in the age of global warming and 36th annual meeting of the mycological society of India, (2009), in Goa University.

Workshop attended /arranged:

'Andragogy and research methodology' ten days workshop arranged by STLRC (Symbiosis university).

'Application of mass spectrometry' fifteen days workshop arranged by National Chemical Laboratory, CSIR, India. Which involves extensive training on MALDI- TOF, Orbi-TOF, Q-TOF.

Workshops for online tool for teaching such as MS team, Pad let, Google meet, Google classroom were attended. So well versed with offline as well as online mode of teaching.

A) Patents:

Nutan D. Mahadik, Ulka S. Puntambekar, Kulbhushan B. Bastawde, Jayant M. Khire, Digambar V. Gokhale (2003). Process for preparation of acidic lipase. US Patent 6,534,303

Mahadik, N.D., Bastawde, K.B., Puntambekar, U.S., Khire, J.M. & Gokhale, D.V. (2004). An improved process for the preparation of acidic lipase. Indian Patent No. 192348.

B) Publications

- Nutan D. Mahadik, Ulka S. Puntambekar, Kulbhushan B. Bastawde, Jayant M. Khire, Digambar V. Gokhale (2002). Production of acidic lipase by *Aspergillus niger* in solid- state Fermentation. Process Biochemistry 38:715-721.
- 2. Nutan D. Mahadik, Ulka S. Puntambekar, Kulbhushan B. Bastawde, Jayant M. Khire, Digambar V. Gokhale (2004). Production of acidic lipase by a mutant of *Aspergillusniger* NCIM 1207 in submerged fermentation. Process Biochemistry 39:2031-2034.
- **3.** K. D. Trimukhe, Nutan D. Mahadik, Digambar V. Gokhale, Anjani J. Varma (2008). Environment-friendly cross-linked chitosan as a matrix for selective adsorption and purification of lipase of *Aspergillus niger*. International Journal of Biological Macromolecules 43:422-425.
- **4.** Nutan C. Mhetras (Nutan D. Mahadik), Kulbhushan B. Bastawde, Digambar V. Gokhale. Purification and characterization of acidic lipase from *Aspergillus niger* NCIM 1207. (2009) Bioresource Technology. 100:1486-1490.
- Nutan C. Mhetras (Nutan D. Mahadik) Sonal Patil, Digambar Gokhale (2010) Lipase of Aspergillus niger NCIM 1207: A Potential Biocatalyst for Synthesis of Isoamyl Acetate. Indian J Microbiol 50(4):432–437.
- Nutan D. Mahadik, Mangesh V. Morey, Bhaskar C. Behera, Urmila V. Makhija & Dattatraya G. Naik.(2011) Cardiovascular-protective, antioxidative, and antimicrobial properties of the natural thallus of lichen *Usnea complanata*. Latin American Journal of Pharmacy. 30 (2): 220-228. Citation: 11
- **7.** Behera B. Bhaskar. Nutan D. Mahadik and Mangesh Morey. Antioxidative and cardiovascular protective activities of metabolite usnic acid and psoromic acid produced by lichen species *Usnea complanata*. Pharmaceutical Biology. 2012 Aug; 50(8):968-79
- 8. Nutan Mhetras. Susan Liddell, Digamber Gokhale. Purification and characterization of an extracellular β -xylosidase from *Pseudozyma hubeiensis* NCIM 3574 (PhXyl), an unexplored yeast. AMB express .2016(6):73
- 9. Nagraj, A.K., Mhetras, N.C., Liddell, S. and Gokhale, D.V. Purification and characterization of βglucosidase from *Penicillium janthinellum* mutant EU2D-21. Current Biotechnology. 2017(6).
- 10. Nutan Mhetras and Digambar Gokhale (2018). Pseudozyma hubeinsis: Unexplored yeast: it's potential in biomass conversion to value added products. Review: Journal of Bacteriology and mycology (6) 2.

- 11. Mhetras, N., Ma-pre, V. and Gokhale, D. (2019) Xylooligasaccharide (XOS) as Emerging Prebiotics: It's Production from Lignocellulosic Material. Advances in Microbiology,9,14-20. Citation:15
- Mhetras, N., Mapare, V. and Gokhale, D. (2019) Production of Xylanase and β-Xylosidase Enzymes by Pseudozyma hubeiensis in Solid State Fermentation. Advances in Microbiology, 9, 467-478.
- 13. Nutan Mhetras, Mapare, V. and Gokhale, D. (2021) Cold active lipase: A catalytic tool for green chemistry. Applied Biochemistry and Biotechnology.193:2245-2266 IF:2.78 Citation :5
- 14. **Book Chapter**: Selvan Ravidran, Pooja Singh, Sanjay Nene, Vinay Rale, Nutan Mhetras and Anuradha Vaidya. (2019) Micro bioreactors and perfusion bioreactors for microbial and mammalian cell culture. Book: Bioengineering Publisher: Intechopen