

DR. MUHAMMAD FERHAN

GREEN BIOTECHNOLOGIST

Assistant Professor &

HEC Approved Supervisor for PhDs

Incharge, Lignin Valorization & Nanomaterials (LVN) Lab,
Centre for Applied Molecular Biology (CAMB),
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https://www.linkedin.com/profile/view?id=74570082&trk=nav_responsive_tab_profile_pic

<http://pu.edu.pk/faculty/description/1819/Dr-Muhammad-Ferhan.html>

OBJECTIVE: I completed PhD in Green Chemistry / Lignocellulosic Green Biotechnology / Industrial Microbiology by Oct/Nov, 2015 from CBBP, Faculty of Forestry, University of Toronto, Canada where I updated my knowledge and skills that would enable me to learn about the ever-evolve technology to get target goals.

SUMMARY OF QUALIFICATIONS

- Excellent organizational and problem solving skills
- Proficient in using various Analytical, Microbial and Molecular biological techniques
- Highly motivated and curious to learn latest cutting edge technologies
- Proven ability to reach goals
- Exceptional communication and interpersonal skills
- Attention to detail and precision, solid work ethics concerning meeting deadlines and reliability
- Supportive team worker with positive attitude, committed and responsible

Research Techniques: DNA/RNA extraction, Gel Electrophoresis, Isoelectric focusing, PCR, Mutation detection, PAGE, Spectrophotometer, i.e; UV/Vis, IR spectrophotometer, Chromatographic Techniques: i.e. Paper Chromatography, Column Chromatography & TLC, Gas Chromatography GC-ECD, HPLC, SEC, FPLC, FTIR, Organic Elemental Analyzer (CHNS/O), Fermentor studies, Affinity GSTrap Affinity Column Chromatography, Anion Exchange Low Pressure Liquid Chromatography, Silver Staining, MALDI-TOF-MS, Q-NMR, Co-Rotation twin screw extruder.

TECHNICAL SKILLS:

Operating Systems, Quality Assurance, Supervisory Skills, Data Interpretation and Report Writing, Calibration and Maintenance of Instruments

Citizenship: Dual Citizen (Canada, Pakistan) and **Canadian Passport Holder**

Awards achieving during my PhD: Ontario Graduate Scholarship (OGS) and Queen Elizabeth II-Graduate Scholarship in Science and Technology (QEII-GSST)

EDUCATION:

PhD (LGB / Bio-Analytical Microbial Sciences) 2011-2015 University of Toronto, ON, Canada.
M.Phil (Molecular Biology/Biotechnology) CEMB, University of the Punjab, Lahore, Pakistan.

M.Sc (Analytical Chemistry) Bahauddin Zakariya University (BZU), Multan, Pakistan.
B.Sc (Chemistry & Biological Sciences) Government College University, Lahore, Pakistan.

This qualification is equivalent to the **Master of Science degree in Molecular Biology from a Canadian University, with high distinction**. Issued by **University of Toronto**, Comparative Education Service (Foreign Credentials, Canadian Explanations Ref: 24416)

Associate Editor of: *Adv in Biotechnol & Microbiol.*
<https://juniperpublishers.com/aibm/editorialboard.php#712>

PROFESSIONAL EXPERIENCE

Assistant Professor (on contract under IPFP) June 20, 2016-June 19, 2017
Assistant Professor (on contract) Aug 31, 2017-Update

Centre for Applied Molecular Biology (CAMB), Punjab University, Lahore, Pakistan.

The assigned duties and key responsibilities are:

Postgrad (Biotechnology) courses teaching
Marking assignments and papers
Prepare materials for submission to granting agencies and foundations
Keep record all experimental data
Manage and respond to project related emails
Supervise postgraduate students working on the related research project
Attend project meetings
Attend area seminars and other meetings as necessary
Prepare research articles, progress reports, and presentations
Monitor the project budget

PhD Scholar Sep 2011-Oct/Nov 2015

CBBP, Faculty of Forestry, University of Toronto, Toronto, ON, Canada

I completed PhD in Green Chemistry / Lignocellulosic Green Biotechnology / Industrial Microbiology by Oct/Nov, 2015 from CBBP, Faculty of Forestry, University of Toronto under the supervision of Profs. Mohini Sain and Ning Yan.

International Research Exchange Program (Canada/Brazil) May 2012-Sep 2012

UNESP, Botucatu; EMBRAPA, Jaguariuna; UNICAMP, Campinas, Brazil.

I was being selected to work as an international exchange researcher funded by CAPES and DFAIT during my PhD program. I did research in Brazil, related to my PhD project in three reputed research institutes i.e., Unesp, Botucatu; Embrapa, Jaguariuna; and Unicamp, Campinas.

Research Assistant Jan 2010-Oct 2010

Ryerson University, Toronto, ON, Canada

I worked as Research Assistant in the field of Bioprocess Engineering / Bio-nanotechnology. I am also involved in the maintenance of lab, ordering of chemicals and instruments, helping graduate students and try to resolve their problems and peer reviewed of research articles. Recently, I also wrote a one research article and trying to submit soon for publication in any peer reviewed journal. I also used (HPLC; Perkin Elmer) with an ion exchange column (Aminex HPX-87H, Biorad, Hercules, USA), and a Refractive Index Detector (HP1047A, Hewlett Packard) for qualitative and quantitative analysis of intermediate metabolites based on t_r values, peak heights and widths.

Researcher

Sep 2009- Dec 2009

York University (Department of Biology) Toronto, ON, Canada

Joined YU in Fall Term 2009 where I assigned TA-ship to teach a course BIO1010 (3hr-lab demonstration, helping students, invigilation, checking assignments and marking) while re-search focus on mammalian cell lines C2C12 and Cos7 cells, transfect cells with DNA, protein extraction and ran western blots in Dr John C. McDermott's Lab.

➤ Researcher

July 2007–Mar 2008

University of Waterloo (Department of Chemical Engineering) Waterloo, ON, Canada

Production and purification of human therapeutic protein hCD83ext from *E. coli*. It's a collaborative research project between three well reputed research organization and US pharmaceutical company Argos Therapeutics. Low Pressure Liquid Chromatography (LPLC) (Pharmacia, GE healthcare) is a form of liquid chromatography used for the separation or purification of proteins / biomolecules from the complex mixtures. GST affinity chromatographic column used to separate the GST moiety from the target protein. GSTrap FF column (GE Healthcare) was used as a suitable GST affinity chromatographic column for conducting on-column cleavage of GST fusion proteins.

➤ Scientific Officer / Jr. Scientist

Feb 2003–May 2007

National Institute for Biotechnology & Genetic Engineering (NIBGE), Faisalabad, Pakistan

Improvement of microbial strains for hyper production of industrial enzymes (invertases, α - and β -galactosidase), acids (citric acid, lactic acid) and biofuel (ethanol). In addition, also used HPLC for the qualitative and quantitative estimation of intermediate metabolites and product analysis based on t_r values, peak heights and widths by using the turbochrom software. I used the similar model of HPLC (Perkin Elmer, USA), column (Aminex HPX-87H, Biorad) and Refractive Index detector which I already mentioned above. For protein purification used Fast Protein Liquid Chromatography (FPLC, Pharmacia) by using different ion exchange columns i.e., Mono Q, Superose 6, Q-Sepharose.

➤ Chemist in QA Department in Pharmaceutics

May 2002-Jan 2003

Schazoo Pharmaceutical Industry (Pvt.) Limited Lahore, Pakistan

Worked as Chemist in above-mentioned pharmaceutical company

➤ Research Scholar

Mar 2001-Apr 2002

National Centre of Excellence in Molecular Biology (CEMB), University of the Punjab, Lahore, Pakistan

Biodegradation and Phytoremediation of pharmaceutical industrial pollutants by using different analytical, microbial and molecular biological techniques.

TAUGHT COURSES

PhD Courses: Green Process Chemistry, Adhesion Sciences and Applications, Environmental Analysis and Risk Management, Bioenergy and Biorefinery Technology, Forest Management Decision Support Systems, Research Methods in Forestry, Graduate Seminar, Research/Thesis

M. Phil Courses: General Molecular Biology, General Virology, Recombinant DNA Techniques, Bio-Statistics & Bioinformatics, Instrumentation, Toxicology, Molecular Immunology, Gene Regulation and Expression

M. Sc Courses: Physical Chemistry, Inorganic Chemistry, Organic Chemistry, Mathematics (Major Sub): **Analytical Chemistry** (Minor Sub): Inorganic Chemistry

Title of M.Phil Theses Supervising by Dr. Ferhan

1- Biological and chemical modifications of lignin using formic acid and acetic acid producing fungal strains for characterization of lignopolyphenols and lignoaromatics. Rehman Javaid (M.Phil Student, Zoology Department, PU, Lahore)

2- Improvement of fungal strains for hyperproduction of ligninases. Aqsa Sabir (M.Phil Student, Biochemistry Department, University of Sargodha)

English Language Proficiency Test

York English Language Test (YELT)
(Evaluation of English proficiency for Academic purposes)

Part 1 Part 2
(Written) (Oral)
Overall **Band 4**

❖ Language of Instruction, Examinations and Corresponding throughout my studies was in English.

PUBLICATIONS / CITATIONS:

1- Ferhan M (2017) Coordination complexes with lignin-based nanoparticles in targeted drug controlled release and their molecular expression in cell lines. *Nov Appro Drug Des Dev* 1(2): 555559.

2- M.Ferhan (2016) A Review on Bark Valorization for Bio- based Polyphenolic and Polyaromatic Compounds. *J.Biochem Biotechnol Biomat.* 1(1):1-15, 2016

3- M. Ferhan and Y. Dahman **(2016)** Novel thermostable clostridial strains through protoplast fusion for enhanced biobutanol production at higher temperature—preliminary study. *AIMS Energ* 4(1): 22-36. DOI: 10.3934/energy.2016.1.22

4- M. Ferhan, N. Yan and M. Sain **(2015)** Bark depolymerization during submerged fermentation using monofloral honey, a natural mediator substitute, and integration between laccases vs. bark biopolymers, characterized by Py-GC-MS. *RSC Adv*: 14937–14952. DOI: 10.1039/C4RA13841D Published online: Dec 12, 2014. **IF=3.289**

5- M. Ferhan, N. Tanguy, N. Yan and M. Sain **(2014)** Comparison of enzymatic, alkaline and UV/H₂O₂ treatments for extraction of beetle infested lodgepole pine (BILP) and aspen bark polyphenolic extractives. *ACS Sustainable Chem. Eng.* 2: 165–172. DOI: 10.1021/SC400184f Published online: October 22, 2013. **IF=5.267**

6- Ferhan M, Yan N and Sain M **(2013)** A new method for demethylation of lignin from woody biomass using biophysical methods. *J Chem Eng Process Technol.* 4: 160 DOI:10.4172/2157-7048.1000160. **IF=1.71**

7- M. Ferhan, S. N. Santos **(2013)** Identification of a potential fungal species by 18S rDNA for ligninases production. *World J Microbiol Biotechnol.* 29, 12: 2437-2440. **IF=1.532**

8- Ferhan M, Alcides LL, de Melo IS, Yan N, Sain M **(2012)** Ligninases Production and Partial Purification of MnP from Brazilian Fungal Isolate in Submerged Fermentation. *Fermentat Technol* 2012, 1:106 doi: 10.4172/2167-7972.1000106. **IF=1.666**

9- Z. Iqbal, A. Aleem, A.H. Tahir, T.J.Gill, A.S.Taj, A.Qayyum, N. Rehman, **M. Ferhan et al. (2011)** Detection of BCR-ABL kinase domain mutations in CD34 cells from newly diagnosed chronic phase CML patients and their association with Imatinib resistance. *Nature Precedings*: hdl:10101/npre.2011.6645.1:Posted 23 Nov 2011

10- Z. Iqbal; A. Tanveer; S.M.Baig; Z. Aziz; M.Iqbal; **M. Ferhan**; *et al.* (2010) Presence of Prior-to-treatment BCR-ABL Mutations in CD34+CD38- Stem Cells of Newly Diagnosed Chronic Phase Untreated CML Patients and Their Correlation with Imatinib Resistance: Implications of Cancer Pharmacogenomics and Pre-Therapeutic Genetic Testing in Personalized Treatment of BCR-ABL+ Leukemia). *Blood*. 116, 2278. **IF=11.841**

Z. Iqbal- A. Tanveer, M. Iqbal, **M. Ferhan**, *et al.* (2009) First comprehensive report of strong interplay of genetic and environmental factors as well as high degree of ethnic and geographical variations in biology of Leukemia as manifested by frequencies of common fusion oncogenes of prognostic significance associated with different Leukemic subtypes in Pakistani population. In: Proceedings of AACR (*American Association for Cancer Research*) Annual meeting 2009, Denver, Colorado, USA on April 18-22, 2009

Z. Iqbal^{1,2*}, A. Tanveer¹, M. Iqbal³, **M. Ferhan**^{4,5}, *et al.* (2008) BCR-ABL kinase domain mutations are present in a considerable number of CML patients before treatment and lead to resistance after initiation of Imatinib therapy: First large scale study on role of naturally-occurring BCR-ABL mutants in Imatinib resistance. . In: Proceedings of AACR (*American Association for Cancer Research*) Annual meeting 2008, Denver, Colorado.

11- Muhammad Ferhan^{*1}, Muhammad Siddique Awan³, and Tanveer Akhtar² (2008) Solid State Fermentation Supported Enhanced Production of α -Galactosidase and Themostabilized the Production Process. International Biopharmaceutical Association *Online publication in IBPA Career Newsletter - May 2008*

12- Rajoka MI, **Ferhan M**, Khalid AM (2005) Kinetics and thermodynamics of ethanol production by a thermotolerant mutant of *Saccharomyces cerevisiae* in a microprocessor-controlled bioreactor. *Let Appl Microbiol.* 40(5): 316-321. **IF=1.579**

13- Muhammad Ferhan (2003) Biodegradation of trichloroethylene (TCE) in the presence of phenolic compound. *J. Biological Sci.* 3(11): 973-983.

14- Muhammad Ferhan, Zahoor Ahmed, S. Riazuddin, M.I. Rajoka and A.M. Khalid (2002) Estimation and Removal of Phenol in Pharmaceutical Industrial Effluents from Paracetamol and Aspirin Manufacturing Units. *Online J. Biological Sci.* 2(9): 587-590.

Total Impact Factor (2017) = 26.884

ABSTRACT ACCEPTED IN INTERNATIONAL CONFERENCES / SYMPOSIUM AND PRESENTATION ATTENDED

M.Ferhan^{*1}, M. I. Rajoka¹ and A. M. Khalid¹.Semi-pilot scale production of Invertases by a derepressed mutant of *Saccharomyces cerevisiae* in a continuously stirred tank reactor under alcohol production conditions. (Accepted oral presentation & Invited as a **Principal Speaker** in **International Conference on Enzyme Technology RELATENZ 2005** which will be held in **Varadero, Cuba from September 20-23, 2005**)

Muhammad Ferhan Enhanced production of ethanol by a depressed mutant of *Saccharomyces cerevisiae* in a semi-pilot scale process. (Accepted oral presentation & **invited speaker** in **international USDA conference Bioenergy - I: From Concept to Commercial Processes**" Tomar, Portugal from March 5-10, 2006)

Muhammad Ferhan^{*1}, Munaza Afzal², & M.I. Rajoka¹. Semi-pilot scale production of citric acid by a 2-deoxy-D-glucose-and aspartate-resistant mutant derivative of *Aspergillus niger* using molasses based medium. (Accepted and published in the booklet of page 51 in **1st International Conference on "Biotechnology and Informatics"** Balochistan University of Information technology & Management Sciences (BUIIMS), Quetta, Pakistan from April 10-12, 2006)

Muhammad Ferhan^{1*}, Nazim Hussain¹, M.I.Rajoka¹ Optimization of cultural conditions on biosynthesis of glucose oxidase in a 23-L computerized controlled bioreactor by citric acid producing mycelia of *As-*

pergillus niger. (Abstract accepted in 56th Annual conference of Canadian Society of Microbiologists **CSM-GSC**, University of Western Ontario, London, Ontario, **Canada** from June 18-21, 2006)

M. Ferhan^{1*} M. Siddique Awan² and M. I. Rajoka¹ Strain improvement by random mutation for enhanced production of β -fructo-furanosidase by a derepressed mutant of *S. cerevisiae* in a 23-L computerized controlled fermentor under ethanol production conditions (Abstract accepted in Engineering Conferences International **ECI "Metabolic Engineering VI: From rec DNA towards Engineering Biological Systems"** NH Leeuwenhorst, Noordwijkerhout, **The Netherlands** from October 1-5, 2006)

M. Siddique Awan ^{1*}, **M. Ferhan**¹, Najma Ayub² Enhanced production of β -Galactosidase by catabolite DG^r mutant of *Aspergillus niger* by using agro-industrial wastes for preparation of lactose free milk (Accepted in 56th Annual conference of Canadian Society of Microbiologists **CSM-GSC**, University of Western Ontario, London, Ontario, **Canada** from June 18-21, 2006)

Muhammad Ferhan^{*1}, M. Siddique Awan*, M. Zahid Yasin*, N.Ayub**, & M.I.Rajoka* Biosynthesis of alpha-galactosidase by using agro-industrial wastes and concomitant production of invertase by derepressed mutant of *Aspergillus niger* under controlled conditions (Abstract accepted in **The World Congress on Industrial Biotechnology and Bioprocessing Linking Biotechnology, Chemistry and Agriculture to Create New Value Chains**, Toronto, Canada from July 11-14, 2006)

Muhammad Ferhan^{*1}, M. Siddique Awan*, M. Hamid Rashid*, & M.I.Rajoka* Lactase of *Aspergillus niger*: Production, purification, and characterization of the enzyme by (Abstract accepted for oral presentation and invited as principal speaker & also selected as president of posters evaluation committee **III-International Symposium on Biochemistry and Molecular Biology & the 6th International Congress on Chemistry and Chemical Engineering**, will be held at the Havana International Conference Center in Havana City, Cuba, from October 16th to 20th, 2006)

M.Ferhan and M.I.Rajoka Enhanced production of ethanol by a de-repressed mutant of *Saccharomyces cerevisiae* in a semi-pilot scale process (Accepted in National symposium on **"Biotechnology for Economic Prosperity"** in July 24-27, 2006 will be held in Nathiagali organized by National Commission on Biotechnology **NCB-MoST**)

Munnaza Afzal, **Muhammad Ferhan**, & M.I. Rajoka Semi scale production of citric acid by *Aspergillus niger* variant with genotype dgr⁻¹, cit⁻¹ using hydrol based medium in a stirred fermentor (Accepted in **National symposium on "Biotechnology for Economic Prosperity"** in July 24-26, 2006 will be held in Nathiagali organized by National Commission on Biotechnology **NCB-MoST**)

M. Siddique Awan ^{1*}, **M. Ferhan**¹, Najma Ayub², M.I.Rajoka¹ Kinetic studies of DG^r mutant of *Aspergillus niger* for enhanced production of β -Galactosidase by using agro-industrial wastes for preparation of lactose free milk (Accepted in National symposium on **"Biotechnology for Economic Prosperity"** in July 24-26, 2006 will be held in Nathiagali organized by National Commission on Biotechnology **NCB-MoST**)

Attend and participated in conference of the Agricultural Biorefinery Innovation Network (**ABIN**) for Green Energy, Fuels & Chemicals (**March 14-16, 2010**) Ivey Spencer Leadership Centre London, ON, Canada where I present **"Production of Bacterial Cellulose Nanofibers using Agricultural waste as Feedstock"**. This conference hosted by the Institute for Chemicals & Fuels from Alternative Resources, The University of Western Ontario, London, ON, Canada.

Attend the **7th Bi-Annual Ontario BioCar Initiative Research Meeting and Advisory Panel Meeting** held on dated (**June 3, 2011**) at the University of Toronto, Faculty Club – Main Dining Room, 41 Willcocks Street, Toronto, ON, Canada.

MEMBERSHIP OF ACADEMIC AND LEARNING SOCIETIES: **PAPTAC** - Pulp and Paper Technical Association of Canada.

Being an active member of "Environment Protection Society" in Government College, Lahore

COMPUTER COURSES ATTENDED:

CCS from Royal Institute of Computer Sciences Lahore DOS and proficient in working with Windows, MS Word, Excel, Power Point, Flash 5 and Biological software e.g. PCGENE, DNA STAR, and GENE RUNNER.

CONGRESS, SYMPOSIA ATTENDED:

Attend the first national symposium on "Biotechnology for Sustainable development" Nov 24-25, 1997 pp-83, organized by Botany Department Government College, Lahore & Biotech Society of Pakistan.

Attended symposium on "Molecular Biology Approach to Diagnostics & Prevention of Genetic Diseases" held at Centre for Advanced Molecular Biology, Punjab University, Lahore on Feb 4, 2000.

Attended symposium on "Third International Biennial Conference of Pakistan Society for Microbiology" with the collaboration CEMB, Punjab University, Lahore held at PC Hotel Lahore on March 28th to 30th, 2000.

Attended the 7th International conference on Trends in "Biochemistry and Molecular Biology" held at Institute of Biochemistry and Biotechnology, University of the Punjab, Lahore on April 2-5, 2003.

Attended the 4th International & 14th national Chemistry Conference held at PCSIR Laboratory Complex, Lahore, Pakistan on May 16-18, 2004.

Attended "First National Conference on Industrial & Environmental Biotechnology" on 29-30 September 2004, Islamabad organized by National Commission on Biotechnology. The title of abstracts are:

I. M.I.Rajoka, M. Siddique Awan, and **M.Ferhan** Genetic Manipulation of *Aspergillus niger* for Enhanced Production of β -Galactosidase for Preparation of Lactose-free Milk

II. M.I.Rajoka, M. Mubashir, and **M.Ferhan** Development of *Aspergillus niger* variant through genetic engineering for Industrial production of citric acid through fermentation of molasses

Attended the Eleventh seminar on "Quality Management and its significance in the present scenario" held at NIBGE, Faisalabad on September 22, 2005.

Attended the Fourth seminar on an "Introduction to ISO 17025 Laboratory Management Standards" held at NIBGE, Faisalabad on November 29, 2005.

Attended "18th FAOBMB Symposium Genomics and Proteomics in Health & Agriculture" on 20-23 November 2005, Lahore organized by Pakistan Society for Biochemistry and Molecular Biology, University of the Punjab, Lahore-54590, Pakistan. The title of abstract is:

M.I.Rajoka, **M.Ferhan**, Munazza Afzal & F. Latif Regulation of enzyme synthesis: a kinetic approach

Attended workshop on "**Biochemical Engineering and Fermentor Applications**" held on Saturday, 19th August 2006 at Institute of Biochemistry and Biotechnology P.U. Lahore. This is the joined venture of IBB, P.U. Lahore & Bioengineering Switzerland.

Attend and participated in International symposium on "**Nano-Chemistry: Chemistry, Biochemistry, Molecular Biology & Bioinformatics of Enzymes**" held on 20-21st September 2006 at School of

Biological Sciences University of the Punjab, New Campus, Lahore. This event sponsored by Pakistan Academy of Sciences.

Attend and participated in International training course (14-18 November 2006) and symposium (19-21 November 2006) on “**Characterization and Management of Emerging Viral Diseases in the Developing World**” at National Institute for Biotechnology and Genetic Engineering (NIBGE), Faisalabad, Pakistan. Sponsored by ICGEB/PAEC/Comstech/HEC/PSF/MinFAL/MOST/NCB.

Poster presentation in NIBGE-COMSTECH (CPC) International workshop (Jan. 5-17, 2004).

REFERENCES:

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<http://www.chem-eng.utoronto.ca/faculty-staff/faculty-members/bradley-a-saville/>

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(Canada/Brazil Exchange Program Lab In-charge)**

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G. Nadeem Sheikh

Ph.D., Post doctorate (Germany), Post doctorate (Harvard, USA).

CWT Fellow (Imperial College, London)

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