

**AFAQ MOHAMED MOHAMED NIYAS**  
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## **OBJECTIVE**

To receive a doctoral degree applying my skills and enthusiasm in the field of life sciences, that would warrant opportunities to pursue postdoctoral research followed by careers in academia allowing me to become a leading scientist.

## **EDUCATION**

### **University of Colombo (Sri Lanka)**

BSc. (Hons) Biochemistry and Molecular Biology, 2012

Subjects: Biochemistry, Molecular Biology, and Chemistry

## **RESEARCH EXPERIENCE**

### **Research Scholar**

**2015 Feb- present**

Driftmier Engineering Center, University of Georgia (USA)

Identifying responsible enzyme/s for the dephosphorylation of glucose-6-phosphate in *E.coli*

Supervisor: Prof. Mark A. Eiteman, Ph.D.(UGA)

Task performed:

- One of the HAD phosphatase gene (*ybiV*) was cloned and expressed in an *E.coli* strain which couldn't consume glucose as major carbon source.
- Several HAD phosphatase and alkaline phosphatase genes (*ybiV*, *yidA*, *yigL*, *yniC*, *yfbT* & *phoA*) were knocked out separately and combined to study the effects of those enzymes in dephosphorylation.
- Modified condition of chemostat fermentations were conducted to improve the yield.
- Also working with undergraduate students in a different project which is identifying the transporter used by the levoglucosan in *E.coli*.

### **Research Assistant**

**2013 Jan -2014 July**

Dept. of Biochemistry and Molecular Biology, University of Colombo (Sri Lanka)

Cloning and expression of cellulase and xylanase genes of *Trichoderma* in a yeast system to develop synergistic saccharification and direct fermentation of cellulosic biomass to ethanol

Supervisor: Prof. W.S.S. Wijesundera (University of Colombo)

Prof. R. L. C. Wijesundera (University of Colombo)

Dr. N. V. Chandrasekharan (University of Colombo)

Task performed:

- *Trichoderma* isolate was cultured and total xylanase activity was assessed using xylan assay.
- Primer sets for endo xylanase and  $\beta$ -xylosidase genes were manually designed using the sequences of *Trichoderma sp* and *Aspergillus sp* respectively.
- Genomic DNA of *Trichoderma* and *Aspergillus* (endemic species) were extracted and amplified using PCR technique.
- Amplified respected sizes of DNA fragments were purified, ligated with TA cloning vector and transformed in *E.coli*.
- Cloned endo-1,4-D-xylanase and  $\beta$  xylosidase genes into yeast compatible expression vector pGAPZaA.

## **Research Assistant**

**2012 April- 2013 Jan**

B.C.R Trading Company (PVT) LTD, Rajagiriya, Colombo, Sri Lanka

Supervisor: Mr. T.N. Ranaweera (Managing Director, B.C.R.)  
Prof. R. L. C. Wijesundera (University of Colombo)  
Dr. N. V. Chandrasekharan (University of Colombo)

Project: A techno-economic feasibility research into producing bioethanol from rice straw.

- Analyzed activity of cellulase enzymes of the several endemic fungal species of Sri Lanka.
- Assessed efficiency of several straw pretreatment methods.
- Conducted a feasibility study of the algae biodiesel production in Sri Lanka.

## **Undergraduate Research Project**

**2011 Feb – 2012 Nov**

Dept. of Chemistry, University of Colombo (Sri Lanka)

Project: Cloning and expression of  $\beta$ -glucosidase gene from *Trichoderma asperellum* in yeast

Supervisors: Prof. W.S.S. Wijesundera (University of Colombo)  
Prof. R. L. C. Wijesundera (University of Colombo)  
Dr. N. V. Chandrasekharan (University of Colombo)

Task performed:

- Determined the activity of  $\beta$ -glucosidase (BGL) enzyme of *Trichoderma asperellum* using cellobiose assay.
- Forward and reverse primers were manually designed with restriction sites.
- The total RNA was extracted from fungal mycelia and cDNA was synthesized using reverse transcriptase.
- The cDNA encoding BGL gene was amplified via PCR. The expression vector pPICZ $\alpha$ A was prepared.

## **PUBLICATIONS**

- **Influence of Phosphatases and Phosphate on the Formation of Glucose from Pentoses in *Escherichia coli***

Afaq M. M. Niyas and Mark A. Eiteman (Manuscript under preparation.)

## **Abstracts**

- **Accumulation of D-Glucose from Pentoses by *Escherichia coli***  
65<sup>th</sup> annual meeting of SIMB (Society of Industrial Microbiology & Biotechnology), August, 2015
- **Characterization of the endo-1, 4-D-xylanase (EXN) gene of *Trichoderma virens* with a view to develop a hemicellulose utilizing recombinant yeast system**  
70<sup>th</sup> annual sessions of SLAAS (Sri Lanka Association for Advancement for Science), December, 2014
- **Cloning and characterization of 1, 4-B-D-glucosidase (BGL) gene from *Trichoderma* with a view to develop a recombinant yeast system for the conversion of cellulose to ethanol.**  
70<sup>th</sup> annual sessions of SLAAS (Sri Lanka Association for Advancement for Science), December, 2014
- **Cloning and characterization of a novel endo chitinase gene from *Trichoderma erinaceum*.**  
Proceedings of the 10th international mycological congress, Bangkok, Thailand. P 908. , August, 2014

## Sequence data

*Trichoderma virens* isolate EXN23 endo-1, 4-beta-xylanase (EXN) gene, partial cds, accession number KJ882380, NCBI (National Centre for Biotechnology Information) **data base**, May, 2014

## OTHER SKILLS AND EXPERIENCE:

### Technical skills:

#### Molecular Biology:

- DNA-isolation from cells/tissues using kits as well as traditional Phenol/Chloroform extraction
- Purification of the isolated DNA by RNase treatment
- RNA-isolation from cells/tissues/mycelia
- RNA column purification
- mRNA selection using oligo dT cellulose and magnetic beads
- Conventional PCR, colony PCR, touchdown PCR and RT-PCR
- Restriction enzyme digestion
- DNA dephosphorylation and subsequent purification using traditional Phenol/Chloroform extraction
- Extraction and purification of DNA from Agarose gels
- Preparation of competent and ultra-competent cells using *E.coli* DH5 $\alpha$  and *E.coli* TOP10 strains
- Recombinant DNA techniques including DNA ligation and transformation (*E.coli* & Yeast)
- Southern blot analysis using biotin labeled DNA probes
- Proficient in relevant microbiology techniques
- Proficient in using Bioinformatics resources and software (NCBI, UniProt and Bioedit etc.)
- Knocking-out *E.coli* genes

#### Biochemistry:

- Separation of proteins using SDS-PAGE
- Extraction and purification of proteins
- Determination of protein activity using biochemical assays (CMC assay, Filter Paper Assay and xylan assay).
- Enzyme kinetic assays and inhibition of enzyme activity
- Proficient in clinical biochemistry assays carried out using biological specimens
- Extraction of cell membranes
- Enzyme precipitation using Salting out and centrifugation.

#### Chemistry:

- Capable of dealing with conventional and instrumentation analytical chemistry techniques such as
  - Thin Layer Chromatography
  - High Pressure Liquid Chromatography
  - Gas chromatography–mass spectrometry
  - Volumetric titrations
  - Colorimetric analysis
  - Solvent extractions
- Good practical and theoretical knowledge in Inorganic, Physical and Organic chemistry
- Have used chemistry related software such as Gaussian, RasMol and ChemDraw etc.

#### Microbiology

- Shake flask experiments
- Growth rate analysis
- Fermentation (chemostat, batch)

#### Computer

- Knowledge of Microsoft Office, Internet, Java, PHP, MySQL and web developing.

## **PRESENTATIONS**

Production of glucose from xylose and L-arabinose (2015)

- Progress of project presented at Eiteman lab, University of Georgia, Athens, GA.

Cloning & expression of fungal  $\beta$ -xylosidase & endo-xylanase genes into a xylose fermenting recombinant yeast strain (2013)

- This seminar was conducted for the introduction of the project under the supervision of Prof. W.S.S. Wijesundera and it was mainly focused on the improved genome shuffling method.

Cloning and expression of  $\beta$ -glucosidase gene from *Trichoderma asperellum* in yeast (2012)

- Undergraduate research project presentation held under the supervision of Prof. W.S.S. Wijesundera. This presentation was focused on the methodology that was to be followed in my undergraduate research project.

Lab safety (2011)

- Conducted for the partial fulfillment of the course "Practical Chemistry IV" under the supervision of Prof. S, Hewage. This presentation was focused on how to take precautions in the laboratories.

## **PROFESSIONAL AFFILIATIONS**

Member at **Society of Industrial Microbiology and Biotechnology (SIMB)**

Participated **the annual meeting of society of industrial microbiology and biotechnology (SIMB) August 2-6 2015, Philadelphia**

Student Member at **Sri Lanka Association for Advancement for Science (SLAAS)**, *Incorporated by Act of Parliament No.11 of 1966; Founded in 1944*

## **ACTIVITIES AND INTERESTS**

1. Prefect of Al-Azhar Navodaya School, Mannar.
2. Prefect of Zahira National College, Puttalam
3. Member of under 19 School Cricket team.
4. Participated in inter school athletics (running 5000 m and 1500 m) and games (cricket, football and volleyball)

## **LANGUAGE**

Capability of communicating in English, Sinhala and Tamil languages.

## REFEREES

- Prof. Mark A. Eiteman, Ph.D.  
Professor of BioChemical Engineering and Microbiology  
Editor-in-Chief, Journal of Biological Engineering  
Driftmier Engineering Center  
University of Georgia  
Athens, GA 30602  
(706) 542-0833 tel  
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- Prof. W. S. Sulochana Wijesundera  
Professor in Biochemistry  
Dept. of Biochemistry and Molecular Biology  
Faculty of Medicine  
University of Colombo  
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sulochana@bmb.cmb.ac.lk
  
- Dr. N. V. Chandrasekharan, Ph.D.  
Senior Lecturer  
Department of Chemistry  
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Sri Lanka.  
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I declare that the above particulars given by me are true and accurate to the best of my knowledge.

Afaq Mohamed Mohamed Niyas