



## Curriculum Vitae

### Personal Details:

**Name:** Mohamad Hekarl Uzir.

**Office Address:** School of Chemical Engineering, Engineering Campus, Universiti Sains Malaysia, Seri Ampangan, 14300 Nibong Tebal, Penang, Malaysia.

**Specialisation:** Biocatalysis and biotransformation, fermentation, mathematical modelling of biological reactions, stability analysis (minor).

### Academic Qualifications:

<b>Degree/Role</b>	<b>Specialization</b>	<b>University / Institution</b>	<b>Year</b>
Associate Professor	Biochemical Engineering	School of Chemical Engineering, Universiti Sains Malaysia	2015-present
Senior Lecturer	Biochemical Engineering	School of Chemical Engineering, Universiti Sains Malaysia	2008-2015
Lecturer	Biochemical Engineering	School of Chemical Engineering, Universiti Sains Malaysia	2005-2008
PhD.	Biochemical Engineering	Advanced Centre for Biochemical Engineering, University College London, United Kingdom.	2005
MSc.	Advanced Chemical Engineering	Department of Chemical Engineering and Chemical Technology, Imperial College of Science, Technology and Medicine, London, United Kingdom.	2001
DIC. (Dip. of Imperial College)	Advanced Chemical Engineering	Department of Chemical Engineering and Chemical Technology, Imperial College of Science, Technology and Medicine, London, United Kingdom.	2001
BEng.(Hons.)	Chemical Engineering	Department of Chemical Engineering, University of Leeds, United Kingdom.	1999

## **Research Work:**

### **1) List of Grants and Projects:**

- (i) **Incentive Grant 2006**
- (ii) **Short Term Grant I (Completed)**: Production of Citronellol as an Artificial Flavour Using the Whole-Cell *Saccharomyces cerevisiae*: Design of a Continuous-Closed-Gas-Loop Bioreactor for Biotransformation (CCGLBB).  
**Co-researcher:** Assoc. Prof. Dr. Mashitah Mat Don.
- (iii) **Fundamental Research Grant Scheme (FRGS) I (Completed)**: On the Microbial Membrane Diffusion during a Whole-Cell Biotransformation: Cellular Investigation of the Reaction-Diffusion Phenomena and Simulation of the Cell-Substrate Interaction in a Bioreactor System.  
**Co-researcher:** Assoc. Prof. Dr. Mashitah Mat Don  
Assoc. Prof. Dr. Mohamad Zailani Abu Bakar  
Assoc. Prof. W. J. N. Fernando.
- (iv) **e-ScienceFund (MOSTI) I (Completed)**: A Coupled Enzyme-Catalysed Asymmetric Synthesis of Drug Precursors using a Novel Membrane Bioreactor for Biotransformation.  
**Co-researcher:** Prof. Azlina Harun@Kamaruddin  
Assoc. Prof. Dr. Mashitah Mat Don
- (v) **Short Term Grant II (Completed)**: A Stereospecific Biotransformation of Geraniol Forming Citronellol with the Whole-Cell *Saccharomyces cerevisiae*: Dynamic Modelling and Optimisation of the Reaction System.  
**Co-researcher:** Assoc. Prof. Dr. Mashitah Mat Don.
- (vi) **Research University Grant (Completed)**: Enhancing the Biocatalytic Performance of Stereospecific Biotransformation of Geraniol into Citronellol using Genetically Engineered Baker's Yeast Type-II, *Saccharomyces cerevisiae*.  
**Co-researcher:** Dr. Rashidah Abd Rahim  
Prof. Mohd Nazalan Mohd Najmuddin.
- (vii) **Short Term Grant III (Completed)**: Development of a Novel Pervaporation Bioreactor for Yeast-Mediated Stereospecific Reduction of *cis/trans*-3,7-dimethyl-2,6-octadiene-1-ol Racemic Mixture.  
**Co-researcher:** Assoc. Prof. Dr. Roslee Othman  
Prof. Azlina Harun@Kamaruddin.
- (viii) **MTDC Project Team Member (Completed)**: S-Ibuprofen Production Pilot Plant.  
**Main investigator:** Prof. Azlina Harun@Kamaruddin  
**Co-researcher:** Dr. Mohamad Hekarl Uzir  
Prof. Subhash Bhatia.

- (ix) **Long Term Research Grant Scheme, (LRGS-KPT) (Completed):** Biofuel Synthesis from Carbon Dioxide Using Anaerobic Bacteria.  
**Programme Head:** Professor Abdul Rahman Mohamed  
**Main investigator:** Prof Azlina Harun@Kamaruddin  
**Co-researcher:** Dr. Mohamad Hekarl Uzir
- (x) **Fundamental Research Grant Scheme, (FRGS-KPM) II (On-going):**  
 Quantification of the Reaction Mechanism Governing the Bi-Enzymatic Biotransformation of Baker's Yeast-Mediated Asymmetric Reduction of Chiral Compounds.  
**Main investigator:** Dr. Mohamad Hekarl Uzir  
**Co-researcher:** Professor Dr. Mohd Nazalan Mohd Najimuddin
- (xi) **e-ScienceFund (MOSTI) II (On-going):** Baker's Yeast Mediated Reduction of Regio-Isomeric Chloro-Aldehyde Forming a Precursor for the Synthesis of (1R,2R)-Tapentadol (3-(1R,2R)-3-(dimethylamino)-1-ethyl-2-methylpropyl phenol).  
**Main investigator:** Dr. Mohamad Hekarl Uzir  
**Co-researcher:** Professor Dr. Azlina Harun@Kamaruddin

## 2) Proceedings and Publications:

### Conference Proceedings:

- (i) **Mohamad H. Uzir and John. M. Woodley\***, "*Kinetic Study and Parameter Estimation of Enzyme-Catalysed Baeyer-Villiger Reaction*". 11<sup>th</sup> European Congress on Biotechnology (ECB11), (August 2003), Basel, Switzerland.
- (ii) **Mohamad H. Uzir, Steven R. Bishop and John M. Woodley\***, "*On the Stability of Biocatalytic Process: A Case Study on Enzyme-Catalysed Baeyer-Villiger Reaction*". BIOCAT2004, (August 2004), Hamburg, Germany.
- (iii) **Mohamad H. Uzir, Steven R. Bishop and John M. Woodley\***, "*Stability Study of Biocatalytic Reactions*". ESBES5, (September 2004), Stuttgart, Germany.
- (iv) Mohd Reza Mohd Radzi and **Mohamad Hekarl Uzir\***, (2007), *On the stability study of an exothermic biocatalytic reaction and its application in control systems*, World Engineering Congress, 2007, Penang, Malaysia.
- (v) Aimi Aishah Ariffin, Mashitah Mat Don, **Mohamad Hekarl Uzir\***, (2008), *Production of Flavour in a Continuous-Closed-Gas-Loop Bioreactor for Biotransformation*. SOMChe2008, Kuala Lumpur, Malaysia.
- (vi) Fatimatul Abas, **Mohamad Hekarl Uzir\***, Mohd Mohd Zahar, (2010), *Effect of pH on the Biotransformation of (R) -1- (4-Bromo-Phenyl) -Ethanol by Using Aspergillus niger as a Biocatalyst*. International Conference on Process Engineering and Advanced Materials, Kuala Lumpur Convention Centre, Kuala Lumpur, Malaysia.

- (vii) Mohd Rezuan M Aspar, Rashidah Abdul Rahim, **Mohamad Hekarl Uzir\***, (2010), *Cloning of Gene Encoding Yeast Alcohol Dehydrogenase 1 (YADH1) in Escherichia coli TOP10 for further use in Biocatalysis*. World Engineering Congress 2010, Kuching Sarawak, Malaysia.
- (viii) Sie-Yon Lau, Subhash Bhatia\*, **Mohamad Hekarl Uzir** and Azlina Harun Kamaruddin, (2010) *Enantioseparation of (R,S)-Ibuprofen Ester via Lipase-Catalysed Dynamic Kinetic Resolution in a Hollow Fibre Membrane Reactor*. The 13<sup>th</sup> APCChe 2010, Taipei, 5-8 October 2010.
- (ix) Nazira Mahmud, **Mohamad Hekarl Uzir\***, (2011), *Production of  $\alpha$ -Terpeniol from Citrus sinensis Peel Extract using Gluconobacter oxydans and Pseudomonas fluorescences*. ICCEIB-SOMChe2011, Universiti Malaysia Pahang, Pahang, Malaysia.
- (x) Lau Sie Yon, Azlina Harun@Kamaruddin, **Mohamad Hekarl Uzir\***, (2012), *Production of Optically Pure (S)-Ibuprofen Acid via Enzymatic Dynamic Kinetic Resolution in Hollow Fibre Membrane Reactor*. CHEMECA2012, Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand, 23-26 September 2012.
- (xi) Aimi Aishah Arifin, **Mohamad Hekarl Uzir\***, (2013), *Mathematical modeling and simulation of citronellol production mediated by Saccharomyces cerevisiae in a continuous-closed-gas-loop bioreactor (CCGLB)*. Proceeding of the 5<sup>th</sup> Regional Conference on Chemical Engineering, AUN/SEED NET, Pattaya Thailand, 7-8 February 2013.
- (xii) Siti Fatihah Salleh\*, Azlina Kamaruddin, **Mohamad Hekarl Uzir**, Abdul Rahman Mohamed, Abdul Halim Shamsuddin, (2016) *Light irradiance and spectral distribution effects on cyanobacterial hydrogen production*. International Conference on Advances in Renewable Energy and Technologies (ICARET 2016).

### **Journal Publications:**

- (i) Mohd Reza Mohd Radzi and **Mohamad Hekarl Uzir\***, (2007), *On the stability study of an exothermic biocatalytic reaction and its application in control systems*, **PERTANIKA Journal of Science and Technology**, No. 1, Vol. 17, 95 – 115.
- (ii) A.H. Kamaruddin\*, **M.H. Uzir**, H.Y. Aboul-Enein, H.N.A. Halim, (2009), *Chemoenzymatic and Microbial Dynamic Kinetic Resolutions*, **Chirality**, Vol. 21, 449 - 467.
- (iii) Nazira Khabibor Rahman, Mohamad Zailani Abu Bakar\*, **Mohamad Hekarl Uzir**, Azlina Harun@Kamaruddin, (2009), *Modelling on the Effect of Diffusive and Convective Substrate Transport for Biofilm*. **Mathematical Biosciences**, No. 1, Vol. 218, 130 – 137.

- (iv) Lau S. Y., **Uzir M. H.**, Kamaruddin A. H. and Bhatia, S\*, (2010), *Lipase-Catalysed Dynamic Resolution of Racemic Ibuprofen Ester via Hollow Fibre Membrane Reactor: Modelling and Simulation*, **Journal of Membrane Science**, No. 1-2, Vol. 357, 109 – 121.
- (v) Khor Guat Kheng; Sim Jia Huey; Kamaruddin Azlina Harun\*; **Uzir Mohamad Hekarl**, (2010), *Thermodynamics and inhibition studies of lipozyme TL IM in biodiesel production via enzymatic transesterification*. **Bioresource Technology**, No. 16, Vol. 101, 6558-6561.
- (vi) Fatimatul Abas, **Mohamad Hekarl Uzir\***, Mohd Mohd Zahar, (2010), *Effect of pH on the Biotransformation of (R) -1- (4-Bromo-Phenyl) -Ethanol by Using Aspergillus niger as a Biocatalyst*. **Journal of Applied Sciences**, No. 24, Vol. 10, 3289-3294.
- (vii) Noor, R. A. Mat, Ahmad, Z.\*; Don, M. Mat, **Uzir, M. H.**, (2010) *Modelling and Control of Different Types of Polymerisation Processes using neural Networks Techniques: A Review*, **Canadian Journal of Chemical Engineering**, No. 6, Vol. 88, 1065-1084.
- (viii) Lau S. Y., Fadzil N. G, Kamaruddin A. H., Bhatia S, and **Uzir M. H.\*** (2011), *Conceptual Design and Simulation of a Plant for the Production of High Purity (S)-Ibuprofen Acid Using Innovative Enzymatic Membrane Technology*, **Chemical Engineering Journal**, No. 2, Vol. 166, 726–737.
- (ix) Khor Guat Kheng, **Mohamad Hekarl Uzir\***, (2011), *Saccharomyces cerevisiae as a Potential Stereospecific Reduction Tool for Biotransformation of Monoterpenoids*. **Yeast**, No. 2, Vol. 28, 93–107.
- (x) Mohd Rezuan M Aspar, Rashidah Abdul Rahim, **Mohamad Hekarl Uzir\***, (2011), *Cloning of Gene Encoding Yeast Alcohol Dehydrogenase 1 (YADH1) in Escherichia coli TOP10 for further use in Biocatalysis*. **PERTANIKA Journal of Science and Technology**, No. 2, Vol. 19, 423-430.
- (xi) Aimi Aishah Ariffin, Mashitah Mat Don, **Mohamad Hekarl Uzir\***, (2011), *Baker's Yeast-Mediated Biotransformation of Geraniol into Citronellol Using a Continuous-Closed-Gas-Loop Bioreactor (CCGLB) System*. **Biochemical Engineering Journal**. No. 1, Vol. 56, 219-224.
- (xii) Aimi Aishah Ariffin, Mashitah Mat Don, **Mohamad Hekarl Uzir\***, (2011), *The Feasibility of Growing Cells of Saccharomyces cerevisiae for Citronellol Production in a Continuous-Closed-Gas-Loop Bioreactor (CCGLB)*, **Bioresource Technology**, No. 19, Vol. 102, 9318-9320.

- (xiii) Rahman, N. K., Kamaruddin, A. H.\* , **Uzir M. H.**, (2011), *Enzymatic synthesis of farnesyl laurate in organic solvent: initial water activity, kinetics mechanism, optimization of continuous operation using packed bed reactor and mass transfer studies*, **Bioprocess and Biosystem Engineering**, No. 6 Vol. 34, 687-699.
- (xiv) Maedeh Mohammadi, Ghasem D. Najafpour, Habibollah Younesi, Pooya Lahijani, **Mohamad Hekarl Uzir**, Abdul Rahman Mohamed\*, (2011), *Bioconversion of synthesis gas to second generation biofuels: A review*, **Renewable and Sustainable Energy Reviews**, No. 9 Vol. 15, 4255-4273.
- (xv) Kumar, Senthil A.; **Uzir, M. H.**; Ahmad, Z\*. (2012), *Comparative study between Candida Antarctica lipase B and Pseudomonas Floroscens as catalyst for Polycaprolactone production*, **Advanced Materials Engineering & Technology Book Series: Advanced Materials Research**, Volume: 626, 547-550.
- (xvi) Fadzil Noor Gonawan, Lau Sie Yon, Azlina Harun Kamaruddin, **Mohamad Hekarl Uzir\***, (2013), *Effect of Co-solvent Addition on the Reaction Kinetics of the Lipase-Catalyzed Resolution of Ibuprofen Ester*, **Journal of Chemical Technology and Biotechnology**, No. 4, Vol. 88, 672-679.
- (xvii) Lau S. Y., Fadzil N. G, Kamaruddin A. H. and **Uzir M. H.\***, (2013), *Enzymatic Deracemization of (R,S)-Ibuprofen Ester via Lipase catalyzed Membrane Reactor*, **Industrial and Engineering Chemistry Research**, No. 27, Vol. 52, 9441–9453.
- (xviii) Fadzil Noor Gonawan, Lau Sie Yon, Azlina Harun Kamaruddin, **Mohamad Hekarl Uzir\***, (2014), *Rapid Base-Catalyzed Racemization of (R)-Ibuprofen Ester in 2 Isooctane–Dimethyl Sulfoxide Medium with Improved Kinetic Model*, **Industrial and Engineering Chemistry Research**, No. 2, Vol. 53, 635-642.
- (xix) Mohammadi M, Mohamed AR\*, Najafpour G.D., Younesi, H., **Uzir M. H.** (2014), *Kinetics Studies on Fermentative Production of Biofuel from Synthesis Gas Using Clostridium ljungdahlii*. **The Scientific World Journal**, Vol. 2014, ([doi.org/10.1155/2014/910590](https://doi.org/10.1155/2014/910590)).
- (xx) Mohammadi M, Mohamed AR\*, Najafpour G.D., Younesi, H., **Uzir M. H.** (2014), *Effect of Organic Substrate on Promoting Solventogenesis in Ethanologenic Acetogene Clostridium ljungdahlii*. **International Journal of Engineering, Transaction B**, No. 2, Vol. 27, 185-194.
- (xxi) Siti Fatihah Salleh, Azlina Kamaruddin\*, **Mohamad Hekarl Uzir**, Abdul Rahman Mohamed, (2014), *Effects of Cell Density, Carbon Dioxide and Molybdenum Concentration on Biohydrogen Production by Anabaena variabilis ATCC 29413*. **Energy Conversion and Management**, Vol. 87, 599-605.

- (xxii) N.N.R. Ahmad, W.J.N. Fernando, **M.H. Uzir\***, (2015), *Parametric Evaluation Using Mechanistic Model for Release Rate of Phosphate Ions from Chitosan-Coated Phosphorus Fertiliser Pellets*. **Biosystems Engineering**, Vol. 129, 78-86.
- (xxiii) Sudiby, **M. H. Uzir**, N. Aziz\*, M. R. Othman, (2015), *Magneto-Electro Deposition of Tin Dendrites*, **Surface & Coatings Technology**, Vol. 264, 66-71.
- (xxiv) Siti Fatihah Salleh, Azlina Kamaruddin\*, **Mohamad Hekarl Uzir**, Abdul Rahman Mohamed, (2015), *Investigation of the links between heterocyst and biohydrogen production by diazotrophic cyanobacterium A. variabilis ATCC 29413*. **Archives of Microbiology**, No. 2, Vol. 198, 101-113. (doi:10.1007/s00203-015-1164-6).
- (xxv) M. Mohammadi, A. R. Mohamed\*, G. Najafpour, H. Younesi, **M. H. Uzir** (2016) *Clostridium ljungdahlii for production of biofuel from synthesis gas*, **Energy Sources, Part A: Recovery, Utilization, and Environmental Effects**, No. 3, Vol. 38, 427-434.
- (xxvi) Salleh, Siti Fatihah, Kamaruddin, Azlina\*, **Uzir, Mohamad Hekarl**; Mohamed, Abdul Rahman, Shamsuddin, Abdul Halim, (2016), *Modeling of the Light Attenuation Phenomenon during the Photoautotrophic Growth of A. variabilis ATCC 29413 in a Batch Photobioreactor*. **Journal of Chemical Technology and Biotechnology** (doi: 10.1002/jctb.5013).
- (xxvii) Siti Fatihah Salleh, Azlina Kamaruddin\*, **Mohamad Hekarl Uzir**, Abdul Rahman Mohamed and Abdul Halim Shamsuddin, (2016), *Kinetic Modeling of Hydrogen Production Rate by Photoautotrophic Cyanobacterium A. variabilis ATCC 29413 as a Function of Both CO<sub>2</sub> Concentration and Oxygen Production Rate*. **Preparative Biochemistry & Biotechnology** (doi.org/10.1080/10826068.2016.1181085).

#### **Chapter in Book:**

- (i) Kamaruddin, A.H.\*, **Uzir, M.H.**, Gonawan, F.N. and Lau, S.Y. (2015), *Dynamic enzymatic kinetic resolution of NSAIDS*. **Advances in Bioprocess Technology**, 317-355, Springer International Publishing, Switzerland. (doi:10.1007/978-3-319-17915-5)
- (ii) **Mohamad Hekarl Uzir\***, (2016), Contributor to **Encyclopedia of Membranes**, Drioli E. and Giorno L. (Editors), Springer-Verlag, Berlin Heidelberg. (doi:10.1007/978-3-642-40872-4)

\* Corresponding author

## **Supervisions:**

### **1) Postgraduates:**

#### **Main Supervision:**

- (i) Ms. Aimi Aishah Ariffin (**MSc.**) – (**Graduated**)  
**Title:** Kinetics of Biotransformation for Citronellol Production Using *Saccharomyces cerevisiae*.
- (ii) Ms. Nazira Mahmud (**MSc.**) – (**Graduated**)  
**Title:** Production of  $\alpha$ -terpeniol From the *Citrus sinensis* Peel Extract Using Biotransformation.
- (iii) Ms. Khor Guat Kheng (**MSc.**) – (**Graduated**)  
**Title:** The Biotransformation of *cis/trans* 3,7-dimethyl-2,6-octadien-1-ol Mediated by *Saccharomyces cerevisiae*.
- (iv) Mrs. Fatimatul Zaharah Abas (**MSc.**) – (**Graduated**)  
**Title:** Optimising the Production of Chiral Alcohol for Angiotensin Receptor Blocker (ARB) Synthesis via *Aspergillus niger*-Catalysed Biotransformation of 1-4-Bromo-phenyl-ethanone.
- (v) Mr. Mohd Fadzil Gonawan (**MSc.**) – (**Graduated**)  
**Title:** The Effect of Different Solvent on the Downstream Process of S-Ibuprofen Production.
- (vi) Mr. Lau Sie Yon (**PhD.**) – (**Graduated**)  
**Title:** Modelling and Simulation of Membrane Bioreactor for S-Ibuprofen Production Pilot Plant.
- (vii) Mr. Muhammad Hazriq Aris (**MSc.**) – (**Graduated**)  
**Title:** Production of  $\alpha$ -Terpineol From *Citrus grandis* Peel Extract Through Biotransformation.
- (viii) Ms. Nor Naimah Rosyadah Ahmad (**MSc.**) – (**Graduated**)  
**Title:** Diffusion Study of Fertilizer into Soil System.
- (ix) Mr. Muhammad Rasyad Alawiddin (**MSc.**) – (**On-Going**)  
**Title:** Baker's Yeast-Mediated Reduction of Regio-Isomeric Chloro-Aldehyde Forming a Precursor for the Synthesis of (1R,2R)-Tapentadol (3-[1R,2R)-3-(dimethylamino)-1-ethyl-2-methylpropyl] phenol).



### **Co-Supervision:**

### **PhD Candidates:**

- (i) Ms. Noor Aziah Serri (**PhD.**) – (**Graduated**)
- (ii) Mr. Senthil Kumar (**PhD.**) – (**Graduated**)
- (iii) Mrs. Noor Fazliani Shoparwe (**PhD.**) – (**Graduated**)
- (iv) Mrs. Siti Fatimah Salleh (**PhD.**) – (**Graduated**)

### **MSc. Candidates:**

- (i) Mrs. Noor Fazliani Shoparwe (**MSc.**) – (**Graduated**)
- (ii) Ms. Nazira Khabibor Rahman (**MSc.**) – (**Graduated**)
- (iii) Mrs. Eka Anggraini Azuardi (**MSc.**) – (**Graduated**)

### **Reviewed Articles in Journals:**

- (1) Mathematical Biosciences (**Elsevier Publication**)
- (2) Process Biochemistry (**Elsevier Publication**)
- (3) Journal of Environmental Management (**Elsevier Publication**)
- (4) Chemical Engineering & Technology Journal (**Wiley**)
- (5) Energy & Fuels (**ACS Publication**)
- (6) Journal of Molecular Microbiology & Biotechnology (**Karger Publication**)
- (7) Desalination (**Elsevier Publication**)
- (8) International Journal of Environmental Engineering (**Inderscience Publication**)
- (9) Journal of Molecular Catalysis B: Enzymatic (**Elsevier Publication**)
- (10) Electronic Journal of Biotechnology (<http://www.ejbiotechnology.info/>)
- (11) Biocatalysis & Biotransformation (**Taylor & Francis**)
- (12) Journal of the Science of Food and Agriculture (**Wiley**)
- (13) Industrial & Engineering Chemistry Research (**ACS Publication**)
- (14) Preparative Biochemistry and Biotechnology (**Taylor & Francis**)
- (15) Microbial Biotechnology (**Wiley**)
- (16) Journal of Environmental Chemical Engineering (**Elsevier Publication**)

### **University's Management Posts:**

- (1) **Programme Chairman for Bioprocess and Environmental Engineering Group**, (May 2010 – Dec. 2012).
- (2) **Programme Chairman for Quality Management**, (Jan. 2013 – Dec. 2015).
- (3) **Pengawas Desasiswa Jaya (Head of Jaya Residential College), Engineering Campus**, (Apr. 2012 – Dec. 2013)
- (4) **Pengawas Desasiswa Jaya (Head of Jaya Residential College), Engineering Campus**, (Jan. 2014 – Dec. 2015)
- (5) **Manager (Talent Empowerment & Creativity)**, (Jan. 2016 – Dec. 2018)