



CURRICULUM VITAE

| A. BUTIR-BUTIR PERIBADI (<i>Personal Details</i>) | | | |
|--|---|--|---|
| Nama Penuh (<i>Full Name</i>) | Mohd Rafein Zakaria | | Gelaran (<i>Title</i>): Assoc. Prof. Dr. |
| No. MyKad / No. Pasport (<i>Mykad No. / Passport No.</i>) | Warganegara (<i>Citizenship</i>) Malaysia | Bangsa (<i>Race</i>) Malay | Jantina (<i>Gender</i>) Male |
| Jawatan (<i>Designation</i>) | Associate Professor | Tarikh Lahir (<i>Date of Birth</i>) | 17 Feb 1981 |

| Alamat Semasa (<i>Current Address</i>) | Jabatan/Fakulti (<i>Department/Faculty</i>) | E-mel dan URL (<i>E-mail Address and URL</i>) |
|---|--|--|
| Laman Bakawali Kota Seriemas 71800 Nilai Negeri Sembilan Tel: | Department Bioprocess Technology Faculty of biotechnology and Biomolecular Sciences, 43400 UPM Serdang Selangor Tel: 03-9769-1946 Fax: | E-mail: mohdrafein@upm.edu.my URL: http://profile.upm.edu.my/mohdrafein/profile.html No. of publications: 39 h- Index SCOPUS (Citations): 14 (592) h- Index Google Citations: 16 (830) Area of expertise: Biomass hydrothermal treatment and utilization, wastewater treatment for biogas generation, polyhydroxyalkanoates, biosurfactants. |

| B. KELAYAKAN AKADEMIK (<i>Academic Qualification</i>) | | | |
|---|---|-----------------------------------|--|
| Nama Sijil / Kelayakan (<i>Certificate / Qualification obtained</i>) | Nama Sekolah Institusi (<i>Name of School / Institution</i>) | Tahun (<i>Year obtained</i>) | Bidang pengkhususan (<i>Area of Specialization</i>) |
| PhD | UPM | 2012 | Environmental Biotechnology |
| MSc | UPM | 2008 | Environmental Biotechnology |
| Bachelor | UPM | 2003 | Biotechnology |

| C. KEMAHIRAN BAHASA (<i>Language Proficiency</i>) | | | | | |
|--|-------------------|---------------------------|------------------|----------------------------|----------------------------|
| Bahasa / Language | Lemah Poor (1) | Sederhana Moderate (2) | Baik Good (3) | Amat Baik Very good (4) | Cemerlang Excellent (5) |
| English | | | | / | |
| Bahasa Melayu | | | | | / |

| D. PENGALAMAN SAINTIFIK DAN PENGKHUSUSAN (<i>Scientific experience and Specialisation</i>) | | | | |
|--|---|------------|----------|--|
| Organization | Position | Start Date | End Date | Expertise |
| Elsevier | Reviewer for Journal of Cleaner Production | 2020 | - | Wastewater treatment, biohydrogen, biomethane, fermentation |
| Springer | Reviewer for Cellulose | 2019 | | Biomass, Enzymolysis, Cellulose, Xylan |
| Elsevier | Reviewer for Chemical Engineering Science | 2017 | 2017 | Wastewater treatment, biohydrogen, biomethane, fermentation |
| Elsevier | Reviewer for Journal of Environmental Management | 2017 | 2017 | Applied Microbiology, Biological Conversion, Environmental Management |
| ScholarOne (American Chemical Society) | Reviewer for Industrial & Engineering Chemistry Research | 2017 | 2017 | Biomass Pretreatment, Saccharification, Fermentation, Green chemistry |
| Elsevier | Reviewer for Industrial Crops and Products | 2016 | - | Biomass, Hydrothermal process, Enzymolysis, Ball Milling, Disk Milling, Biochemicals |
| Taylor & Francis | Reviewer for Critical Reviews in Food Science and Nutrition | 2016 | 2016 | Biomass, Hydrothermal process, Enzymolysis, Ball Milling, Disk Milling, Biochemicals |
| Elsevier | Reviewer for International Journal of Hydrogen Energy | 2016 | - | Biomass, Enzymolysis, Biofuels, Biogas, Biohydrogen, Biochemicals |
| Springer | Reviewer for Applied Biochemistry and Biotechnology | 2015 | - | Biomass, Enzymolysis, Biofuels, Biogas, Biohydrogen, Biochemicals |
| Springer | Reviewer for Annals of Microbiology | 2015 | 2015 | Bioplastics, Biopolymers, Polyhydroxyalkanoates, Fermentation |
| Elsevier | Reviewer for Bioresource | 2015 | - | Biomass, Hydrothermal process, Enzymolysis, |

| | | | | |
|------------------|---|------|------|--|
| | Technology | | | Biofuels, Biochemicals |
| BioMed Central | Reviewer for Biotechnology for Biofuels | 2015 | - | Biomass, Hydrothermal process, Enzymolysis, Biofuels |
| Elsevier | Reviewer for Energy Conversion and Management | 2015 | 2015 | Biomass, Hydrothermal process, Ball Milling |
| ACS Publications | Reviewer for Environmental Science & Technology | 2014 | 2014 | Environmental Biotechnology, Biomass, Hydrothermal process |
| Elsevier | Reviewer for Applied Energy | 2014 | 2014 | Environmental Biotechnology, Biomass, Hydrothermal process |
| Elsevier | Reviewer for Micron Journal | 2010 | 2010 | Environmental Biotechnology, Biopolymer |

E. APPOINTMENTS (*Lantikan*)

i) INTERNATIONAL

| Majikan / Employer | Jawatan / Designation | Jabatan / Department | Tarikh lantikan / Start Date | Tarikh tamat / Date Ended |
|---|--------------------------|--|------------------------------|---------------------------|
| National Institute of Advanced Industrial Science and Technology, Japan | Post-Doctoral Researcher | Biomass Refinery Research Center (Separation Team) | 17-07-2013 | 30 June 2015 |
| AFOB Asian Congress of Biotechnology 2015, Istana Hotel | Committee | Department of Bioprocess Technology | 2014 | 2014 |

ii) NATIONAL

| | | | | |
|---|--------------------|---|----------|----------|
| Ministry of Human Resource (MOHR) – Handling of biohazard and medical | Panel | Development of National Occupational Skills Standard (NOSS) document for the Department of Skills Development (DSD) | 2016 | 2016 |
| Seminar on Bioreactor Operation and Fermentation Data Analyses | Committee | Department of Bioprocess Technology | 2016 | 2016 |
| SIRIM Berhad | Research Associate | Industrial Biotechnology | Oct 2011 | Jan 2012 |
| Vivantis Technologies Sdn Bhd | Project Manager | Life Sciences/ Wastewater treatment | Feb 2006 | Feb 2007 |

| III) UNIVERSITY/FACULTY/DEPARTMENT | | | | |
|---|--|--|--------------|-------------|
| Universiti Putra Malaysia | Committee, Grant Evaluation and Monitoring-Faculty level | Faculty of Biotechnology and Biomolecular Sciences | 1 Mar 2019 | 31 Dec 2020 |
| Universiti Putra Malaysia | Associate Professor | Department of Bioprocess Technology | 2 Jan 2019 | Present |
| Universiti Putra Malaysia | Committee, Research and Postgraduate studies | Faculty of Biotechnology and Biomolecular Sciences | 2 Jan | 31 Dec 2020 |
| Institute of Tropical Forestry and Forest Products (INTROP), UPM | Head of Program | Biopolymer and Derivatives | 1 Dec 2018 | Present |
| Universiti Putra Malaysia | Senior Lecturer | Department of Bioprocess Technology | 2 April 2012 | 31 Dec 2018 |
| Universiti Putra Malaysia | Research Assistant | Department of Bioprocess Technology | Mar 2007 | Sep 2011 |
| Universiti Putra Malaysia | Research Assistant | Department of Bioprocess Technology | 2003 | 2006 |
| International Symposium on Applied Engineering and Sciences, 2017 UPM | Poster judge | Department of Bioprocess Technology | 2017 | 2017 |
| International Biotechnology Competition & Exhibition (IBCEx) 2017 | Poster judge | UTM, Skudai Johor | 2017 | 2017 |
| Wood and Biofiber International Conference | Committee | INTROP, UPM | 2017 | 2017 |
| 3U1i Program with Indah Water Konsortium | Committee | Department of Bioprocess Technology | 2017 | 2018 |
| Malaysian Society for Microbiology | Poster judge | Environmental Microbiology Poster Session | 2016 | 2016 |
| Industrial Linkages and Community | Committee | Department of Bioprocess Technology | 2016 | Present |
| Internship Program- Undergraduate students | Committee | Department of Bioprocess Technology | 2016 | Present |
| AFOB Asian Congress of Biotechnology 2015 Istana Hotel | Committee | Department of Bioprocess Technology | 2015 | 2015 |

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|--|--------------------|-------------------------------------|------|---------|
| Institute of Tropical Forestry and Forest Products (INTROP), UPM | Research Associate | Biopolymer and Derivatives | 2015 | Present |
| Academic Program Evaluation for Bachelor of Microbiology | Committee | Department of Bioprocess Technology | 2012 | 2014 |
| Biomagnetic Day | Chairman | Department of Bioprocess Technology | 2015 | 2015 |
| Faculty Research Book | Committee | Department of Bioprocess Technology | 2013 | 2014 |
| Faculty Promotion and Publicity | Committee | Department of Bioprocess Technology | 2013 | 2014 |
| Biomagnetic Day | Committee | Department of Bioprocess Technology | 2012 | Present |
| Undergraduate seminar / proposal and final report evaluator | Member | Department of Bioprocess | 2012 | Present |
| Postgraduate seminar / proposal and final report evaluator | Member | Department of Bioprocess | 2012 | Present |

F. ANUGERAH DAN HADIAH/ PENGIKTIRAFAN (*Honours and Awards/ Recognition*)

| Name of awards | Title | Award Authority | Award Type | Year |
|----------------------------|---|-------------------------------|-------------------|-------------|
| <i>Non-Academic Awards</i> | Outstanding Contribution in Reviewing Energy Conversion and Management-International | Elsevier | Certificate | 2018 |
| <i>Non-Academic Awards</i> | Award for High Impact Project- Industrial and Community Linkages | CIRNeT-UPM | Certificate | 2018 |
| <i>Non-Academic Awards</i> | Excellent Service Award 2017 | UPM | Certificate | 2018 |
| <i>Non-Academic Awards</i> | Outstanding Contribution in Reviewing Bioresource Technology Journal-International | Elsevier | Certificate | 2017 |
| <i>Non-Academic Awards</i> | Outstanding Contribution in Reviewing Chemical Engineering Science Journal-International | Elsevier | Certificate | 2017 |
| <i>Non-Academic Awards</i> | Outstanding Contribution in Reviewing Industrial Crops and Products Journal-International | Elsevier | Certificate | 2017 |
| <i>Non-Academic Awards</i> | Incentive Journal Publication 2016 | RMC-UPM Research Appreciation | RMC-UPM | 2017 |

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| | | Ceremony | | |
| <i>Non-Academic Awards</i> | Excellent Service Award 2015 | UPM | UPM | 2016 |
| <i>Non-Academic Awards</i> | University Research Award - –ategory: Publishing Journal 2015 | Pameran reka cipta, penyelidikan dan inovasi (PRPI) 2016, UPM | UPM | 2016 |
| <i>Non-Academic Awards</i> | ITEX 2011-International | Malaysian Invention and Design Society (MINDS) | Gold Medal | 2011 |
| <i>Non-Academic Awards</i> | Pameran reka cipta, penyelidikan dan inovasi (PRPI) 2009 | UPM | Gold medal | 2010 |
| <i>Non-Academic Awards</i> | PECIPTA 2009 | PECIPTA, KLCC, Malaysia | Silver Medal | 2009 |
| <i>Non-Academic Awards</i> | PRPI, UPM | UPM | Gold Medal | 2009 |
| <i>Academic Awards</i> | Scholarship (MOHE) | Ministry of Higher Education, Malaysia | Funding | 2009-2012 |
| <i>Non-Academic Awards</i> | Seminar on Biomass for Biofuels and Value-Added By-Products. The Saujana, Kuala Lumpur-International | University Malaysia Pahang | Silver Medal and Certificate | 2009 |
| <i>Awards of Merit</i> | | | | |

G. SENARAI PENERBITAN (Sila masukan nama pengarang, tajuk, nama jurnal, jilid, muka surat dan tahun diterbitkan) (List of publications – author (s), title, journal, volume, page and year published)

Journals

*** Corresponding author**

41. Yuya Hashiguchi, Mohd Rafein Zakaria*, Toshinari Maeda, Mohd Zulkhairi Mohd Yusoff, Yoshihito Shirai, Mohd Ali Hassan. Ecotoxicological assessment of palm oil mill effluent final discharge by zebrafish (*Danio rerio*) embryonic assay. Submitted to Environmental Pollution. Jun 2020 (5.714)

40- Shobanah Menon Baskaran, Mohd Rafein Zakaria*, Mohd Shamzi Mohamed, Helmi Wasoh, Toshinari Maeda, Mohd Ali Hassan, Ibrahim M. Banat. Biosurfactant production by *Pseudomonas aeruginosa* RS6 using biodiesel side stream waste glycerol as a substrate: Optimization of fermentation conditions. Submitted to Environmental Pollution. Jun 2020 (5.714)

39. Liana Noor Megashah, Hidayah Ariffin, Mohd Rafein Zakaria, Mohd Ali Hassan. 2020. Modification of Cellulose Degree of Polymerization by Superheated Steam Treatment for Versatile Properties of Cellulose Nanofibril Film. Accepted in Cellulose-June 2020. (3.917)

38- Abubakar Abdullahi Lawal, Mohd Ali Hassan, Mohamed Abdilllah Ahmad Farid, Tengku Arisyah TengkuYasim-Anuar, Mohd Zulkhairi Mohd Yusoff, Mohd Rafein Zakaria, Ahmad Muhaimin Roslan, Mohd Noriznan Mokhtar, YoshihitoShirai. 2020. Production of biochar from oil palm frond by steam pyrolysis for removal of residual contaminants in palm oil mill effluent final discharge. Journal of

Cleaner Production. 265,121643 (IF 6.395)

37- Abubakar Lawal, Mohd Ali Hassan, Mohamed Abdilllah Ahmad Farid, Tengku Arisyah Tengku Yasim-Anuar, Mohd Zulkhairi Mohd Yusoff, Mohd Rafein Zakaria, Ahmad Muhaimin Roslan, Mohd Noriznan Mokhtar, Yoshihito Shirai. 2020. One-step steam pyrolysis for the production of mesoporous biochar from oil palm frond to effectively remove phenol in facultatively treated palm oil mill effluent. *Environ. Technol. Inno.* (IF 2.800)

36- Yuya Hashiguchi, Mohd Rafein Zakaria, Toshinari Maeda, Mohd Zulkhairi Mohd Yusoff, Mohd Ali Hassan, Yoshihito Shirai. 2020. Toxicity identification and evaluation of palm oil mill effluent and its effects on the planktonic crustacean *Daphnia magna*. *Sci. Total Environ.* 710, 136277. (IF 5.527)

35- Siti Jamilah Hanim Mohd Yusof, Ahmad Muhaimin Roslan, Khairul Nadiah Ibrahim, Sharifah Sopliah Syed Abdullah, Mohd Rafein Zakaria, Mohd Ali Hassan, Yoshihito Shirai. 2019. Life Cycle Assessment for Bioethanol Production from Oil Palm Frond Juice in an Oil Palm Based Biorefinery. *Sustainability.* 11, 6928 (IF 2.592)

34- Aiman Zulkifli, Mohd Zulkhairi Mohd Yusoff, Latifah Abd Manaf, Mohd Rafein Zakaria, Ahmad Muhaimin Roslan, Hidayah Ariffin, Yoshihito Shirai, Mohd Ali Hassan. Green Energy Potential from the Organic Fraction of Municipal Solid Waste in Malaysia Ahmad. *Sustainability.* 11 (14), 3909. (IF 2.592)

33- Mohammed Abdilllah Ahmad Farid, Mohd Rafein Zakaria*, Mohd Ali Hassan, Izzudin Ibrahim, Mohd Hafif Samsudin, Mohd Ridzuan Othman, Ahmad Amiruddin Mohd Ali, Yoshihito Shirai. 2019. A holistic approach for palm oil mill effluent treatment by incorporating anaerobic-aerobic-wetland sequential system and convective sludge dryer via rotary drum. *Chem. Eng. J.* 369, 195-204 (IF 8.235)

32- Liana Noor Megashah, Hidayah Ariffin, Mohd Rafein Zakaria and Mohd Ali Hassan. 2018. Multi-step pretreatment as an eco-efficient pretreatment method for the production of cellulose nanofiber from oil palm empty fruit bunch. *AsPac J. Mol. Biol. Biotechnol.* 26 (2): 1-8 (Scopus)

31- Nurhajirah Mohamed Biran, Mohd Zulkhairi Mohd Yusoff, Toshinari Maeda, Mohd Rafein Zakaria, Lian-Ngit Yee, Mohd Ali Hassan. 2018. Triple knockout of frdC gltA and pta genes enhanced PHA production in *Escherichia coli*. *AsPac J. Mol. Biol. Biotechnol.* 26 (1): 11-18 (Scopus)

30- Muhammad Azman Zakaria, Mohd Zulkhairi Mohd Yusoff, Mohd Rafein Zakaria, Mohd Ali Hassan, Thomas K. Wood, Toshinari Maeda. 2018. Pseudogene product YqiG is important for pflB expression and biohydrogen production in *Escherichia coli* BW25113. *3 Biotech*, 8:435 (IF 1.497)

29- Liana Noor Megashah, Hidayah Ariffin, Mohd Rafein Zakaria and Mohd Ali Hassan. 2018. Properties of Cellulose Extract from Different Types of Oil Palm Biomass. *IOP Conf. Ser.: Mater. Sci. Eng.* 368 012049 (Scopus)

28- Liana Noor Megashah, Hidayah Ariffin, Mohd Rafein Zakaria and Yoshito Ando 2018. Characteristics of cellulose from oil palm mesocarp fibres extracted by multi-step pretreatment methods. *IOP Conf. Ser.: Mater. Sci. Eng.* 368 012001 (Scopus)

27- Siti Jamilah Hanim Mohd Yusof, Ahmad Muhaimin Roslan, K N Ibrahim, Syarifah Sopliah Syed Abdullah, Mohd Rafein Zakaria, Mohd Ali Hassan and Yoshihito Shirai. 2018. Environmental performance of bioethanol production from oil palm frond petiole sugars in an integrated palm biomass biorefinery. *IOP Conf. Ser.: Mater. Sci. Eng.* 368 012004 (Scopus)

26- Pretreatment of Oil Palm Biomass for Fermentable Sugars Production. 2018. Nur Fatin Athirah

Ahmad Rizal, Mohamad Faizal Ibrahim, Mohd Rafein Zakaria, Suraini Abd-Aziz, Lai Yee Phang, Mohd Ali Hassan. *Molecules*, 23, 1310. (IF 2.861)

25- Norlailiza Ahmad, Mohd Rafein Zakaria*, Mohd Zulkhairi Mohd Yusoff, Shinji Fujimoto, Hiroyuki Inoue, Hidayah Ariffin, Mohd Ali Hassan 2018. Subcritical H₂O-CO₂ pretreatment of oil palm mesocarp fiber for xylooligosaccharide and glucose production. *Molecules*, 23, 1310. (IF 2.861)

24- Nur Fatin Athirah Ahmad Rizal, Mohamad Faizal Ibrahim, Mohd Rafein Zakaria, Ezyana Kamal Bahrin, Suraini Abd-Aziz, Mohd Ali Hassan. 2018. Combination of superheated steam with laccase pretreatment together with size reduction to enhance enzymatic hydrolysis of oil palm biomass. *Molecules*. 23 (4),811 (IF 2.861)

23- Mohammed Abdillah Ahmad Farid, Mohd Ali Hassan, Yun Hin Taufiq-Yap, Yoshihito Shirai, Mohd Rafein Zakaria*. 2017. Utilization of biomass-derived bioadsorbent in purification of biodiesel produced from waste cooking oil. *J. Clean. Product*. 165,262-272 (IF 5.715)

22- Azam Fikri Taifor, Mohd Rafein Zakaria*, Mohd Zulkhairi Mohd Yusoff, Toshinari Maeda, Mohd Ali Hassan, Yoshihito Shirai. 2017. Elucidating substrate utilization in biohydrogen production from palm oil mill effluent by *Escherichia coli*. *Int. J. Hydr. Energy*. 42, 5812-5819 (IF 3.205)

21- Zulnaim Dzulkurnain, Mohd Ali Hassan, Mohd Rafein Zakaria, Puteri Edaroyati Megat Wahab, Muhamad Yusuf Hassan, Yoshihito Shirai. 2017. Co-composting of municipal sewage sludge and landscaping waste - – pilot scale study. *Waste Biomass Valorization*. 8, 695-705 (IF 0.915)

20- Izzudin Ibrahim, Suraini Abd-Aziz, Yoshihito Shirai, Yoshito Andou, Mohd Ridzuan Othman, Ahmad Amiruddin Mohd Ali, Mohd Rafein Zakaria. 2017. Reduction of residual pollutants from biologically treated palm oil mill effluent final discharge by steam activated bioadsorbent from oil palm biomass. *J. Clean. Product*. 141, 122-127 (IF 4.959)

19- Mohd Rafein Zakaria*, Satoshi Hirata, Shinji Fujimoto, Izzudin Ibrahim, Mohd Ali Hassan. 2016. Soluble inhibitors generated during hydrothermal pretreatment of oil palm mesocarp fiber suppressed the catalytic activity of *Acremonium* cellulase. *Bioresour. Technol*. 200, 541-547. (IF 4.902)

18- Mohd Rafein Zakaria*, Satoshi Hirata, Shinji Fujimoto, Mohd Ali Hassan. 2015. Combined pretreatment with hot compressed water and wet disk milling opened up oil palm biomass structures resulting in enhanced enzymatic digestibility. *Bioresour. Technol*. 193, 128-134. (IF 5.039)

17- Mohd Rafein Zakaria*, Mohd Nor Faiz Norrrahim, Satoshi Hirata, Mohd Ali Hassan. 2015. Hydrothermal and wet disk milling pretreatment for high conversion of biosugars from oil palm mesocarp fiber. *Bioresour. Technol*. 181, 263-269. (IF 5.039)

16- Mohd Rafein Zakaria*, Satoshi Hirata, Mohd Ali Hassan. 2015. Hydrothermal pretreatment enhanced enzymatic hydrolysis and glucose production from oil palm biomass. *Bioresour. Technol*. 176, 142-148. (IF 5.039)

15- Faiqah Abd-Rahim, Helmi Wasoh, Mohd Rafein Zakaria, Arbakariya Ariff, Rizal Kapri, Nazaruddin Ramli, Liew Siew-Ling. 2014. Production of high yield sugars from *Kappaphycus alvarezii* using combined methods of chemical and enzymatic hydrolysis. *Food Hydrocolloids*. 42, 309-315. (IF 4.280)

14- Mohd Rafein Zakaria*, Satoshi Hirata, Mohd Ali Hassan. 2014. Combined pretreatment using alkaline hydrothermal and ball milling to enhance enzymatic hydrolysis of oil palm mesocarp fiber. *Bioresour. Technol*. 169, 236–243. (IF 5.039)

- 13- Mohd Rafein Zakaria*, Shinji Fujimoto, Satoshi Hirata, Mohd Ali Hassan. 2014 Ball Milling Pretreatment of Oil Palm Biomass for Enhancing Enzymatic Hydrolysis. *Appl. Biochem. Biotechnol.* 173; 7. (IF 1.687)
- 12- Mohd Rafein Zakaria*, Hidayah Ariffin, Suraini Abd-Aziz, Mohd Ali Hassan, Yoshihito Shirai. 2013. Improved properties of poly(3-hydroxybutyrate-co-3-hydroxyvalerate) produced by *Comamonas* sp. EB172 utilizing volatile fatty acids by regulating the nitrogen source. *BioMed Res. Int.* 1-8. (IF 2.706)
- 11- Nordiyana Nordin, Mohd Rafein Zakaria, Mohd Izuan Effendi Halmi, Arbakariya B. Ariff, Ruzniza Mohd Zawawi, Helmi Wasoh. 2013. Isolation and screening of high efficiency biosurfactant-producing bacteria *Pseudomonas* sp. *J. Biochem. Microbiol. Biotechnol.* 1, 25-31. (NCIJ)
- 10- Nur Haziqah Aniyah Salihan, Arbakariya Ariff, Mohd Rafein Zakaria, Suraini Abd_Aziz, Md Noor Abd Wahab, Helmi Wasoh. 2013. Performance of B-glucosidase produced by *Ganoderma lucidum* using waste substrate as carbon source. *J. Biochem. Microbiol. Biotechnol.* 1, 17-24. (NCIJ)
- 9- Mior Ahmad Khushairi Mohd Zahari, Mohd Rafein Zakaria, Hidayah Ariffin, Mohd Nooriznan Mokhtar, Jailani Salihon, Yoshihito Shirai, Mohd Ali Hassan. 2012. Renewable Sugars from Oil Palm Frond Juice as an Alternative Novel Fermentation Feedstock for Value-Added Products. *Bioresour. Technol.* 110, 566-571. (IF 5.039)
- 8- Noor Azman Mohd Johar, Mohd Ali Hassan, Mohd Rafein Zakaria, Phang Lai Yee, Yoshihito Shirai. 2012. Evaluation of factors affecting polyhydroxyalkanoates production by *Comamonas* sp. EB172 using central composite design. *Malaysian J. Microbiol.* 8, 184-190. (Scopus)
- 7- Yee Lian Ngit, Tabassum Mumtaz, Mitra Mohammadi, Phang Lai Yee, Yoshito Ando, Raha Abdul Rahim, Sudesh Kumar, Mohd Ali Hassan, Hidayah Ariffin, Mohd Rafein Zakaria*. 2012. Polyhydroxyalkanoate synthesis by recombinant *Escherichia coli* JM109 expressing PHA biosynthesis genes from *Comamonas* sp. EB172. *J. Microbiol. Biochem. Technol.* 4: 103-110. (IF 2.16)
- 6- Mohd Firwance Basri, Shahrakbah Yacob, Mohd Ali Hassan, Yoshihito Shirai, Minato Wakisaka, Mohd Rafein Zakaria, Phang Lai Yee. 2010. Improved Biogas Production from Palm Oil Mill Effluent by a Scaled-down Anaerobic Treatment Process. *World J. Microbiol. Biotechnol.* 26: 505-514. (IF 1.353)
- 5- Mohd Rafein Zakaria, Meisam Tabatabaei, Farinazleen Mohamed Ghazali, Suraini Abd-Aziz, Yoshihito Shirai, Mohd Ali Hassan. 2010. Polyhydroxyalkanoate production from anaerobically treated palm oil mill effluent by new bacterial strain *Comamonas* sp. EB172. *World J. Microbiol. Biotechnol.* 26: 767- 774. (IF 1.353)
- 4- Mohd Rafein Zakaria, Hidayah Ariffin, Noor Azman Mohd Johar, Suraini Abd_Aziz, Haruo Nishida, Yoshihito Shirai, Mohd Ali Hassan. 2010. Biosynthesis and characterization of Poly(3-hydroxybutyrate-co-3-hydroxyvalerate) copolymer from wild type *Comamonas* sp. EB172. *Polym. Degrad. Stab.* 95: 1382- 1386. (IF 2.633)
- 3- Meisam Tabatabaei, Mohd Rafein Zakaria, Raha Abdul Rahim, Andre-Denis G. Wright, Yoshihito Shirai, Norhani Abdullah, Mehdi Shamsara, Kenji Sakai, Mohd Ali Hassan. 2010. Comparative Study of Methods for Extraction and Purification of Environmental DNA from Wastewater Sludge. *Afri. J. Biotechnol.* 31:4926-4937. (IF 0.511)
- 2- Alawi Sulaiman, Mohd Rafein Zakaria, Mohd Ali Hassan, Yoshihito Shirai, Zainuri Busu. 2009. Co-digestion of palm oil mill effluent and refined gl9tewartiaash water for chemical oxygen demand

removal and methane production. *American Journal of Environmental Sciences*. 5: 639-646. (NCIJ)

1- Mohd Rafein Zakaria, Suraini Abd-Aziz, Hidayah Ariffin, Nor `Aini Abdul Rahman, Phang Lai Yee and Mohd Ali Hassan. 2008. *Comamonas* sp. EB172 isolated from digester treating palm oil mill effluent as potential polyhydroxyalkanoate (PHA) producer. *Afr. J. Biotechnol.* 7: 4118-4121 (IF 0.511)

Chapter in book

2- Siti Jamilah Hanim Mohd Yusof, Mohd Rafein Zakaria, Ahmad Muhaimin Roslan, Ahmad Amiruddin Mohd Ali, Yoshihito Shirai, Hidayah Ariffin, Mohd Ali Hassan. **Chapter 12**. Oil Palm Biomass Biorefinery for Future Bioeconomy in Malaysia. *Lignocellulose for Future Bioeconomy*. 2019. 265-285

1- Norlailiza Ahmad, Mohd Rafein Zakaria. **Chapter 8**. Oligosaccharides from hemicellulose. *Lignocellulose for Future Bioeconomy*. 2019. 135-152

Proceedings

45. Liana Noor Megashah, Hidayah Ariffin, Mohd. Ali Hassan, Mohd Rafein Zakaria, Yoshito Ando. Versatile Properties of Nanocellulose Film from Oil Palm Empty Fruit Bunch by Superheated Steam Pretreatment. Wood and Biofiber International Conference 2019 (WOBIC2019). 3rd – 5th Dec 2019.

44. Ahmad Aiman Bin Zulkifli, Mohd Ali Hassan, Yoshihito Shirai, Mohd Zulkhairi Mohd Yusoff, Mohd Rafein Zakaria. Utilization Of Municipal Solid Waste For Green Energy In UPM. The International Congress of the Malaysia Society for Microbiology 2019 (ICMSM2019) at The Royale Chulan Seremban, Negeri Sembilan, Malaysia from 13 Nov. 2019.

43. Shobanah Menon Baskaran, Mohd Rafein Zakaria, Mohd Shamzi Mohamed and Mohd Ali Hassan. Optimization of Biosurfactant Production from Biodiesel Side Stream Glycerine by *Pseudomonas aeruginosa* RS6. The International Congress of the Malaysia Society for Microbiology 2019 (ICMSM2019) at The Royale Chulan Seremban, Negeri Sembilan, Malaysia from 13 Nov. 2019.

42. Mohd Idham Hakimi, Mohd Zulkhairi Mohd Yusoff, Abubakar Abdullahi Lawal, Mohd Rafein Zakaria, Mohd Ali Hassan, Yoshihito Shirai. Production Of Biochar As Bioadsorbent From Oil Palm Trunk. 7th International Symposium on Applied Engineering and Sciences, (SAES). UPM. 11-12 Nov 2019.

41. Siti Jamilah Hanim Mohd Yusof, Ahmad Muhaimin Roslan, Khairul Nadiah Ibrahim, Sharifah Sopliah Syed Abdullah, Mohd Rafein Zakaria, Mohd Ali Hassan and Yoshihito Shirai. Life Cycle Assessment of Bioethanol Production From Oil Palm Frond in Oil Palm Based Biorefinery. 7th International Symposium on Applied Engineering and Sciences, (SAES). UPM. 11-12 Nov 2019.

40. Abubakar Abdullahi Lawal, Tengku Arisyah Tengku Yasim-Anuar, Mohd Hafif bin Samsudin, Mohd Idham Hakimi, Mohd Rafein Zakaria, Noriznan Mokhtar, Mohd Ali Hassan, Yoshihito Shirai. Characterization of Pristine and Thermally Modified Biochars Derived from Oil Palm Frond and their Adsorption of Phenol and Tannic acid. 7th International Symposium on Applied Engineering and Sciences, (SAES). UPM. 11-12 Nov 2019.

39. Liana Noor Megashah, Hidayah Ariffin, Mohd. Ali Hassan, Mohd Rafein Zakaria, Yoshito Ando. Characteristic of Oil Palm Empty Fruit Bunch Nanocellulose Film. 7th International Symposium on Applied Engineering and Sciences, (SAES). UPM. 11-12 Nov 2019.

38. Mohd Rafein Zakaria, Shobanah Menon Baskaran, Ahmad Syafiq Mukhlis Ahmad Sabri, Mohd

Shamzi Mohamed, Helmi Wasoh, Toshinari Maeda, Mohd Ali Hassan, Ibrahim M. Banat Rhamnolipids Biosurfactant: A Green and Environmentally Chemicals Derived from *Pseudomonas aeruginosa* RS6. 7th International Symposium on Applied Engineering and Sciences, (SAES). UPM. 11-12 Nov 2019.

37. Nur Aina Natasha Mohd Asmadi, Mohd Rafein Zakaria, Hidayah Ariffin, Toshinari Maeda. Palm Oil Mill Effluent Sludge Oil as Cheaper Carbon Sources for The Production of Biosurfactant. 7th International Symposium on Applied Engineering and Sciences, (SAES). UPM. 11-12 Nov 2019.

36. Shobanah Menon Baskaran, Mohd Rafein Zakaria, Mohd Shamzi Mohamed, Mohd Ali Hassan. Production of Biosurfactant from Biodiesel Side Stream Glycerine by *Pseudomonas aeruginosa* RS6. 7th International Symposium on Applied Engineering and Sciences, (SAES). UPM. 11-12 Nov 2019.

35. Aiman Bin Zulkifli, Mohd Ali Hassan, Yoshishito Shirai, Mohd Zulkhairi Mohd Yusoff, Mohd Rafein Zakaria. Utilization Of Municipal Solid Waste For Green Energy In UPM. 7th International Symposium on Applied Engineering and Sciences, (SAES). UPM. 11-12 Nov 2019.

34. Siti Jamilah Hanim Mohd Yusof, Ahmad Muhaimin Roslan, Shinji Fujimoto, Mohd Rafein Zakaria, Mohd Ali Hassan and Yoshihito Shirai Production of Xylooligosaccharides by Carbon Dioxide-Assisted Hydrothermal Pretreatment of Oil Palm Biomass. AFOB Malaysia Chapter International Symposium 2019, 20-23 October 2019. The Everly Putrajaya, Malaysia.

33. Abubakar Abdullahi Lawal, Tengku Arisyah Tengku Yasim-Anuar, Mohd Hafif Samsudin, Mohd Idham Hakimi, Mohd Rafein Zakaria, Noriznan Mokhtar, Mohd Ali Hassan, Yoshihito Shirai. Pyrolysis Degradation Behavior of Oil Palm Woody Biomass and Industrial Wood Chip using Thermogravimetric Analysis. AFOB Malaysia Chapter International Symposium 2019, 20-23 October 2019. The Everly Putrajaya, Malaysia.

32. Mohd Rafein Zakaria, Shobanah Menon Baskaran, Ahmad Syafiq Mukhlis Ahmad Sabri, Mohd Shamzi Mohamed, Helmi Wasoh, Toshinari Maeda, Mohd Ali Hassan, Ibrahim M. Banat. Valorization of Biodiesel Side Stream Waste Glycerol for Rhamnolipids Production by *Pseudomonas aeruginosa* RS6. AFOB Malaysia Chapter International Symposium 2019, 20-23 October 2019. The Everly Putrajaya, Malaysia

31. Mohd Rafein Zakaria, Shobanah Menon Baskaran, Helmi Wasoh, Toshinari Maeda, Hidayah Ariffin, Mohd Ali Hassan, Ibrahim M. Banat. Production and characterization of rhamnolipid based biodiesel side stream waste glycerol by *Pseudomonas aeruginosa* RS6. 8th International Conference on Bioprocessing. (IBA-IFI-BIOP 2019), Miri, Sarawak, Malaysia, 1-4 May 2019.

30. Mohd Rafein Zakaria, Shobanah Menon Baskaran. Valorization of biodiesel side stream waste glycerol for biosurfactant production by *Pseudomonas aeruginosa* WG. 6th International Symposium on Applied Engineering and Sciences, (SAES). KYUTECH, Tobata Campus, Japan. 15-16 December 2018.

29. Liana Noor Megashah, Hidayah Ariffin, Mohd Rafein Zakaria, Yoshito Ando. Isolation of cellulose from oil palm empty fryfruit bunch by multi-step, totally chlorine free treatment method for cellulose nanofibril production. 6th International Symposium on Applied Engineering and Sciences, (SAES). KYUTECH, Tobata Campus, Japan. 15-16 December 2018.

28- Liana Noor Megashah, Hidayah Ariffin, Mohd Rafein Zakaria, Yoshito Ando. Effect of pretreatment concatenation on the characteristics of nanocellulose. Wood and Biofiber International Conference 2017 (WOBIC2017). Bangi-Putrajaya Hotel, Malaysia. 21-23 November 2017.

27- Khairiatul Nabilah-Jansar, Mohd Rafein Zakaria, Ahmad Muhaimin Roslan, Mohd Ali Hassan. Lignocellulosic composition of mixed oil palm biomass after hydrothermal pretreatment. Wood and Biofiber International Conference 2017 (WOBIC2017). Bangi-Putrajaya Hotel, Malaysia. 21-23 November 2017.

26- Mohd Rafein Zakaria, Satoshi Hirata, Mohd Ali Hassan. Combined pretreatment of hot compressed water and wet disk milling for nano-fibrillation of oil palm biomass. Wood and Biofiber International Conference 2017 (WOBIC2017). Bangi-Putrajaya Hotel, Malaysia. 21-23 November 2017.

25- Norlailiza Ahmad, Mohd Rafein Zakaria, Hidayah Ariffin, Mohd Ali Hassan. Subcritical water-carbon dioxide pretreatment of oil palm mesocarp fiber for xylooligosaccharides and glucose production. Wood and Biofiber International Conference 2017 (WOBIC2017). Bangi-Putrajaya Hotel, Malaysia. 21-23 November 2017.

24- Siti Jamilah Hanim Mohd Yusof, Ahmad Muhaimin Roslan, Khairul Nadiah Ibrahim, SharifahSoplah Syed Abdullah, Mohd Rafein Zakaria, Mohd Ali Hassan, Yoshihito Shirai. Life cycle assessment for bioethanol production from oil palm frond in an oil palm based biorefinery. Wood and Biofiber International Conference 2017 (WOBIC2017). Bangi-Putrajaya Hotel, Malaysia. 21-23 November 2017.

23- Nur Aina Natasha Mohd Asmadi, Mohd Rafein Zakaria, Izzatul Syazana Ismail, Fatini Arisah. Feasibility of palm oil mill effluent sludge oil as cheaper carbon sources in biosurfactant production. 5th International Symposium on Applied Engineering and Sciences, (SAES). UPM, Malaysia. 14-15 November 2017.

22- Nur Fatin Athirah Ahmad Rizal, Mohamad Faizal Ibrahim, Mohd Rafein Mohd Zakaria, Suraini Abd-Aziz, Ezyana Kamal Bahrin, Mohd Ali Hassan. Combination of superheated steam with laccase pretreatment together with size reduction to enhance enzymatic hydrolysis of oil palm biomass. 5th International Symposium on Applied Engineering and Sciences, (SAES). UPM, Malaysia. 14-15 November 2017.

21- Liana Noor Megashah, Hidayah Ariffin, Mohd Rafein Zakaria, Yoshito Ando. Multiple stage Pretreatment affecting the properties of nanocellulose from oil palm frond. 5th International Symposium on Applied Engineering and Sciences, (SAES). UPM, Malaysia. 14-15 November 2017.

20- Khairiatul Nabilah-Jansar, Mohd Rafein Zakaria, Ahmad Muhaimin Roslan, Mohd Ali Hassan. Hydrothermal pretreatment of mixed oil palm biomass. 5th International Symposium on Applied Engineering and Sciences, (SAES). UPM, Malaysia. 14-15 November 2017.

19- Yuya Hashiguchi, Mohd Rafein Zakaria, Toshinari Maeda, Mohd Zulkhairi Mohd Yusoff, Mohd Ali Hassan. Toxicity identification evaluation of palm oil mill effluent final discharge in Malaysia. 5th International Symposium on Applied Engineering and Sciences, (SAES). UPM, Malaysia. 14-15 November 2017.

18- Mohd Rafein Zakaria, Satoshi Hirata, Shinji Fujimoto, Mohd Ali Hassan. Effect of lignin and phenolic inhibitors on biosugars conversion. UPM- Chulalongkorn University. Biotechnology of Biomass Utilization for ASEAN Development. Thailand. 5-8 September 2016.

17- Mohd Rafein Zakaria, Satoshi Hirata, Shinji Fujimoto, Mohd Ali Hassan. Factors affecting high glucose recovery from pretreatment of oil palm biomass. UPM-Sejong Symposium, Sejong University, Korea. 10-17 April 2016.

16- Mohd Rafein Zakaria, Satoshi Hirata, Shinji Fujimoto, Mohd Ali Hassan. Recent pretreatment of oil palm biomass for high recovery of xylose and glucose. Asian Congress on Biotechnology, Istana

Hotel, Kuala Lumpur, Malaysia. 15-19 Nov 2015.

15- Mohd Rafein Zakaria, Satoshi Hirata, Mohd Ali Hassan. Soluble inhibitors from hydrothermal pretreatment of oil palm mesocarp fiber suppress the catalytic activity of Acremonium cellulose. Asian Congress on Biotechnology, Istana Hotel, Kuala Lumpur, Malaysia. 15-19 Nov 2015.

14- Yuya Hashiguchi, Mohd Rafein Zakaria, Toshinari Maeda, Mohd Zulkhairi Mohd Yusoff, Mohd Ali Hassan. Improvement of conventional POME treatment system for environmental sustainability. Asian Congress on Biotechnology, Istana Hotel, Kuala Lumpur, Malaysia. 15-19 Nov 2015.

13- Muhammad Azman Zakaria, Marahaini Mokhtar, Mohd Zulkhairi Mohd Yusoff, Mohd Ali Hassan, Mohd Rafein Zakaria, Toshinari Maeda. Absent of Pseudogene yqiG in *Escherichia coli* has influenced hydrogen production. Asian Congress on Biotechnology, Istana Hotel, Kuala Lumpur, Malaysia. 15-19 Nov 2015.

12- Zulnaim Dzulkurnain, Mohd Hafif Shamsudin, Mohd Rafein Zakaria, Puteri Edaroyati Megat Wahab, Yoshihito Shirai, Mohd Ali Hassan. Co-Composting of municipal sewage sludge and landscaping wastes by pilot scale system. Asian Congress on Biotechnology, Istana Hotel, Kuala Lumpur, Malaysia. 15-19 Nov 2015.

11- Mohd Rafein Zakaria, Satoshi Hirata, Mohd Ali Hassan. Combined pretreatment of hot compressed water and wet disk milling un13tewartia13il palm biomass structures and enhanced enzymatic digestibility. 23rd European Biomass Conference and Exhibition (EUBCE), Messe Wien Exhibition & Congress Center, Messeplatz 1, 1021 Wien, Austria. 1-4 June 2015.

10- Mohd Rafein Zakaria, Satoshi Hirata, Shinji Fujimoto, Mohd Ali Hassan. Pretreatment of oil palm biomass for high xylose and glucose recovery. 2nd International Symposium on Applied Engineering and Sciences (SAES2014) Kyushu Institute of Technology, Fukuoka, Japan. 20th – 21st Dec. 2014

9- Muhammad Azman Zakaria, Mohd Zulkhairi Mohd Yusoff, Lian Ngit Yee, Mohd Ali Hassan, Mohd Rafein Zakaria, Toshinari Maeda, Thomas. K. Wood. yqiG pseudogene of *Escherichia coli* related to hydrogen production. 2nd International Symposium on Applied Engineering and Sciences (SAES2014) Kyushu Institute of Technology, Fukuoka, Japan. 20th – 21th Dec. 2014

8- Mohd Rafein Zakaria, Satoshi Hirata, Mohd Ali Hassan. Pretreatment and bioconversion of oil palm biomass-from waste to biochemical and biomaterial. Society for Biotechnology, Japan (SBJ), Sapporo Convention Center, Hokkaido from September 9 to 11, 2014.

7- Mohd Rafein Zakaria, Satoshi Hirata, Mohd Ali Hassan. Combined pretreatment using alkaline hydrothermal and ball milling to enhance enzymatic hydrolysis of oil palm mesocarp fiber. Biomass Refinery Research Center Symposium, Tokyo, Japan. 8 September 2014.

6- Mohd Nor Faiz Norrrahim, Mohd Rafein Zakaria, Satoshi Hirata, Mohd Ali Hassan. Combining superheated steam and wet disk milling pretreatments of oil palm biomass to improve the enzyme digestibility and sugar yield Biomass Refinery Research Center Symposium, Tokyo, Japan. 8 September 2014.

5- Nurhajirah Mohamed Biran, Mohd Rafein Zakaria, Mohd Zulkhairi Mohd Yusoff, Toshinari Maeda, Yoshihito Shirai and Mohd Ali Hassan. Enhanced production of polyhydroxyalkanoates (PHA) by inactivation of PHA depolymerase gene in *Comamonas* sp. EB172. AFOB Regional Symposium, Kuala Lumpur. 2014

4- Akbar Ciptanto, Mohd Zulkhairi Mohd Yusoff, Mohd Rafein Zakaria, Toshinari Maeda and Mohd Ali Hassan. Biohydrogen production from palm oil mill effluent using anaerobic microflora under

thermophilic condition. AFOB Regional Symposium, Kuala Lumpur. 2014

3- Zulnaim Dzulkurnain, Muhamad Yusuf Hasan, Mohd Hafif Shamsudin, Siti Suliza Salamat, Mohd Rafein Zakaria, Mohd Ali Hassan. Compost performance of municipal sewage sludge and landscaping wastes by windrow system process. AFOB Regional Symposium, Kuala Lumpur. 2014

2- Mohd Rafein Zakaria, Shinji Fujimoto, Satoshi Hirata, Mohd Ali Hassan, Yoshihito Shirai. Ball milling pretreatment of oil palm biomass for enhancing enzymatic hydrolysis. AFOB Regional Symposium, Kuala Lumpur. 2014

1- Hidayah Ariffin, Mohd Rafein Zakaria, Wan Md Zin Wan Yunus, Yoshihito Shirai, Haruo Nishida and Mohd Ali Hassan. 2011. Enhanced Utilization of Polyhydroxyalkanoates by Improving the Physical Properties via Different Fermentation Strategy and Blending with Other Bio-based Materials. Asian Congress on Biotechnology 2011 (ACB 2011).

Other publications/ patents/Trademark/ Copyright

1. PCT/MY2009/000143) Tabatabaei M, **Zakaria MR**, Raha AR, Hassan MA and Shirai Y. X3; Rapid Method for Direct Extraction of PCR-compatible DNA from Environmental Samples. **Patent pending. Member**
2. PCT/MY2010/000004) **Zakaria MR**, Suraini AA, Farinazleen MG, and Hassan MA. *Comamonas putranensis* sp. nov., a novel poly(β -hydroxyalkanoates) producer isolated from digester -treated palm oil mill effluent. **Patent pending. Member**
3. PI2011004440 Hassan MA, Ariffin H, Zahari MAKM, **Zakaria MR**, Mokhtar MN, Salihon J, Shirai Y. Utilization of renewable sugars from all palm frond juice for value added products. **Patent pending. Member**
4. Biofertilizer pellets from sewage sludge for soil and plant nutrients (New:BioPellens)- **TRADEMARK: Filed. Member**
5. Standard operating procedure for composting of oil palm biomass and palm oil mill effluent sludge. **COPYRIGHT: Filed. Member**

H. PROJEK PENYELIDIKAN TERKINI dan TERDAHULU (Current and Past Research Project)

| Consultancy | | | | | |
|--------------------|---|----------------------------|--------------------|--|---------------|
| Project No. | Project Title | Role | Year | Source of fund | Status |
| UPMCS- | Research on future of renewable energy and palm oil industry in Malaysia | Member (RM 140,000) | Jun 2018- Mar 2019 | Mitsubishi Heavy Industries Asia Pasific | Completed |
| UPMCS- | Collaborative research on the use of hydrothermal carbonization technology for treatment of oil palm biomass to be used in composting: part 1 - -- reliminary study | Member (RM 140,000) | Nov 2018- Mar 2019 | Mitsubishi Heavy Industries Asia Pasific | Completed |
| UPMCS-802 | Research study on BRIS soil for maize plantation | Leader (RM 17,400) | Jan- Apr 2018 | SB Sinergi Sdn Bhd | Completed |
| | Research Study on | Member | Feb 2018 | Novozymes | |

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|--------------------|---|-------------------------------|-----------------------|---|---------------|
| | the Acceleration of Composting Process from Spent Rice Husk with Chicken Manure | | | | |
| | Nanocellulose from tropical biomass | Member (RM 300,000) | Jan 2017- Dec 2019 | Consultation | In-progress |
| UPMCS | Survey on municipal solid waste composition, utilization and management in selected cities in Malaysia”. | Member (RM 152,000) | Sept 2017-Mar 2018 | Mitsubishi Heavy Industries Asia Pasific | Completed |
| UPMCS-757 | Start-up and batch operations of co-composting of treated palm oil mill effluent sludge and empty fruit bunch at semi-commercial plant | Leader (RM 190,000) | Sep 2017-Mar 2018 | TDM Plantations Sdn. Bhd | Completed |
| UPMCS | Torrefaction of oil palm biomass for alternative fuel | Leader (RM 152,000) | 2017-April 2018 | Consultation (Mitsubishi Heavy Industries Asia Pasific) | Completed |
| UPMCS | Research Study on Biofertilizer Pellets for Landscape Plants to support CJ Bio Malaysia’s application to Department of Environment for Special Management of Scheduled Waste (SW204 & SW411). | Member (RM 250,000) | 2016 (6 months) | CJ Bio Malaysia Sdn. Bhd | Completed |
| UPMCS | Research study on the effectiveness of biofertilizer pellets for landscape plants | Member (RM 200,000) | 2015 (2 years) | Indah Water Konsortium | Completed |
| UPMCS | Co-composting of landscaping wastes and domestic sewage sludge in pilot scale windrow and 10 m ³ bioreactor systems. | Member (RM 120,000) | 2012 (2 years) | Indah Water Konsortium | Completed |
| | | | | | |
| Grants | | | | | |
| Project No. | Project Title | Role | Year | Source of fund | Status |
| IF1019E1159 | Rhamnolipids biosurfactant production from | Leader | Mar 2020-Feb 2022 | ICF-MESTECC | In-progress |

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|---------------------|---|------------------------------|-------------------------------|----------------------|-------------|
| | waste glycerine and its potential application in agricultural industries | | | | |
| InnoHUB-UPM 9003273 | Rhamnolipids as potential biofungicide in biological control of zoosporic plant pathogens | Leader | Oct 2019-Oct 2020 | UPM | In-progress |
| | Adsorptive removal of heavy metal ions from leachate final discharge using activated biochar-derived adsorbent from oil palm biomass | Member | Sep 2019-Dec 2021 | FRGS-KPT | In-progress |
| | Utilization of Municipal Solid Waste for Bioenergy Production in Universiti Putra Malaysia Bintulu Campus | Member | Jan 2019-Dec 2020 | GP-IPB | In-progress |
| | Nanocellulose from tropical biomass | Member | Jan 2017-Dec 2019 | HICoE | Completed |
| | Utilization of municipal solid waste for green energy in Universiti Putra Malaysia | Member | Nov 2017-Oct 2020 | SWCorp | In-progress |
| GP | Characterization of Biosugars Produced from Saccharification of Napier Grass Supplied with POME Final Discharge for the Production of Biochemical | Member (RM 46,000) | Nov 2017-Nov 2019 | Geran Putra, UPM | Completed |
| 9602100 | Feasibility of oil palm empty fruit bunch-pressed oil and plam oil mill effluent sludge oil as cheaper carbon sources for biosurfactant production. | Leader (RM 25,000) | Feb 2018-Feb 2019 (1 year) | Geran Putra IPS, UPM | Completed |
| 9553700 | Valorization of waste cooking oil and biodiesel side streams glycerine for | Leader (RM 94,000) | Sep 2017-Feb 2020 | Geran Putra Berimpak | In-progress |

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|---------|--|------------------------------|-------------------|----------------------|-----------|
| | sustainable production of biosurfactants by <i>Pseudomonas aeruginosa</i> strains | | | | |
| 9502300 | Elucidating xylooligosachharides formation from oil palm mesocarp fiber by hydrothermal pretreatment | Leader (RM 20,000) | 2016-2017 | Geran Putra IPS, UPM | Completed |
| 9487800 | Unravel biohydrogen production from palm oil mill effluent (POME) via anaerobic fermentation by <i>E. coli</i> BW25113 | Leader (RM 20,000) | 2016-2017 | Geran Putra IPS, UPM | Completed |
| SATREPS | Promotion of green economy with palm oil industry for biodiversity conservation in Malaysia | Member (RM 2,980,000) | Sep 2014-Sep 2018 | JSPS,JICA,KPT | Completed |
| 9385700 | Isolation and characterization of a transposon mutant of <i>Comamonas</i> sp. EB172 enhancing the production of polyhydroxyalkanoic acid | Leader (RM 30,000) | 2012 (1 year) | RUGS-UPM | Completed |

I. ID PUBLISHING *(Publishing ID)*

| | Author ID | Name |
|--------|---|----------------------|
| Scopus | 55346979800 | Zakaria, Mohd Rafein |
| ORC ID | http://orcid.org/0000-0002-2698-615X | Zakaria, Mohd Rafein |

J. RANGKAIAN SOSIAL *(Social Networking)*

| | |
|-----------------------|---|
| <i>LinkedIn</i> | https://www.linkedin.com/nhome/?trk= |
| <i>Researchgate</i> | https://www.researchgate.net/profile/Mohd_Rafein_Zakaria2 |
| <i>Google Scholar</i> | https://scholar.google.com/citations?user=GkwQf5UAAAAJ&hl=en |
| <i>Website url</i> | http://profile.upm.edu.my/mohdrafein |

K. SUPERVISION OF STUDENTS

| PHD | | | |
|--------------------|-------------|--|---------------|
| <i>Name</i> | <i>Role</i> | <i>Project Title</i> | <i>Status</i> |
| 1-Yuya Hashiguchi- | Chairman | Toxicity identification evaluation of palm oil mill effluent final discharge and its effect on aquatic organisms | On-going |

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|---------------------------------|----------|---|-----------------|
| 2-Siti Jamilah Hanim Mohd Yusof | Member | Development of biorefinery process to produce bioethanol from oil palm frond. | On-going. |
| 3-Liana Nor Megashah | Member | Non-chlorinated cellulose nanofiber production from oil palm biomass. | On-going |
| 4- Abubakar Abdullahi Lawal | Member | Evaluation of adsorption properties of oil palm fronds derived bioadsorbent for removal of organic pollutants | On-going |
| 5- Mohd Idham Hakimi Razali | Member | Development of nano-porous biochar from oil palm trunk as bio-adsorbents | On-going |
| MSc | | | |
| 1-Nordiyana Nordin. | Member | Characterization and production of biosurfactant by isolated <i>Pseudomonas aeruginosa</i> RS6. | Completed-2015 |
| 2-Nur Haziqah Aniyah Salihan | Member | Performance of B-glucosidase produced by <i>Ganoderma lucidum</i> using waste substrate as a carbon source. | Completed-2015 |
| 3-Zulnaim Dzulkurnain | Member | Co-composting of municipal sewage sludge and landscaping waste by pilot scale system and the application of compost to an ornamental plant. | Completed-2017 |
| 4-Nurhajirah Mohamed Biran | Member | Construction of knock-outs mutants of <i>Escherichia coli</i> BW25113 for improved polyhydroxyalkanoates production. | Completed-2018 |
| 5-Muhammad Azman Zakaria | Member | Pseudogene product YqiG is important for pflB expression and biohydrogen production in <i>Escherichia coli</i> BW25113. | Completed-2018 |
| 6-Azam Fikri Taifor- | Chairman | Application of metabolic engineered <i>Escherichia coli</i> strains to enhance biohydrogen production from palm oil mill effluent | Completed-2018 |
| 7-Norlailiza Ahmad | Chairman | Subcritical H ₂ O-CO ₂ pretreatment of oil palm mesocarp fiber for xylooligosaccharide and biosugars production. | Completed-2018 |
| 8-Khairiatul Nabilah Jansar- | Member | Production of glucose from oil palm biomass using hydrothermal pretreatment. | Completed-2018. |
| 9-Nur Fatin Athirah Ahmad Rizal | Member | Effect of physic-chemical and biological pretreatment of oil palm biomass for fermentable sugars production. | Completed-2018 |
| 10- Nur Aina Natasha | Chairman | Production and characterization of a biosurfactant produced by <i>Pseudomonas aeruginosa</i> from sludge oil and pressed empty fruit bunch. | On-going |
| 11- Shobanah Menon Baskaran | Chairman | Production and characterization of a biosurfactant produced by | On-going |

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|---|----------|--|----------------|
| | | <i>Pseudomonas aeruginosa</i> from biodiesel side stream glycerine. | |
| Undergraduate | | | |
| 1- Nur Idayu Zahari | Chairman | Isolation and characterization of lipase-producing bacteria. | Completed-2013 |
| 2-Fairuzana Jaafar | Chairman | Screening, isolation and characterization of protease producing microorganisms. | Completed-2013 |
| 3-Khyruz Tasyriq Abu Samah | Chairman | Extraction, production and optimization of rhamnose from Pomelo peel. | Completed-2013 |
| 4-Nor Salwa Alhana Ahmad Fozi | Chairman | Isolation and screening of hemicellulose degrading bacteria. | Completed-2016 |
| 5-Nurul Hidayah Jamaluddin | Chairman | Isolation and screening of cellulose-degrading bacteria. | Completed-2016 |
| 6-Pang Lih Min | Chairman | Optimization of rhamnolipid production by <i>Pseudomonas aeruginosa</i> RW9 using waste frying oil. | Completed-2017 |
| 7-Abdullah Hadi Ahmad Suhairun | Chairman | Identification of cellulase and he19tewartia19oseroducing bacteria | Completed-2017 |
| 8-Nur Farzana Izzati Mohd Jaslina | Chairman | Optimization of biosurfactant production from waste glycerine by <i>Pseudomonas aeruginosa</i> RS6. | Completed-2017 |
| 9-Diah Erninda Idris | Chairman | Biosurfactant production by <i>Pseudomonas aeruginosa</i> RS6 using waste glycerol as a substrate. | Completed-2018 |
| 10-Nur Alya Syafinaz Mohd Nasir. | Chairman | Antibacterial properties of biosurfactant produced by <i>Pseudomonas aeruginosa</i> RW9 against <i>Pantoa ananatis</i> . | Completed-2019 |
| 11-Ahmad Syafiq Mukhlis Ahmad Sabri. | Chairman | Antimicrobial potential of rhamnolipids produced by <i>Pseudomonas aeruginosa</i> RS6 against <i>Pantoa st19tewartia</i> | Completed-2019 |
| 12- Muhammad Haikal Iman bin Ab Halim | Chairman | Isolation and screening of biosurfactant producing bacteria from oil-contaminated soil | Completed-2020 |
| 13- Nurfariesya Farhana Shaharfuiddin | Chairman | Characterization of locally isolated biosurfactant producing bacteria by phenotypic approach | Completed-2020 |
| 14- Yew Jing Lam | Chairman | Isolation and screening of biosurfactant producing bacteria from petroleum refinery wastewater | Completed-2020 |
| Internship students | | | |
| 1-Nalahyini Kumar. BSc (Biotechnology) (Hons.) Manipal International University (MIU), No 1, MIU Boulevard, 71800, Putra Nilai, Negeri Sembilan Darul Khusus. 13thFebruary 2017 till 21st April 2017 (10 weeks). | | | |
| 2-Anuja Selvadurai. BSc (Biotechnology) (Hons.) Manipal International University (MIU), No 1, MIU | | | |

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| Boulevard, 71800, Putra Nilai, Negeri Sembilan Darul Khusus. 29th January 2018 till 6th April 2018 (10 weeks). |
| 3-Divieya Nadrraja BSc (Biotechnology) (Hons.) Manipal International University (MIU), No 1, MIU Boulevard, 71800, Putra Nilai, Negeri Sembilan Darul Khusus. 29th January 2018 till 6th April 2018 (10 weeks). |
| 4- Safia Abdullahi Ali Bachelor of Biotechnology. Infrastructure University of Kula Lumpur, Corporate Block, Unipark Suria, Jalan Ikram-Uniten, 43000 Kajang, Selangor. Malaysia. 23rd July – 12th Oct 2020. (12 weeks). |
| 7- Nada Salah Ali Alsabbah. Bachelor of Biotechnology. INTI International University, Persiaran Perdana BBN, Putra Nilai, 71800 Nilai, Negeri Sembilan. 1st July – 20th Oct 2020. (16 weeks). |

L. Examiner to Student

| | |
|----|--|
| 1. | PhD- Biosynthesis of carbohydrate and lipid in <i>Chlorella vulgaris</i> for biofuel feedstock production. Universiti Perguruan Sultan Idris. External examiner. Dec 2019. |
| 2. | MSc – Biomethane production from acidified palm oil mill effluent in thermophilic anaerobic sequential batch reactor. Universiti Kebangsaan Malaysia. External examiner. Mar 2020. |
| 3. | |

M. Professional Societies

| | Author ID |
|----|--|
| 1. | Member- Malaysia Society for Microbiology- National. Since 2014- |
| 2. | Member- Japanese Society for Biotechnology- International. Since 2014- |
| 3. | Member- Asian Federation of Biotechnology- International. Since 2014- |
| 4. | Member Persatuan Pegawai Akademik Universiti Putra Malaysia. National. Since 2015 |