



# PROF. DR AZIZ AHMAD

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## QUALIFICATIONS

- Doctor of Philosophy (Plant Biochemistry), University Putra Malaysia
- Bachelor of Science (Biochemistry and Microbiology), University Pertanian Malaysia

## FIELD OF RESEARCH

- Plant Biochemistry
- Plant Biotechnology
- Plant Cell culture

## RESEARCH INTEREST

Biochemical mechanism and plant-microbes interaction in mitigating the abiotic and biotic stresses in crops. Research focus mainly on the involvement of lipid and carbohydrate as defense and adaptation metabolites in crops, particularly rice and tuber under drought, salinity stresses as well as infestation by pathogenic microbes.

## RESEARCH PROJECTS

- Enhancing plant tolerance to biotic and abiotic stresses with utilization advancement in nanoparticle technology (2019-2024) LRGs: Development of climate ready rice for sustaining food security in Malaysia
- Elucidating the regulatory of flower development in induced mutant polyploidy rice *Oriza sativa* (2016-2019)
- Establishment of salt tolerant rice via over expression of omega-3-desaturase gene (2013-2015)

## EXPERT LINKAGES

- RAJEEV BHAT – ERA FOR FOOD BY PRODUCT VALORISATION TECHNOLOGIES (VALORTECH) ESTONIAN UNIVERSITY OF LIFE SCIENCE. TARTU ESTONIA EUROPEAN UNION

## PROFFESIONAL MEMBERSHIP

- Malaysian Society for Plant Physiology
- International Society of Horticulture (ISH)

## GRANTS

Project : Enhancing plant tolerance to biotic and abiotic stresses with utilization advancement in nanoparticle technology

Position : Head of Project

Grant Name : LRGS

Status : Active

Amount : RM560,000.00

Project : Elucidating the Bio-efficacy of Coastal Halophytes Rhizobacteria in Promoting Rice Plant Health, Growth and Productivity on Saline Soil

Position : Co-researcher

Grant Name : FRGS

Status : Active / Completed

Amount : RM118,500.00

## PUBLICATIONS

### Journal Article

1. Wan Afifudeen, C.L., Aziz, A., Wong, L.L., Takahashi, K., Toda, T., Abd Wahid, M.E., Cha, T.S. 2021. Transcriptome-wide study in the green microalga *Messastrum gracile* SE-MC4 identifies prominent roles of photosynthetic integral membrane protein genes during exponential growth stage. *Phytochemistry*, 192, 112936
2. Loh, S.H., Chen, M.K., Fauzi, N.S., Aziz, A., Cha, T.S. 2021. Enhanced fatty acid methyl esters recovery through a simple and rapid direct transesterification of freshly harvested biomass of *Chlorella vulgaris* and *Messastrum gracile*. *Scientific Reports*, 11(1), 2720.
3. Wan Afifudeen, C.-L., Loh, S.H., Aziz, A., Takahashi, K., Effendy, A.W.M., Cha, T.S. 2021. Double-high in palmitic and oleic acids accumulation in a non-model green microalga, *Messastrum gracile* SE-MC4 under nitrate-repletion and -starvation cultivations. *Scientific Reports*, 11(1), 438.

4. Teh, K.Y., Loh, S.H., Aziz, A., Takahashi, K., Effendy, A.W.M., Cha, T.S. 2021. Lipid accumulation patterns and role of different fatty acid types towards mitigating salinity fluctuations in *Chlorella vulgaris*. *Scientific Reports*, 11(1), 438
5. Cha, T.S., Yee, W., Phua, P.S.P., Loh, S.H., Aziz, A. 2021. A brief period of darkness induces changes in fatty acid biosynthesis towards accumulation of saturated fatty acids in *Chlorella vulgaris* UMT-M1 at stationary growth phase. *Biotechnology Letters*, 43(4), pp. 803–812.
6. Ng, L.C., Adila, Z.N., Shahrul Hafiz, E.M., Aziz, A. 2021. Foliar Spray of Silicon Enhances Resistance against *Pyricularia oryzae* by Triggering Phytoalexin Responds in Aerobic Rice. *European Journal of Plant Pathology*, 159(3), pp. 673–683.
7. Ng, L.C., Adila, Z.A., Hafiz, E.M.S., Aziz, A., Ismail, M.R. 2020. Foliar sprayed-silicon to induce defense-related enzymatic activity against *pyricularia oryzae* infection in aerobic rice. *Malaysian Applied Biology*, 49(4), pp. 213–221.
8. Mohd-Razali, A., Morni, M.M., Taib, M., Ahmad, A. 2020. Phytic acid content and digestibility of coconut residues derived-proteins after solid-state fermentation by *aspergillus awamori*. *Malaysian Applied Biology*, 49(4), pp. 121–126.
9. Jamali, S.A.M., Badaluddin, N.A., Baharum, S.N., Salim, J.M., Ahmad, A., Taib, M. 2020. *Trichoderma atroviride* isolated from mangroves of the east coast of peninsular Malaysia exhibited high tolerance against heavy metal cadmium. *Malaysian Applied Biology*, 49(4), pp. 113–120.
10. Chaudhry, G.-E.-S., Rahman, N.H., Sevakumaran, V., Ahmad, A., Mohamad, H., Zafar, M.N., Sung, Y.Y., Muhammad, T.T. 2020. Induction of cytotoxicity by *Bruguiera gymnorhiza* in human breast carcinoma (MCF-7) cell line via activation of the intrinsic pathway. *Journal of Advanced Pharmaceutical Technology and Research*, 11(4), pp. 233–237.
11. Norlina, R., Norashikin, M.N., Loh, S.H., Aziz, A., Cha, T.S. 2020. Exogenous Abscisic Acid Supplementation at Early Stationary Growth Phase Triggers Changes in the Regulation of Fatty Acid Biosynthesis in *Chlorella vulgaris* UMT-M1. *Applied Biochemistry and Biotechnology*, 191(4), pp. 1653–1669
12. Anne-Marie, K., Yee, W., Loh, S.H., Aziz, A., Cha, T.S. 2020. Effects of Excess and Limited Phosphate on Biomass, Lipid and Fatty Acid Contents and the Expression of Four Fatty Acid Desaturase Genes in the Tropical *Selenastraceae* *Messastrum gracile* SE-MC4. *Applied Biochemistry and Biotechnology*, 190(4), pp. 1438–1456.
13. Anne-Marie, K., Yee, W., Loh, S.H., Aziz, A., Cha, T.S. 2020. Influence of nitrogen availability on biomass, lipid production, fatty acid profile, and the expression of fatty acid desaturase genes in *Messastrum gracile* SE-MC4. *World Journal of Microbiology and Biotechnology*, 36(1), 17.
14. Teh, K.Y., Afifudeen, C.L.W., Aziz, A., Wong, L.L., Loh, S.H., Cha, T.S. 2019. De novo whole genome sequencing data of two mangrove-isolated microalgae from Terengganu coastal waters. *Data in Brief*, 27, 104680.
15. Jusoh, M., Loh, S.H., Aziz, A., Cha, T.S. 2019. Gibberellin Promotes Cell Growth and Induces Changes in Fatty Acid Biosynthesis and Upregulates Fatty Acid Biosynthetic Genes in *Chlorella vulgaris* UMT-M1. *Applied Biochemistry and Biotechnology*, 188(2), pp. 450–459.

16. Nyuk, L.M.A., Teh, K.Y., Ahmad, A., Lam, S.S., Saidon, S.A.B., Husri, M.N., San, C.T. 2019. Metabolite profiling of *Scenedesmus regularis* using nuclear magnetic resonance (NMR). *Malaysian Applied Biology*, 48(1), pp. 117–121.
17. Mohd-Razali, A., Taib, M., Murni, M., Ahmad, A. 2019. Bioconversion of coconut-residue to soluble protein by *Aspergillus awamori*. *Malaysian Applied Biology*, 48(1), pp. 241–249.
18. Shamsudin, H.S., Yaman, M.A.M., Ahmad, A., Hassim, M.F.N. 2019. Elucidating the dynamic of drought tolerance rice, mr219-4 to the *Xanthomonas oryzae* infection. *Malaysian Applied Biology*, 48(1), pp. 157–162.
19. Ma, N.-L., Aziz, A., Teh, K.-Y., Lam, S.S., Cha, T.-S. 2018. Metabolites Re-programming and Physiological Changes Induced in *Scenedesmus regularis* under Nitrate Treatment. *Scientific Reports*, 8(1), 9746.
20. Norhanizan, S., Aziz, A. 2018. Thidiazuron amends the organ development of endangered aquatic plant *Cryptocoryne elliptica* Hook. F. *IOP Conference Series: Materials Science and Engineering*, 440(1), 012046.
21. Andriani, Y., Lazim, N.H.M., Asari, A., ...Ahmad, A., Mohamad, H. 2018. Evaluation of selected echinoderms from peninsular Malaysia for cytotoxicity against HepG2 cells, antioxidant and antibacterial activities, and their metabolites profiling. *Journal of Applied Pharmaceutical Science*, 8(10), pp. 32–038.
22. Norashikin, M.N., Loh, S.H., Aziz, A., Cha, T.S. 2018. Metabolic engineering of fatty acid biosynthesis in *Chlorella vulgaris* using an endogenous omega-3 fatty acid desaturase gene with its promoter. *Algal Research*, 31, pp. 262–275.
23. Ma, N.L., Che Lah, W.A., Kadir, N.A., ...Lam, S.D., Ismail, M.R. 2018. Susceptibility and tolerance of rice crop to salt threat: Physiological and metabolic inspections. *PLoS ONE*, 13(2), e0192732.
24. Osman, S.-M., Chuah, T.S., Loh, S.H., Cha, T.S., Ahmad, A. 2018. Light-color-induced changes in fatty acid biosynthesis in *Chlorella* sp. strain KS-MA2 in early stationary growth phase. *Biotropia*, 25(1), pp. 33–42.
25. Ismail, Z., Ahmad, A., Muhammad, T.S.T. 2017. Phytochemical screening of in vitro *Aglaonema simplex* plantlet extracts as inducers of SR-B1 ligand expression. *Journal of Sustainability Science and Management*, 12(2), pp. 34–44
26. Rahman, N.H., Vigneswari, S., Ahmad, A., Mohamad, H., Muhammad, T.S.T. 2017. Cytotoxic effects and evidence of Apoptosis from *Avecennia alba* extracts on human breast cancer cell line (Mcf-7). *Journal of Sustainability Science and Management*, 12(2), pp. 80–88.
27. Osman, S.M., Seng, C.T., Hong, L.S., San, C.T., Ahmad, A. 2017. Variations in growth and fatty acid composition of mangrove-isolated *Chlorella* strains. *Journal of Sustainability Science and Management*, 12(2), pp. 17–25.
28. Lau, C.C., Loh, S.H., Aziz, A., Cha, T.S. 2017. Effects of disrupted omega-3 desaturase gene construct on fatty acid composition and expression of four fatty acid biosynthetic genes in transgenic *Chlorella vulgaris*. *Algal Research*, 26, pp. 143–152
29. Ahmad, A., Osman, S.M., Cha, T.S., Loh, S.H. Phosphate-induced changes in fatty acid biosynthesis in *Chlorella* sp. KS-MA2 strain. *Biotechnologia*, 97(4), pp. 295–304.
30. Mat Lazim, N.H., Asari, A., Mohamad, F., ...Taib, M., Mohamad, H. 2016. Potential anti-atherosclerotic compound isolated from *Acanthaster planci*. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, 7(1), pp. 482–487.

31. Nuruzzaman, M., Sharoni, A.M., Satoh, K., ...Ahmad, A., Kikuchi, S. 2015. NAC transcription factor family genes are differentially expressed in rice during infections with rice dwarf virus, rice black-streaked dwarf virus, rice grassy stunt virus, rice ragged stunt virus, and rice transitory yellowing virus. *Frontiers in Plant Science*, 6(September), 676.
32. Zairul-Fazwan, M.Z., Aziz, A., Cha, T.S. 2015. Isolation and characterization of heat-shock protein 90 (HSP90) specific promoter of *Cryptocoryne ciliate*. *Malaysian Applied Biology*, 44(1), pp. 83–87
33. Aziz, A., Siti-Fairuz, M., Abdullah, M.Z., Ma, N.L., Marziah, M. 2015. Fatty acid profile of salinity tolerant rice genotypes grown on saline soil. *Malaysian Applied Biology*, 44(1), pp. 119–124.
34. Aziz, A., Jack, R. 2015. Total phenolic content and antioxidant activity in *Nypa Fruticans* extracts. *Journal of Sustainability Science and Management*, 10(1), pp. 87–91.
35. Jusoh, M., Loh, S.H., Chuah, T.S., Aziz, A., Cha, T.S. 2015. Elucidating the role of jasmonic acid in oil accumulation, fatty acid composition and gene expression in *Chlorella vulgaris* (Trebouxioophyceae) during early stationary growth phase. *Algal Research*, 9, pp. 14–20.
36. Jusoh, M., Loh, S.H., Chuah, T.S., Aziz, A., Cha, T.S. 2015. Indole-3-acetic acid (IAA) induced changes in oil content, fatty acid profiles and expression of four fatty acid biosynthetic genes in *Chlorella vulgaris* at early stationary growth phase. *Phytochemistry*, 111, pp. 65–71
37. Al-madhagi, I.A.H., Hasan, S.M.Z., Ahmad, A., Yusoff, W.A. 2014. The starch status during growth and development of strawberry plant under tropical climatic condition. *Acta Horticulturae*, 1024, pp. 115–120
38. Ighwela, K.A., Ahmad, A.B., Abol-Munafi, A.B. 2014. Evaluation of apparent digestibility coefficients of different dietary maltose levels in Nile Tilapia (*Oreochromis niloticus*) fingerlings. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, 5(2), pp. 1014–1018
39. Ma, N.L., Cha, T.S., Maziah, M., Aziz, A. 2013. Comparison of particle bombardment-transformation parameters between stem and calli explants of *Aglaonema simplex*. *Journal of Fisheries and Aquatic Science*, 8(4), pp. 544–552.
40. Ighwela, K.A., Bin Ahmad, A., Abol-Munafi, A.B. 2013. Water stability and nutrient leaching of different levels of maltose formulated fish pellets. *Global Veterinaria*, 10(6), pp. 638–642.
41. Aziz, A., Nurhalim, M.S. 2012. Antioxidants activity in pineapple CV. n36 culture under Aluminium stress. *Malaysian Applied Biology*, 41(1), pp. 23–28
42. Cha, T.S., Yee, W., Aziz, A. 2012. Assessment of factors affecting Agrobacterium-mediated genetic transformation of the unicellular green alga, *Chlorella vulgaris*. *World Journal of Microbiology and Biotechnology*, 28(4), pp. 1771–1779.
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44. Willy, Y., Cha, T.S., Aziz, A. 2012. Factors affecting Agrobacterium-mediated genetic transformation of marine microalga, *Nannochloropsis* sp. *Journal of Sustainability Science and Management*, 7(2), pp. 153–163.

45. Norhayati, Y., Aziz, A., Nurhuda, Y. 2012. Effects of salinity on growth and chlorophyll content of *aglaonema simplex* cultures. *Journal of Sustainability Science and Management*, 7(1), pp. 37–41.
46. Cha, T.S., Ng, F.L., Aziz, A., Loh, S.H. 2012. Effect of nitrate on oil content and fatty acid composition of *Nannochloropsis* SP. At early stationary growth phase. *Journal of Sustainability Science and Management*, 7(1), pp. 30–36.
47. Cha, T.S., Chen, J.W., Goh, E.G., Aziz, A., Loh, S.H. 2011. Differential regulation of fatty acid biosynthesis in two *Chlorella* species in response to nitrate treatments and the potential of binary blending microalgae oils for biodiesel application. *Bioresource Technology*, 102(22), pp. 10633–10640.
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49. Cha, T.-S., Chen, C.-F., Yee, W., Aziz, A., Loh, S.-H. 2011. Cinnamic acid, coumarin and vanillin: Alternative phenolic compounds for efficient *Agrobacterium*-mediated transformation of the unicellular green alga, *Nannochloropsis* sp. *Journal of Microbiological Methods*, 84(3), pp. 430–434
50. Ramanathan, T., Ahmad, A., Ahmad, A.S., Kalimutho, M. 2011. Taxonomical identity and polysaccharide produced by *Bacillus* species isolated from old aged medicinal decoctions. *Journal of Sustainability Science and Management*, 6(1), pp. 2–9
51. Idris, W.M.R.W., Saman, Md.Y.M., Ahmad, A., Noor, A.S.M. 2010. Organizing ready-made virtual objects for virtual environments. *Proceedings - 2010 International Conference on User Science and Engineering, i-USEr 2010*, pp. 220–225, 5716756.
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54. Saman, M.Y.M., Rahman, M.N.A., Ahmad, A., Tap, A.O.M. 2006. A fast-optimal for DNA sequences similarity search. *WSEAS Transactions on Computers*, 5(7), pp. 1525–1532.
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## SUPERVISION

### Doctor of Philosophy Degree

Thesis Title : Elucidating the effects of synthetic and natural polyhydroxy alkaloids from *Aglaonema simplex* on the expression levels of SRB1 gene

Student Name : Zuriah Ismail

Role : Main Supervisor

Status : Graduated

Thesis Title : Effects of nutrients, light and temperature on oil content and fatty acid biosynthesis gene in *Chlorella* sp KS-MA2

Student Name : Siti Mariam Osman

Role : Main Supervisor

Status : Graduated

### Master Degree

Thesis Title : Biochemical characterization of Si-mediated rice plant infected with blast pathogen *Pyricularia oryzae*

Student Name : Nura Adila bt Zahari

Role : Co Supervisor

Status : Graduated

Thesis Title : Protocols for *Agrobacterium*-mediated transformation of rice

Student Name : Muhammad Haziq Syahir bin Khaizuran

Role : Main Supervisor

Status : Graduated

### COURSE TAUGHT

- Research Methodology in Biology
- Ecological Biochemistry
- Biochemistry
- Cell and Tissue culture

### LINKS

- SCOPUS : <https://www.scopus.com/authid/detail.uri?authorId=24824205100>
- WoS : M-4919-2016  
<https://www.webofscience.com/wos/author/record/7469392>
- Researchgate : <https://www.researchgate.net/profile/Aziz-Ahmad-12>
- ORCID : <https://orcid.org/0000-0002-2270-5197>