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BOOK OF ABSTRACTS

1ST BIONANOTECHNOLOGY RESEARCH SEMINAR

5 OCT 2020

AUDITORIUM AL-RAZI, T02 BUILDING, FACULTY OF SCIENCE, UTM



BioNanoSem
BIONANOTECHNOLOGY RESEARCH

Edited By:
Nik Ahmad Nizam Nik Malek
Atieya Abdul Hadi



1st Bionanotechnology Research
Seminar 2020

**Organized
by**



5 October 2020

Auditorium Al-Razi, T02 Building, Faculty of Science, Universiti Teknologi Malaysia
<https://csnano.utm.my/bionanosem/>

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BioNanoSem 2020
(Bionanotechnology Research Seminar)

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ATIEYA ABDUL HADI

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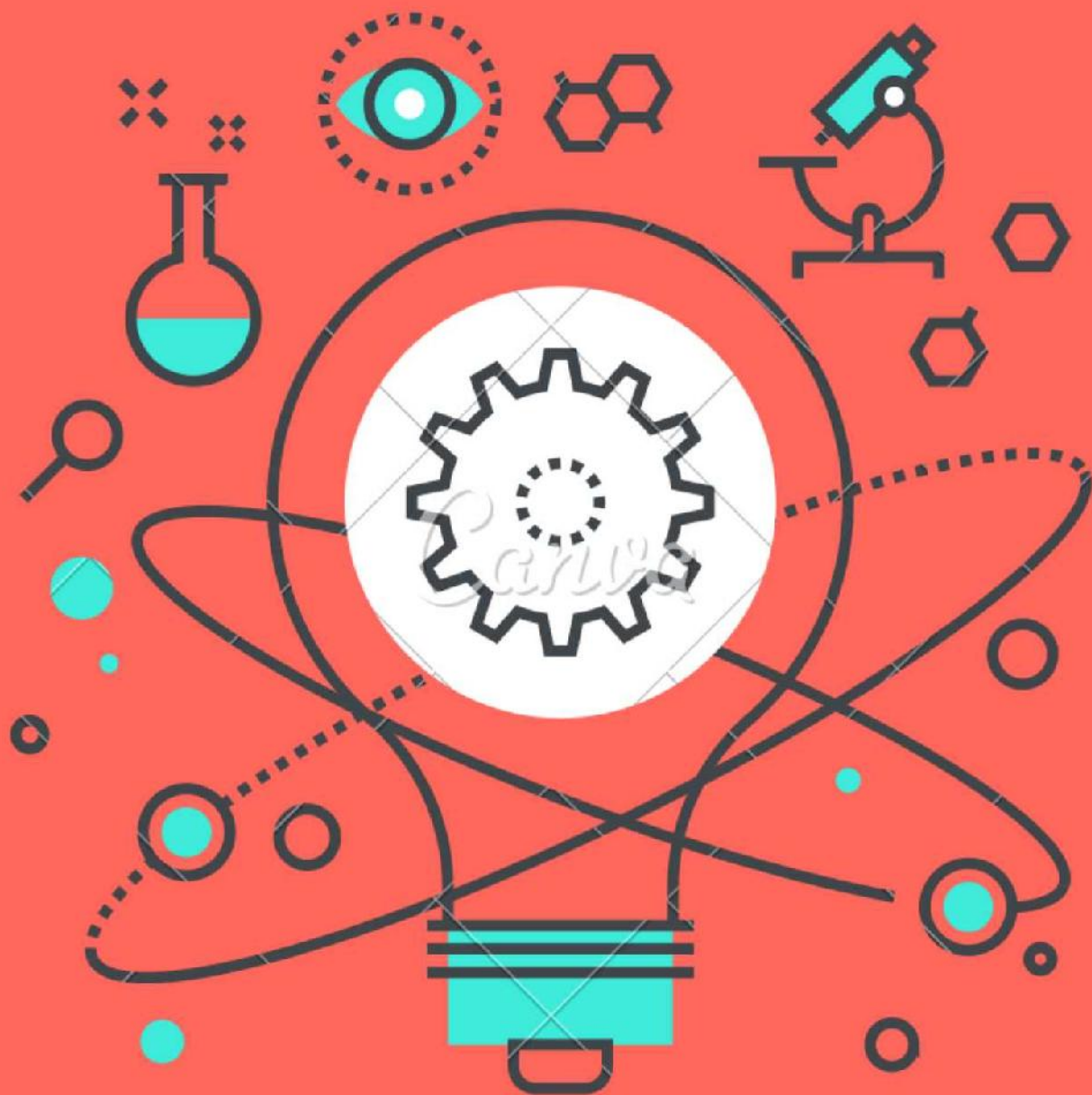
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BIO. NANO. SEMINAR.



1ST BIONANOTECHNOLOGY RESEARCH SEMINAR

5 October 2020

Auditorium Al-Razi, T02, Faculty of Science, UTM

<https://csnano.utm.my/>

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1st Bionanotechnology Research Seminar 2020

Foreword



BioNanoSem
BIONANOTECHNOLOGY RESEARCH

Foreword by program advisor

Bismillahirrahmanirahim.

In the name of Allah the Almighty, I am very grateful to Allah SWT for the given opportunity in organizing 1st Bionanotechnology Research Seminar in 2020 or in short, BioNanoSem 2020. This is the 1st seminar held for sharing information and knowledge about research in bionanotechnology field. Bionanotechnology is the combination of biology or living things and nanotechnology. It can also be considered as application of nanotechnology for biological application such as antibacterial nanomaterials, nanobiomaterials, nanomedicine etc.

The main purpose of this 1st seminar is to obtain information on the research progress from each Transdisciplinary Research (TDR) Projects under an umbrella of a TDR Program (UTM-TDR17). The program is about development of antibacterial wound healing agent from silver nanoparticles that have been synthesized using local plant extract. The idea of this project is started by enhancing the plant with phytochemical compounds using plant tissue culture and then, biosynthesis, immobilization, *in vitro* and *in vivo* analyses and finally, halal documentation of the product. It is important that we all can learn from each other since the program is transdisciplinary where it involves several different disciplines including plant and animal tissue cultures, physical, inorganic and analytical chemistries and Halal science.

I would like to thank to all the committee members for organizing this wonderful seminar and participants who sharing your knowledge and experiences for us. May this event create wonderful ecosystem for transdisciplinary research.

ASSOC. PROF. TS. CHM DR. NIK AHMAD NIZAM NIK MALEK

Director,

Centre for Sustainable Nanomaterials (CSNano),

Ibnu Sina Institute for Scientific and Industrial Research (ISI-ISIR),

Universiti Teknologi Malaysia (UTM).

*Program leader for UTM Transdisciplinary Research Grant. UTM-TDR17: Antibacterial Wound Healing Application of Bio-Inspired Green Silver Nanoparticles.

Foreword by program director

Assalamualaikum and greetings to everyone.

First and foremost, it is my great pleasure to welcome all of our distinguished keynote speakers, oral presenters and participants to the 1st BioNanotechnology Seminar (BioNanoSem) 2020. My deepest gratitude for everyone's full commitment to participate in this conference and to share their expertise with all of the participants. I hope that this seminar will act as a blooming platform for academicians, researchers and students, especially in the field of bionanotechnology to exchange the knowledge and possible advancement for the betterment of the future.

This 1st seminar is an ongoing plan by the Center of Sustainable Nanomaterial (CSNano), Ibnu Sina starting from February 2020. Even though in the midst of a pandemic due to the coronavirus outbreak, we truly believe this does not stop us from executing our dream. Therefore, Alhamdulillah we managed to carry out the seminar on 5th October 2020 and insyaAllah will continue this platform annually starting this year.

On behalf of the organizing committee, I wish to express our sincerest gratitude and appreciation to CSNano UTM especially our advisor, Assoc Prof Ts ChM Dr Nik Ahmad Nizam Nik Malek for continuous support in making this seminar a reality. Finally, I would like to take this opportunity to congratulate the organizing committee for their remarkable dedication and creativity in making this joint seminar a resounding success. My best wishes to all of the participants for an intellectually stimulating and memorable experience. May Allah's blessing be upon you.

"The capacity to learn is a gift; the ability to learn is a skill; the willingness to learn is a lifetime choice."

ATIEYA ABDUL HADI

PhD Student,
Bioscience Program,
Department of Biosciences, Faculty of Science, UTM

1st Bionanotechnology Research Seminar 2020

Organizing Committee

Advisor : Assoc Prof Ts ChM Dr Nik Ahmad Nizam Nik Malek

Director : Atieya Abd Hadi

Committee Member :-

Secretary : Muhammad Redza Mohd Radzi

Treasurer : Muhammad Hariz Asraf Hassan

Place and technical : Siti Nabihan Ishak

F&B : ChM Shahrulnizahana Mohammad Din

Protocol : Tan Yong Chee

MC : Nur Aqilah Faiqah

Registration : Suziana



Date: 5 October 2020

Venue: Auditorium Al-Razi, Level 1, T02 Building, Faculty of Science, UTM

Time	Activities	Presentation Title
845 – 900	Registration	
900 - 915	Opening Ceremony by Director of CSNano, ISI-SIR, UTM	
915 - 945	Keynote Speaker 1: Prof Dr Mustaffa Shamsuddin	Chemistry of Nanoparticles
945 - 1015	Keynote Speaker 2: Dr Azman Abd Samad	Plant Tissue Culture as Tool for Plant Biomass Production
1015 - 1045	Tea Break	
1045 - 1115	Keynote Speaker 3: Assoc Prof Ts ChM Dr Nik Ahmad Nizam Nik Malek	Immobilization of Nanoparticles
1115 - 1130	Oral Presentation 1: Nur Kamilah Mohd Nordin	Effect of Plant Growth Regulators on the Shoot Biomass and Antioxidant Activity of <i>Persicaria odorata</i>
1130 - 1145	Oral Presentation 2: Saeed Ullah	An Efficient Method for Induction of Adventitious Root from <i>Persicaria odorata</i>
1145 – 1200	Oral Presentation 3: Siti Nabihan Ishak	The Synergistic Effect of Nanocomposite Zeolite/Silver/LDH for Dyes Removal and Bacterial Colonization Inhibition
1200 – 1215	Oral Presentation 4: Muhammad Hariz Asraf Hassan	Antibacterial Assessment of in situ Synthesised Bio-Inspired Silver Nanoparticles using <i>Orthosiphon aristatus</i> Leaf Extract Immobilised on Synthesised Zeolite A
1215 – 1245	Keynote Speaker 4: Dr Khairunadwa Jemon	Dipping Your Toes in the Water: Introduction to Experimental and Methods for Wound Healing Assessment
1245 -230	Break/Lunch	
230 – 245	Oral Presentation 5: Faridah Aminullah Lubis	Green Synthesized Silver Nanoparticles: A Future Intervention to Minimize Antibiotics Resistance
245 – 315	Keynote Speaker 5: Assoc Prof Dr Ahmad Che Yaacob	Pengenalan dan Prosedur Persijilan Halal Malaysia
315 – 330	Oral Presentation 6: In Am Nabila binti Mohd Hashim	<i>Halal</i> Pharmaceutical Certificate Guideline
330 - 345	Closing Ceremony by Director of CSNano, ISI-SIR, UTM	

1st Bionanotechnology Research Seminar 2020

Keynote Lecture



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BIONANOTECHNOLOGY RESEARCH

Chemistry of Nanoparticles

Mustaffa Shamsuddin

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Abstract

Nanomaterials are an increasingly important product of nanoscience. They possess unique properties such as optical, electronic or mechanical properties. Due to size and surface area to volume ratio, their chemical and physical properties differ from those of bulk materials. They have wide applications in catalysis, electronics, healthcare, cosmetics, water purification and other areas. This presentation will give an overview of how nanosized structure may affect the properties of materials. The importance of size control and the stabilization of nanoparticles is explained. Methods of synthesis of nanoparticles is also discussed. The biosynthesis approach employing plants extract is emphasised.

Keywords: Nanoparticles; stabilization; synthesis

Biography



Mustaffa Shamsuddin joined UTM as an Assistant Lecturer A in 1984 after receiving his B.Sc (Hons) in Chemistry from the University of East Anglia at Norwich. He obtained his M.Sc in Chemistry also from the University of East Anglia in 1986 and was then appointed as a Lecturer at the Faculty of Science, UTM. He then went on to the University of Leeds where he earned his Ph.D. in Coordination & Organometallic Chemistry in 1995 working with Professor Bernard Shaw in novel metal complexes of mixed nitrogen-phosphorus donor ligands. He was promoted to Associate Professor in 2000 and to Professor in 2008. During his service in UTM, he had served as Head, Department of Chemistry (2005-2007), Deputy Dean, Faculty of Science (2007-2009) and Director, Ibnu Sina Institute (2011-15). He retired from academia in 2020 after 36 years of service to the academic and research field. Currently, he is an Adjunct Professor in Inorganic Chemistry at the Faculty of Science, UTM.

Plant Tissue Culture as Tool for Plant Biomass Production

Azman Abd Samad

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Abstract

Plant tissue culture has been studied intensively to clone many plant species including ornamental plants, herbs and crop plants. Organ culture is more favourable due to its high regeneration percentage and low potential of somaclonal variation. This technique is not only produced mass planting materials but pathogen free plants. However, the regeneration frequency of plants are often low and plant species dependent. Diversity of plant species offer high resources of invaluable plant secondary metabolites. The drawback is the accumulation of plant secondary metabolite is organ localised and usually very low in the tissue cultured plants. Hence, this paper discusses the strategies to enhance shoot biomass by varying explant type, plant growth regulators and type of plant cultures. Type of cultures applied will also affect the plant products. The enhancement of secondary metabolites in adventitious root culture system is also elaborated. This approach enables production of high frequency micropropagated plants and plant biomasses with high antioxidant metabolites.

Keywords: Organ culture; secondary metabolite; plant biomass; adventitious root culture

Biography



Dr. Azman Abd Samad is a senior lecturer at Department of Biosciences, Faculty of Science, UTM. His expertise is plant tissue culture and plant genetic modification. Currently, he is actively involved in micropropagation of pineapple, establishment of organ culture of Malaysian herbs and optimization of *Agrobacterium*-mediated transformation method of medicinal plants. He is a project leader for UTM Transdisciplinary Research Grant (UTM-TDR17.1 (T2): Enhancement of bioactive compounds from cell and organ cultures of selected Malaysian herbs).

Immobilization of Nanoparticles

Nik Ahmad Nizam Nik Malek

Centre for Sustainable Nanomaterials, Centre for Sustainable Nanomaterials (CSNano),
Ibnu Sina Institute for Scientific and Industrial Research (ISI-ISIR),
Universiti Teknologi Malaysia (UTM)
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Abstract

There are some problems with nanoparticles related to safety issue, reactivity and aggregation or agglomeration issues. One of the approaches to solve these problems is by immobilizing the nanoparticles onto suitable support materials. Hence, this paper discusses on suitable immobilization technique for nanoparticles and gives some insight on the immobilization process. The discussion is focusing more on immobilizing silver nanoparticles (AgNP) on zeolites and some important fundamental principle behind this technique. The AgNP can be immobilized on zeolite by initially enriched the zeolite with silver ions and then, reduced the loaded silver ions to AgNP using reducing agent. The AgNP immobilized on zeolite could act as antimicrobial agent in various application.

Keywords: Nanoparticles; immobilization

Biography



Associate Professor Ts ChM Dr Nik Ahmad Nizam Nik Malek is a Director of Centre of Sustainable Nanomaterials (CSNano), Ibnu Sina Institute for Scientific and Industrial Research (ISI-ISIR), Universiti Teknologi Malaysia (UTM), lecturer at Department of Biosciences, Faculty of Science, UTM, professional chemist and technologist, and chartered chemist. His expertise is applied materials science where his research area involves application of materials in biological and medical application. He is a program leader for UTM Transdisciplinary Research Grant (UTM-TDR17: Antibacterial Wound Healing Application of Bio-Inspired Green Silver Nanoparticles). His current major research is development of inorganic antibacterial agent especially green silver nanoparticles.

Dipping Your Toes in the Water: Introduction to Experimental and Methods for Wound Healing Assessment

Khairunadwa Jemon

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Cancer and Infectious Diseases (CAID) Research Group, Health and Wellness Research Alliance, Universiti Teknologi Malaysia.
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Abstract

Wound healing is a complex biological process. In recent years, a number of experimental models have been developed to study wound healing process. These models are also important to test any new therapeutic materials as well as to study the mechanism of wound healing process. This presentation will give an overview of the currently available model to study wound healing. Methods to evaluate the healing progression will also be discussed.

Keywords: Wound healing model; *in vitro*; *in vivo*

Biography



Dr Khairunadwa Jemon is a senior lecturer at the Department of Biosciences, Faculty of Science, UTM. She is also a member of the Cancer and Infectious Diseases Research Group (CAID), Health and Wellness Research Alliance of Universiti Teknologi Malaysia. She completed her PhD in 2014 from the University of Otago, New Zealand, where was trained as immunologist and molecular virologist. Her research interest centred around three overlapping themes; cancer immunology, immunology of wound healing and exploration of biomaterials for biomedical applications. She has been actively involved in various inter- and trans-disciplinary research collaborations.

Pengenalan dan Prosedur Persijilan Halal Malaysia

Ahmad Che Yaacob

Akademi Tamadun Islam, Fakulti Sains Sosial dan Kemanusiaan
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Abstrak

Tulisan ini membincangkan mengenai sejarah dan perkembangan pelaksanaan persijilan halal di Malaysia yang dikeluarkan oleh Jabatan Kemajuan Islam Malaysia (JAKIM) bermula dari tahun 1974. Ini termasuklah pengenalan e-Halal JAKIM, penyeragaman prosedur halal Malaysia dan akhirnya penubuhan Majlis Halal Malaysia pada tahun 2016. Tulisan ini juga membincangkan 3 aspek utama penyediaan Manual Prosedur Halal Malaysia, iaitu aspek Hukum Syarak, aspek perundangan dan aspek keperluan semasa industri serta pengguna. Turut dijelaskan adalah logo halal Malaysia dan perbezaannya dengan logo halal negara-negara yang lain. Terdapat 7 skim persijilan halal Malaysia, iaitu produk makanan, premis makanan, rumah sembelih, barang gunaan, kosmetik, farmaseutikal, dan logistik. Perkara yang amat penting yang turut dibincangkan adalah mengenai takrif halal dan ruang lingkup konsep halal. Tulisan ini turut menjelaskan syarat-syarat persijilan, keperluan umum persijilan, keperluan khusus persijilan, fi persijilan, dan sijil serta logo persijilan. Di akhir perbincangan akan dibahaskan tanggungjawab pemegang sijil halal Malaysia. Adalah diharapkan tulisan ini boleh menjadi asas bagi kefahaman tentang konsep dan keperluan halal supaya memudahkan pihak industri dan syarikat untuk mendapatkan persijilan halal.

Katakunci: Halal; persijilan Halal; prosedur Halal

Biografi



Prof Madya Dr Ahmad Che Yaacob adalah pensyarah di Akademi Tamadun Islam, Fakulti Sains Sosial dan Kemanusiaan, UTM. Skop kajian dan kepakaran beliau ialah ekonomi islam, zakat, wakaf, Baitulmal dan fiqh. Beliau merupakan ketua projek bagi *Transdisciplinary Research (TDR)* projek bertajuk "*Halalan Tayyiban Documentation of Bioinspired Green Silver Nanoparticles*".

1st Bionanotechnology Research Seminar 2020

Oral Presentation



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BIONANOTECHNOLOGY RESEARCH

Effect of Plant Growth Regulators on the Shoot Biomass and Antioxidant Activity of *Persicaria odorata*

Nur Kamilah Mohd Nordin^a, Nur Aimi Aqilah Mohd Usri^a, Azman Abd Samad^{a*}, Nik Ahmad Nizam Nik Malek^{a,b}

^aDepartment of Biosciences, Faculty of Science, Universiti Teknologi Malaysia (UTM).

^bCentre for Sustainable Nanomaterials, Centre for Sustainable Nanomaterials (CSNano), Ibnu Sina Institute for Scientific and Industrial Research (ISI-ISIR), Universiti Teknologi Malaysia (UTM)

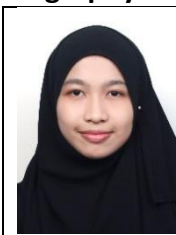
(Email: *azmansamad@utm.my)

Abstract

Persicaria odorata or locally known as 'kesum' possesses high bioactivity including antioxidant activity. However, antioxidant activity of tissue cultured plant materials of *P. odorata* is not yet fully understood. In addition, the effect of plant growth regulators (PGR) on shoot biomass and antioxidant activity of *P. odorata* is still yet to be explored. Therefore, in this study, the effect of PGR on shoot regeneration frequency, shoot biomass and antioxidant activity of *P. odorata* were evaluated. Nodal explants (1 cm) were treated with PGRs in the range of 1 – 4 mg L⁻¹ 6-Benzylaminopurine (BAP), combination of 2 mg L⁻¹ BAP and NAA concentrations (0.05, 0.5, 1, 2 mg L⁻¹) and incubated for 6 weeks. Antioxidant activity that was evaluated using FRAP and DPPH assays indicated that the highest shoot regeneration percentage (93.33 ± 6.67 %) and fresh shoot gains (151.00 ± 1.00 mg) were achieved when the explants were treated with 2 mg L⁻¹ BAP. It was found out that there was no significant difference to other single BAP concentration tested. However, the combination of 2 BAP + 0.2 NAA produced higher fresh weight gains (219.47 ± 1.50 mg) than other BAP+NAA combinations. For FRAP assay, the shoot extracts treated with 2 BAP + 0.2 NAA showed higher antioxidant potential than the control. In contrast, DPPH assay showed that the 2 BAP + 0.2 NAA treated sample (156.33 ± 4.70 µgmL⁻¹) had lower IC₅₀ value than the control (275.00 ± 3.00 µgmL⁻¹). Lower IC₅₀ and higher FRAP values indicated high antioxidant activity in PGR treated samples. In conclusion, PGR enhanced antioxidant activity in tissue cultured shoots. Future investigation such as the relationship between shoot biomass and secondary metabolites and its effect on antioxidant activity may elucidate their roles in the synthesis of silver nanoparticles.

Keywords: shoot regeneration; kesum; plant growth regulators antioxidant activity

Biography



Nur Kamilah binti Mohd Nordin is a student under Master of Philosophy. She had a degree in BSc in Biology. Her Final Year Undergraduate Project (FYUP) involved the role of microbes in the solid-state fermentation. Her current project is about the role of plant growth regulators, antioxidant activity and the synthesis of silver nanoparticles using *Orthosiphon stamineus* (misai kucing) and *Persicaria odorata* (kesum) extracts.

An Efficient Method for Induction of Adventitious Root from *Persicaria odorata*

Saeed Ullah, Azman Abd Samad*

Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia (UTM), Johor, Malaysia
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Abstract

Persicaria odorata is a good source of regular aliphatic aldehydes and possesses a series of biological properties such as antioxidant, antimicrobial, and antitumor. Root extracts of *P. odorata* have been reported to contain aliphatic hydrocarbon which lead to its high antioxidant activity. To date, no study has been conducted to exploit antioxidant compounds in the roots such as application of adventitious root culture. In this study, a method for the induction of adventitious root biomass from tissue cultured *P. odorata* was evaluated. Effect of different auxins concentrations on root induction was optimised. Nodal explants (10 mm) were cultured on MS media supplemented with IBA, NAA and IAA at (0, 0.5, 1, 1.5 and 2 mg/L) for four weeks. Adventitious roots were successfully induced from all treatments. Results showed that the highest fresh weight gain of root biomass was obtained at 1 mg/L IBA (0.22 ± 0.12 g) followed by 0.5 NAA (0.19 ± 05 g) and 1 mg/L IAA (0.18 ± 10). This indicate that IBA fresh root biomass was significant as compared to other treatment. The highest rooting percentage (80%) was observed at 1 mg IAA followed by 1 mg/L IBA (62%) and 0.5 mg/L NAA (45%). This indicate that the factor such as thickness and number of roots produced showed an effect on fresh root biomass. In conclusion, IBA could serve as an alternative treatment for root biomass induction which leads to produce high antioxidant metabolites in *P. odorata*.

Keywords: *Persicaria odorata*; plant growth regulators; plant tissue culture

Biography



Saeed Ullah is currently a final year student of Master in Biotechnology in Department of Biosciences, Faculty of Science, UTM. His project is about plant tissue culture under supervision of Dr Azman Abd Samad. As an undergraduate, Saeed Ullah received a Bachelor of Zoology in 2017, with a research project about fish parasite. After undergraduate completion Saeed Ullah join Brilliant College as a teacher of biology.

The Synergistic Effect of Nanocomposite Zeolite/Silver/LDH for Dyes Removal and Bacterial Colonization Inhibition

Siti Nabihan Ishak^a, Nik Ahmad Nizam Nik Malek^{*a,b}, Mustaffa Shamsuddin^c, Juan Matmin^c and Gopinathan Sankar^d

^aDepartment of Biosciences, Faculty of Science, Universiti Teknologi Malaysia (UTM), Johor, MALAYSIA.

^bCentre for Sustainable Nanomaterials (CSNano), Ibnu Sina Institute for Scientific and Industrial Research (ISI-ISIR), Universiti Teknologi Malaysia (UTM), Johor, MALAYSIA

^cDepartment of Chemistry, Faculty of Science, Universiti Teknologi Malaysia (UTM), Johor, MALAYSIA.

^dDepartment of Chemistry Materials Chemistry Section University College London, UNITED KINGDOM. (E-mail:sitinabihanishak@gmail.com,* nikhizam@utm.my)

Abstract

Despite various technologies for ideal safe water, it is challenging to remove both chemical and biological contaminants simultaneously. Thus, a study aiming to enhance the adsorption performance and antibacterial property of adsorbent is necessary. In this research, zeolite A (Zeo) was synthesized using low-cost raw kaolinite as a source of silica and alumina, followed by modification with silver ion (Ag) and layered double hydroxide (LDH) to produce a nanocomposite. Field Emission Scanning Electron Microscopy with Energy Dispersive X-Ray Spectroscopy of the materials confirmed the formation of AgZeo/LDH as LDH nanoparticle could be observed on the smooth surface of zeolite A, while EDX data proved the presence of Ag ions. AgZeo/LDH nanocomposite removed 5.1 mg/g methylene blue (cationic dyes) and 32.4 mg/g acid orange 7 (anionic dye) in 10 mg/L of dyes. Additionally, the nanocomposite AgZeo/LDH has antibacterial activity against *Escherichia coli* ATCC 11229 (Gram-negative) and *Staphylococcus aureus* ATCC 6538 (Gram-positive). As a conclusion, the AgZeo/LDH nanocomposite has high adsorption performance and exhibits antibacterial property which could be potentially used as a single water filter material.

Keywords: Zeolite; silver; layered double hydroxide; adsorption; antibacterial

Biography



Siti Nabihan Ishak is a PhD student under Bioscience Program at the Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia (UTM) under supervision of Assoc. Prof. Ts ChM Dr Nik Ahmad Nizam Nik Malek. She is a fast track student who graduated in degree of Biology (BSc (Biology) at UTM. Currently, she is doing PhD entitled "Silver-Zeolite Composite with Layered Double Hydroxide as Versatile Adsorbent and Antibacterial Activity". Her work specifically on the development of inorganic material as adsorbent and antibacterial agent.

Antibacterial Assessment of in situ Synthesised Bio-Inspired Silver Nanoparticles using *Orthosiphon aristatus* Leaf Extract Immobilised on Synthesised Zeolite A

Muhammad Hariz Asraf^a, Nik Ahmad Nizam Nik Malek^{a,b,*}

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Abstract

A greener technology has led to the use of a cleaner method for silver nanoparticles (AgNP) synthesis. This was done through a novel in situ technique using *Orthosiphon aristatus* leaf extract as a reducing agent for reducing Ag ions to Ag⁰ (AgNP). The synthesised materials were characterised using X-ray powder diffraction (XRD), field emission scanning electron microscopy (FESEM), and transmission electron microscopy (TEM). The characterization results showed the formation of AgNP (10–50 nm) immobilised on zeolite surface and inside the framework of zeolite A. The greener method of producing AgNP here exhibited comparable antibacterial activity against *Escherichia coli* ATCC 11229 and *Staphylococcus aureus* ATCC 6538 as compared to that of Ag⁺-loaded zeolite A. This proved the successful AgNP synthesis on the zeolite A framework as the synthesised materials showed antibacterial activity as unmodified zeolite A has no antibacterial property. Thus, the inspiration of using a greener in situ method of synthesising AgNP immobilised on zeolite A has proven its potential substitute for conventional synthesis methods.

Keywords: silver nanoparticles; *Orthosiphon aristatus*; in situ synthesis; zeolite A; antibacterial activity

Biography



Muhammad Hariz Asraf Hassan is currently pursuing his Ph.D in Biosciences at the Department of Biosciences, Faculty of Science, Universiti Teknologi Malaysia (UTM), Skudai. He obtained Bachelor of Biotechnology with Honours from International Islamic University Malaysia (IIUM) and MSc in Biotechnology at UTM. His background of research includes biotechnology, materials science, microbiology, and animal tissue culture. He is a Ph.D student under supervision of Assoc Prof Ts ChM Dr Nik Ahmad Nizam and the research scope is about the immobilization of silver nanoparticles on zeolite as antibacterial wound healing agent.

Green Synthesized Silver Nanoparticles: A Future Intervention to Minimize Antibiotics Resistance

Faridah Aminullah^a, Khairunadwa Jemon^{a*}, Nik Ahmad Nizam Nik Malek^{a,b}

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Abstract

Antibacterial resistance is a global issue due to the misuse of antibiotics. The fact that bacteria can undergo genetic changes over time accelerate the problem and thus concerted efforts are required in R&D of new antibacterial products. Silver nanoparticles (AgNP) is reported to exert a broad biocidal effect but greatly depend on the physicochemical properties and the capping agent. Recent findings suggested that green synthesized AgNP exhibits significant antibacterial properties, yet the exact mechanisms and toxicity are still in investigation. Hence, this research aims to evaluate the activity of AgNP synthesized using *Persicaria odorata* (L.) Sojak plant extract (PO-AgNPs) against skin-associated bacteria. The formation of PO-AgNPs was confirmed by UV-visible spectrophotometer which revealed an absorption peak at around 440 nm. Further characterization using Fourier transform infrared spectroscopy, X-ray diffraction and energy-dispersive X-ray spectroscopy showed the presence of biomolecules from the leaves extract that responsible for the productions of AgNPs and the crystalline nature of the synthesized AgNPs. Images from field emission scanning electron microscope and transmission electron microscope revealed spherical structure of PO-AgNPs with the size of 5 – 23 nm. From disc diffusion and time-kill assays, PO-AgNPs exhibit good inhibition against gram-positive bacteria (*Staphylococcus aureus*, Methicillin-Resistant *S. aureus* (MRSA), and *Staphylococcus epidermidis*) and gram-negative bacteria (*Pseudomonas aeruginosa*). Overall, these results further consolidate that AgNPs synthesized from the leaves extract from *P. odorata* possess a promising antibacterial activity.

Keywords: Silver nanoparticles, antibacterial

Biography



Faridah Aminullah obtained her B.Sc. (Hons) Biochemistry from the Universiti Kebangsaan Malaysia (UKM) and later M.Sc. in Forensic Science from the Universiti Teknologi Malaysia (UTM). She is currently pursuing her PhD at the Department of Biosciences, faculty of Science, UTM under the supervision of Dr Khairunadwa Jemon where she is working on the antibacterial wound healing activity of bio-inspired green silver nanoparticles. Her area of interest is green synthesis of silver nanoparticles, antibacterial, and wound healing.

***Halal* Pharmaceutical Certificate Guideline**

In Am Nabila Mohd Hashim, Ahmad Che Yaacob

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Abstract

The increasing of halal awareness in the pharmaceutical industry has a prominent impact on Malaysia's economic growth. The awareness surprisingly boosts customers' trust and confidence in every product claimed as halal compliant. As to uphold the trust of customers in halal products, halal pharmaceutical is introduced to the pharmaceutical industry. Aligned with the existence of the halal pharmaceuticals, MS 2424:2019 (P); a Malaysian Standard in Halal Pharmaceuticals-General Guidelines was developed. The standard is fully installed with the terms and definitions pertinent to the halal pharmaceuticals and all of the requirements to comply halal certification.

Keywords: Halal industry; Halal pharmaceuticals; Malaysian Standards

Biography



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