PROGRAM AND ABSTRACT BOOK

BioMIC2018

UNIVERSITAS GADJAH MADA
BADAN PENERBIT DAN PUBLIKASI

UGM BioMIC 2018

International Conference on Bioinformatics, Biotechnology, and Biomedical Engineering

19–20 October 2018 | Yogyakarta, Indonesia

Bioinformatics and Biological Data Mining

Biomedical Science and Engineering

Biomolecular and Biotechnology

Drug Development and Nutraceutical

Genetic Resources and Uses

About
Universitas Gadjah Mada

Universitas Gadjah Mada (UGM) was established on December 19, 1949 as a state and national university. Considered one of the oldest universities in Indonesia, it serves as a pillar of educational awakening in Indonesia, and purports to be a defender and disseminator of Pancasila.

UGM headquarters is located in the Bulaksumur Campus, Yogyakarta. As of today, UGM has 18 faculties, a vocational school, and a graduate school, offering more than 251 courses. UGM's mission is inspired by the spirit of Tri Dharma of Higher Education (Tri Dharma Perguruan Tinggi), comprised of Teaching, Research, and Community Services. More than 56,000 students, both domestic and international, are studying at UGM in a myriad of vocational, undergraduate, and graduate programs.

Citizenship commitment is manifested in community services as well as community empowerment activities, one of which by assigning students to a rural internship program in all regions of Indonesia.

UGM humanizes academic and non-academic activities in the principle of educopolis environment. This principle is elaborated multidisciplinary collaborative learning process in which responsive to ecological issues. The vision of UGM is to be a pioneer world class national university, excellent and innovative univesity, to serve the nation and humanity based on national cultural values and the national Ideology, Pancasila. The mission of UGM is to carry out education, research, and community service as well as preservation and development of knowledge that is excellent and useful for society.

info @ugm.ac.id

+62 (274) 6492599

ugm.yogyakarta

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About
Badan Penerbit dan Publikasi UGM

Badan Penerbit dan Publikasi Universitas Gadjah Mada (BPP UGM) is a supporting unit for publishing as University's Tridharma (Education, Research, and Community Service). Established since February 2015, the objective is to encourage and support the academicians' publication work in international scientific journals. BPP also together with UGM Press as an academic publisher in UGM. We lead publishing journals and books from UGM's academic works.

The International Conference on Science and Technology (ICST), the International Conference on South East Asia Studies (ICSEAS), the International Conference on Tropical Agriculture (ICTA), the International Conference on Health Sciences (ICHS), and the International Conference on Bioinformatics, Biotechnology, and Biomedical Engineering (BioMIC) are parts of UGM Annual Scientific Conferences (UASC) which organized by BPP UGM.

bpp@ugm.ac.id

+62-274-649-1963

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About
UGM Press

UGM Press continuously supports the vision of UGM to be a pioneer world class national university, excellent and innovative university, especially in the field of education through a mission to provide a high-quality education by publishing academic publications. Established since 1971, UGM Press's objective is to encourage and facilitate academic publications to become a trusted partner in educating the nation.

UGM Press proved to be one of the university publishers in Indonesia recognized by Southeast Asia University seen from the number of books published. Every year UGM Press publications continue to increase. Counting from 1971 to 2017, more than 2,000 book titles have been published.

Currently UGM Press initiated the reading community through the "Let's Buy Original Books" campaign since the increase in the purchase of the original book will increase the productivity of writing the book.

ugmpress@ugm.ac.id

+62-274-561-037

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The 1st International Conference on
Bioinformatics, Biotechnology, and Biomedical Engineering
Program and Abstract Book

Editor
Tri Rini Nuringtyas
Muhammad Rafieiy
Rangga Kala Mahaswa
Sulis Setiowati
Galih Putri Wulandari
Zahrah Nurfadhilah
Sri Nopitasari
Muhammad Khairurrijal
Hendy Eka Putra

Book designer
Muhammad Rafieiy

Section images by
Wildan Ainurrahman
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Alex Murry
https://flic.kr/p/8fvE2C; CC BY-NC-ND 2.0
Muhammad Rafieiy
https://flic.kr/p/YtNt7C; CC-BY-NC-2.0
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https:// eastparc-hotel.com

Welcoming Remarks from the Chairman

Distinguished guests, respected colleagues, and ladies and gentlemen.

On behalf of the whole Programme Committee, I would like to warmly welcome you to the first International Conference on Bioinformatics, Biotechnology and Biomedical Engineering (BioMIC 2018). The BioMIC is part of UGM Annual Scientific Conference (UASC) is hosted by Badan Penerbit dan Publikasi , Universitas Gadjah Mada in collaboration with IEEE Indonesia Section.

The first of BioMIC aims to facilitate the research sharing and discussion of bio-related disciplines covering in five symposia: Bioinformatics and Biological Data Mining, Biomedical Science and Engineering, Biomolecular and Biotechnology, Drug Development and Nutraceutical, and last but not least Genetic Resource and its uses. For this, the organizing committee is supported by 7 faculties including Faculty of Mathematics and Natural Science, Faculty of Engineering, Faculty of Biology, Faculty of Medicine, Public Health and Nursing, Faculty of Dentistry, Faculty of Pharmacy, Faculty of Agriculture, and 2 Research Centers, Research Center for Biotechnology and Center for Innovation of Agro Technology.

The committee is delighted with the positive response of researchers to this conference, shown by the number of papers we received. We received 138 submissions with 115 active manuscripts from 8 countries including Malaysia, Romania, Australia, Japan, Pakistan, Austria, Hong Kong, and our own Indonesia. To keep the high quality of the papers presented, each of paper was reviewed by at least three reviewers who are experts on the subjects, giving in total 80 reviewers involved in the process. We are proudly informed that the selected papers will be published in online proceedings or journals depends on the symposium. The Bioinformatics and Biological Data Mining, Biomedical Science and Engineering will be published in IEEE digital library while the Biotechnology and Molecular Biology, as well as the Genetics Resources and Its Uses, will be published in Indonesian Journal of Biotechnology or AIP proceedings. The Drug Development and Nutraceutical symposia will be published in the Indonesian Journal of Pharmacy and Traditional Medicine

Journal. The acceptance rate varies depends on the symposium and the platform of publication. In general the average of acceptance is 75.7%, especially for the proceedings of IEEE digital library, the acceptance rate is 71%. All of the publication schemes will be submitted for major international indexing database to ensure the visibility internationally of the articles presented in BioMIC 2018.

We are all grateful for the contributions of our invited speakers. We will have 6 plenary speakers, and 8 speakers of the symposium. The invited speakers, we believe, will enrich the conference with their presentation covering the key topics within five symposia, showing emerging trends in the bioinformatics, biotechnology, and biomedical engineering. We hope that the scientific program will be both stimulating and informative.

The organization of a conference like BioMIC 2018 is very much a team effort. I want to thank all the members of the organizing committee, who have carried a huge and complicated workload. I also wish to acknowledge the members of the scientific committee, who had the arduous task of reviewing the very many submissions we received.

BioMIC 2018 strives to offer plenty of networking opportunities, providing the participants with the opportunity to meet and interact with the leading scientists and researchers, friends as well as colleagues. We hope all the participants will benefit from these 2 days of intellectual discussions and most importantly networking among our peers. Let us together make this Conference an unforgettable experience for all! THANK YOU.

Yogyakarta, 19 October 2018

Chairman of the Organizing Committee,
Dr. Tri Rini Nuringtyas

Welcoming Remarks
from the Rector of Universitas Gadjah Mada

Dear distinguished speakers, participants, ladies, and gentlemen.

On behalf of Universitas Gadjah Mada, it is my pleasure and privilege to welcome you all to Yogyakarta for the first International Conference on Bioinformatics, Biotechnology, and Biomedical Engineering (BioMIC 2018), hosted by Universitas Gadjah Mada (UGM). As a pioneering university, history of UGM's education has opened the boundaries between academics and professionals across the world, to discover critically scientific invention as the precious roots of knowledge for the benefit of humankind.

Today, we still have the grand challenges which are parts of the big global problem. In the health area, we still suffer from many deadly diseases, the lack of access to medical care, and uncertainty adequate resources while the world is suffering from climate change and its impact at global levels including the food security and global ecosystem. Besides the grand challenges, we are also walking on the trajectory of disruption era and connecting with the fourth industrial revolution. As a scientist with greater encouragement, we should think together on how we can increase understanding of the global and complex issues. It soon became clear that mono-disciplines alone could not provide the solutions. We believe that together with inter- or multi-disciplinary approach, we can remove the obstacles for more rapid progress on addressing the global problem. For this purpose, UGM is proud to be leading the way in facilitating the interdisciplinary research dissemination of cutting-edge information on bio-related subjects.

In striving for this synergy, UGM comes up with BioMIC 2018, a conference that supports discussion, co-operation, and exchange among multi-discipline experts. The wonderful thing about BioMIC 2018 is bridging the gap among disciplines to bring and share their innovation, research, and ideas on answering the critical global health issues through the bioinformatics, biotechnology, and biomedical engineering views. Let us think widely to identify research supports in the biomedical engineering field and bioinformatics to facilitate contact with biomolecular, drug development, and genetic resources and uses.

With the synergism of system biology, big data analysis, as well as the application of artificial intelligent, we are ready towards the next phase of disruption era and to improve the great transformation and sustainable innovation on unwinding the complex of global problems ranging from ecology, health to agriculture etc.

The BioMIC 2018 as a part of UGM Annual Scientific Conference Series, is holding annual gatherings for the brilliant ideas from Indonesia and overseas to share the latest findings in their fields. It proves UGM's consistency to preserve the international academics relation. This series has been an enormous success to bring collaboration with our international partners, building the scientific networks, increasing Indonesia author's greatness in the global publications' scopes, and with a global readership, and underscoring UGM's place as a standard-bearer of scientific development.

In this opportunity, I wish to very sincerely thank as well to speakers and experts who have attended this year's conference. Most sincere gratitude is also extended to the organizing committee members in the BioMIC 2018 preparation, for their hard work, as well as the entire staff of UGM's Badan Penerbit dan Publikasi (BPP). And finally, I personally would like to thank all the conference participants who contribute to making this truly the most memorable BioMIC 2018.

It is in my sincere hope that owing appreciated to your scientific activities; this conference will come up with strong resolutions on human well-being across generations. I wish you all a pleasant stay in Yogyakarta, and above all a successful BioMIC 2018.

Thanks for your very kind attention.

Rector of Universitas Gadjah Mada,
Prof. Ir. Panut Mulyono, M. Eng., D.Eng.

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NOW OPEN
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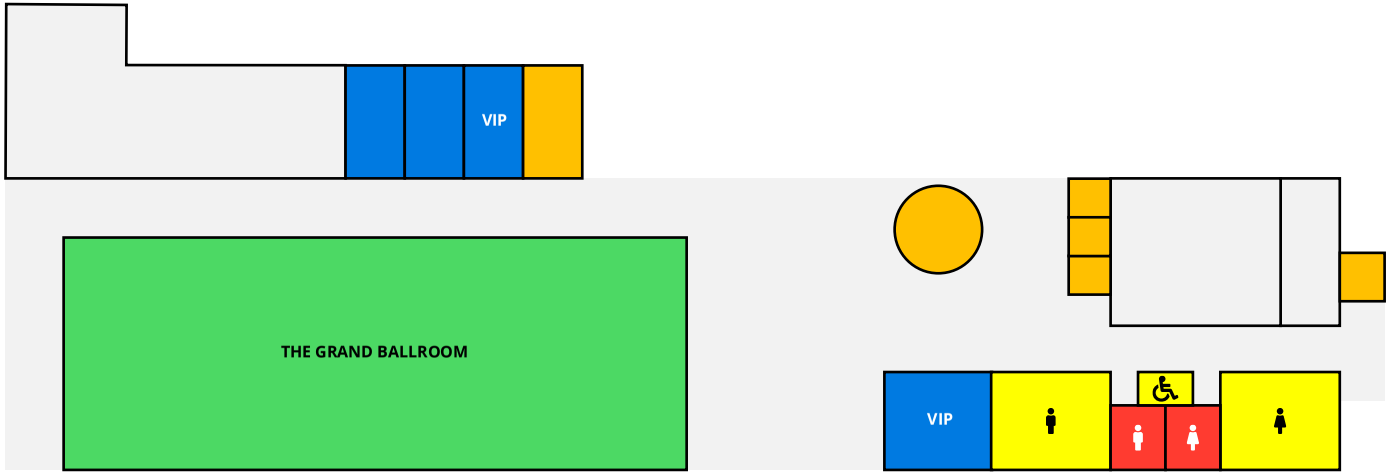
The 4th floor of Eastparc Hotel



Conference room
Committee room
Prayer room
Lift/Stairs
Rest room
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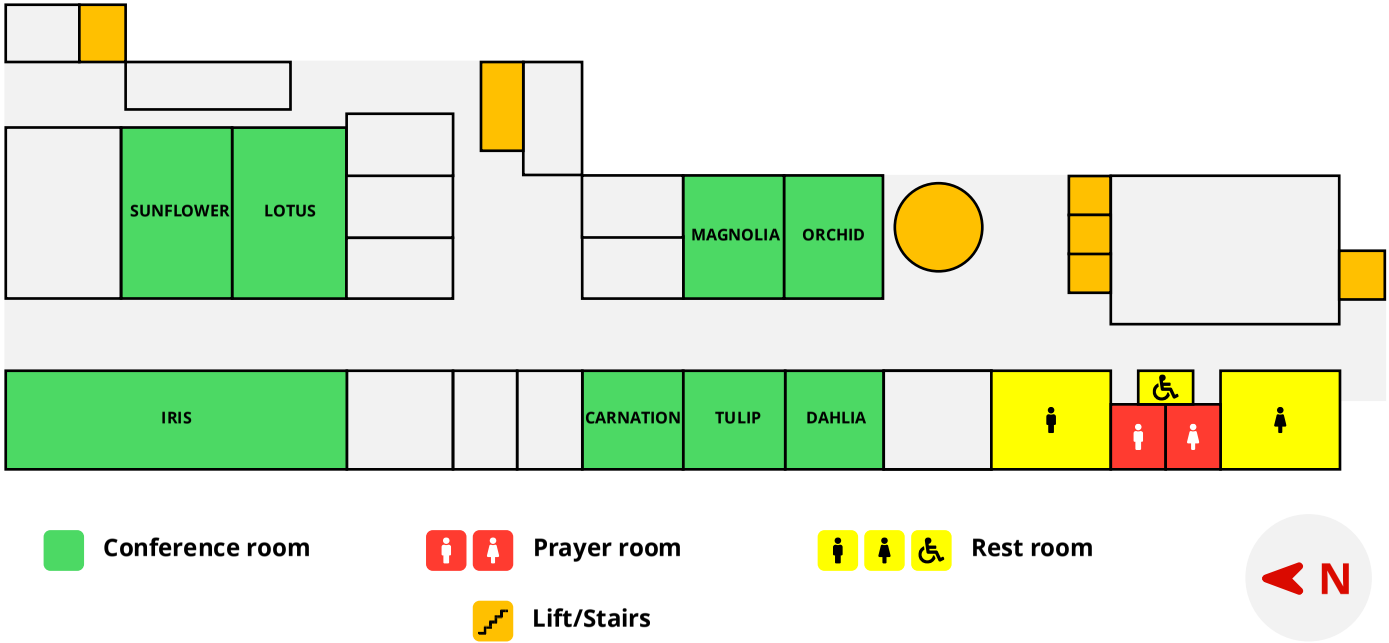
The 3rd floor of Eastparc Hotel




SCHEDULE


OKTOBER 2018
UNIVERSITAS
GADJAH MADA
SURO / SAPAR 1952 Be
MINGGU SENIN SELASA RABU KAMIS JUM'AT SABTU
1 20 WAGE
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Universitas Gadjah Mada
Bulaksumur, Yogyakarta - INDONESIA 55281
+62 274 6492599
+62 274 565223
info@ugm.ac.id

DAY 1 Conference schedule

FRIDAY, 19 OCTOBER 2018

Time	Program	Venue
07:00–08:00	REGISTRATION	Ballroom lobby
	OPENING CEREMONY	
08:00–08:50	 Dr. Tri Rini Nuringtyas *BioMIC 2018 Chairman*	Ballroom
	 Prof. Panut Mulyono *Rector of Universitas Gadjah Mada*	
08:50–09:00	PHOTO SESSION	
	PLENARY SESSION I	
09:00–09:45	 Prof. Jun-Ya Kato *NAIST, Japan*	Ballroom
	DISCUSSION	
09:45–10:00	COFFEE BREAK	Ballroom lobby
	PLENARY SESSION II	
10:00–11:20	 Prof. Masahiko Hatano *Chiba University, Japan*	Ballroom
	 Dr. Piergiorgio Gentile *Newcastle University, United Kingdom*	
	DISCUSSION	
11:20–13:00	LUNCH BREAK	Ballroom lobby
13:00–15:00	SYMPOSIA SESSION I 	Parallel rooms

Time	Program	Venue
15:00–15:30	COFFEE BREAK	Front of parallel rooms
15:30–17:10	SYMPOSIA SESSION II 	Parallel rooms

DAY 1 Bioinformatics and Biological Data Mining Symposium

CARNATION ROOM

Code	Title and Authors
	SYMPOSIUM SESSION I 13:00 – 15:00
C1-199	Classification of Brain Magnetic Resonance Images Based on Statistical Texture Meidar Hadi Avizenna, Indah Soesanti, and Igi Ardiyanto
C1-191	Analysis of Retinal Fundus Images for Classification of Glaucoma Maria Ulfa Muthmainah, Hanung Adi Nugroho, Bondhan Winduratna, and Ilcham Ilcham
C1-032	Identification of Significant Protein Diabetes Mellitus Type 2 with Fuzzy C-Means and Topological Analysis Alif Ahmad Zulfikar, Mohammad Romano Diansyah, Azka Ardhya Rizqa Effendie Putri, and Wisnu Ananta Kusuma
C1-753	K-Nearest Neighbor (KNN) Analysis on Genes Expression Datasets of Maize Nested Association Mapping (NAM) Showed Confident Classification on Organ-specific Expression Ika Fitria Widiawati, Husna Nugrahapraja, and Rohmatul Fajriyah
C1-022	A Parallel ClustalW Algorithm on Multi-Raspberry Pis for Multiple Sequence Alignment Fathurrochman Habibie, A. Afiahayati, Guntur Budi Herwanto, Aufaclav Zatu Kusuma Frisky, and Sri Hartati
	SYMPOSIUM SESSION II 15:30 – 16:50
C2-766	Data Mining and Comparative Analysis of Human Skin Microbiome from EBI Metagenomics Database Matin Nuhamunada, Gregorius Pratama, Setianing Wikanthi, Mohamad Khoirul Anam, Raden Ludhang Pradipta Rizki, and Nastiti Wijayanti
C2-341	Screening of Oxamic Acid Similar 3D Structures as Candidate Inhibitor *Plasmodium falciparum* L-Lactate Dehydrogenase of Malaria Through Molecular Docking Sahal Muttaqin and Jaler Sekar Maji

Code	Title and Authors
C2-228	Comparison Study of Melanocortin 4 Receptor in Cattle, Buffalo, Sheep and Goat Based on Genbank Data Latifah Latifah, Dyah Maharani, Kustantinah Kustantinah, and Tety Hartatik

DAY 1 Biomedical Science and Engineering Symposium

MAGNOLIA ROOM

Code	Title and Authors
	SYMPOSIUM SESSION I 13:00 – 15:00
M1-598	The Differences between the Transverse, Compressive and Tensile Strengths of Cold Polymerized Acrylic Resin Materials with Various Thickness Laelia Dwi Anggraini and Soenarno
M1-104	Financial Sources Options for Telemedicine Program within Universal Health Coverage (UHC) Era in Indonesia Anis Fuad, Siti Setyawati Mulyono Putri, Mei Neni Sitaresmi, and Diah Ayu Puspandari
M1-592	Stichophus Hermanni Collagen with Local Hydroxyapatite as Bone Substitute Material Toward Osteoclast Number and Toxicity Endang Wahyuningtyas and Erwan Soegiatno
M1-013	The Fibroin Cocoon *Bombyx mori* L is Cytocompatible with Human Primary Pulp Cells Sartika Puspita, Marsetyawan Soesatyo, Siti Sunarintyas, and Ema Mulyawati
M1-729	Effect of *Bombyx mori*'s Sericin Immobilization over Poly (L-Lactic Acid) Surface on Mesenchymal Stem Cells Attachment and Proliferation Yenny Yustisia, Siti Sunarintyas, and Rina Susilowati
M1-027	Preparation and Characterization of Hyroxyapatite Based on Human Teeth with Various of Calcination Rani Deliana Panggabean and Yusril Yusuf
	SYMPOSIUM SESSION II 15:30 – 16:50
M2-094	Power Grip Exoskeleton Design as Rehabilitation Devices for Post-Stroke Survivors Djoko Kuswanto, Bambang Iskandriawan, and Panji Satrio Mahardhika
M2-388	Early Detection of Leptospirosis by Using Loop-Mediated Isothermal Amplification (LAMP) Method Dyah Ayu Widiasih, Heru Susetya, and Rini Widayanti

Code	Title and Authors
M2-899	Geometric Stent Design Mapping of Commercial Coronary Stent in Indonesia Nahar Taufiq, Marsetyawan H.N.E. Soesatyo, Alva Edy Tontowi, Budi Yuli Setianto, and Widowati Siswomihardjo

DAY 1 Biomedical Science and Engineering Symposium

ORCHID ROOM

Code	Title and Authors
	SYMPOSIUM SESSION I 13:00 – 15:00
O1-336	The Effect of Platelet Rich Plasma Incorporation Toward Swelling Profile and Gel Fraction of Synthetic Coral Scaffold Erlina Sih Mahanani, Farda N., Tejaningasih I., and Khairunissa N.
O1-466	Finite Element Investigation of GO Reinforced PLLA Stent Deployment Farid Wajdi, Alva Edy Tontowi, Indraswari Kusumaningtyas, and Andi Rahadiyan Wijaya
O1-169	Biocomposite of Hydroxyapatite/Gelatin/PVA for Bone Graft Application Alva Edy Tontowi, Adhi Anindyajati, Rina Tangkudung, and Punto Dewo
O1-538	Synthesis of Silicon Substituted Hydroxyapatite Using Microwave Irradiation Annisa Tsalsabila, Yessie Sari, and Akhiruddin Maddu
O1-598	Synthesis of Duck Eggshells-based Fluorapatite by Using Microwave Irradiation Nur Aisyah Nuzulia, Yessie Widya Sari, and Desi Riah Sari
O1-145	β-Carotene Gingival Mucoadhesive Patch to Prevent Panoramic Radiography Exposure's Effect on GCF Rurie Shantiningsih, Silviana Diba, and Anggun Andini
	SYMPOSIUM SESSION II 15:30 – 16:50
O2-834	Determination of Estrus Phase in Cattle Using Electronic Nose Pudji Astuti, Claude Mona Airin, Slamet Widiyanto, Norman Prayogo, and Kuwat Triyana
O2-468	Wireless Ankle Rehabilitation for Post Stroke Recovery Based on Calf Muscle Stregth Asih Setiarini, Hanum Arrosida, and Basuki Winarno
O2-925	Bicycle Design for Children with Spastic Cerebral Palsy to Enhance Interaction Between Children and Parents Bambang Iskandriawan, Djoko Kuswanto, and Elly Fitriana Soedjito

DAY 1 Biomolecular and Biotechnology Symposium

SUNFLOWER ROOM

Code	Title and Authors
	SYMPOSIUM SESSION I 13:00 – 15:00
B-01	 Univ.Prof. Dietmar Haltrich *Universitat fur Bodenkultur Wien, Austria*
B-02	 Prof. Montarop Yamabhai *Suranaree University of Technology, Thailand*
B-03	 Prof. Irfan Dwidya Prijambada *Universitas Gadjah Mada, Indonesia*
	SYMPOSIUM SESSION II 15:30 – 16:50
S2-453	Identification of Single Nucleotide Polymorphism of GDF9 Gene in Garut Sheep Resti Yuliana Rahmawati, Sumadi, and Tety Hartatik
S2-586	Molecular Detection of *Colletotrichum* spp. on Postharvest Commodities of Horticulture in Central Java and Yogyakarta, Indonesia Ady Bayu Prakoso, Suryanti, and Ani Widiastuti
S2-086	Isolation and Characterization of *Metuf* Promoters Gene from Cassava (*Manihot esculenta* Crantz.) Sony Suhandono, Iqbal Mitryadinillah, Annisa Rizkia, and Tati Kristianti
S2-606	Virtual Screening of Natural Inhibitors from Kaffir Lime (*Citrus hystrix* DC) on Estrogen Receptor (ER) and Erbb2 (HER2) in Breast Cancer Lisna Hidayati, M. Adnan, Indah Nuraini, and Woro Anindito Sri Tunjung

DAY 1 Biomolecular and Biotechnology Symposium

LOTUS ROOM

Code	Title and Authors
	SYMPOSIUM SESSION II 15:30 – 16:50
L2-243	Application of CRISPR/Cas9 Genome Editing System for Molecular Breeding of Orchids Endang Semiarti, Aziz Purwantoro, Jaka Widada, Yasushi Yoshioka, Shogo Matsumoto, Aries B. Sasongko, Matin Nuhamunada, Windi Mose, Muhammad Dylan Lawrie, Yuli Setiawati, Sri Nopitasari, Kana Ninomiya, and Yuki Asano
L2-406	The Establishment of PCR Cloning and Sequencing of Glycoprotein D Gene of Bovine Hepervirus-1 (BHV-1) Isolated from Field Case in Indonesia Dewi Noor Hidayati, Eko Agus Srihanto, Tri Untari, Michael Haryadi Wibowo, Widya Asmara, and Koichi Akiyama
L2-190	Development of CRISPR/Cas9 Plasmid for Multiple Sites Genome Editing in Oil Palm (*Elais guineensis* jacq.) Victor Aprilyanto, Chris Darmawan, Condro Utomo, and Tony Liwang

DAY 1 Drug Development and Nutraceutical Symposium

TULIP ROOM

Code	Title and Authors
	SYMPOSIUM SESSION I 13:00 – 15:00
B-04	 Prof. Mitsunori Kirihata *Osaka Prefecture University, Japan*
B-05	 Prof. Eni Harmayani *Universitas Gadjah Mada, Indonesia*
B-06	 drg. Ferry Sandra, Ph.D. *Trisakti University, Indonesia*
	SYMPOSIUM SESSION II 15:30 – 16:50
T2-783	Antioxidant and Cytotoxic Activity of Ethanolic Extract of Curry Leaf (*Clausena excavata*) Burm. F. Against Cervical Cancer Cells (HeLa) in Vitro Madina Alfi Manaroh, Tri Rini Nuringtyas, Warisatul Ilmi, and Hermanita Indah
T2-463	Antioxidant Activity of Bioactive Peptides Derived from the Hydrolysates of Jack Bean (*Canavalia ensifromis* (L.) DC) Protein Isolate Bambang Dwi Wijatniko and Agnes Murdiati
T2-562	Effects of Anti-Collagenase, Anti-Elastase, Anti-Tyrosinase and Antioxidant Activities of the Extract and Fraction from *Turbinaria decurrens* Bory. Arief Nurrochmad, Wirasti, Arifin Dirman, Endang Lukitaningsih, Adillah Rahmawati, and Nanang Fakhrudin
T2-777	Antioxidant Potency of Red Dragon Fruit Flesh and Peel Prepared by Different Extraction Methods Novi Febrianti, Purwanti Purbosari, Sofia Haryana, Triana Hertiani, and Sukarti Moeljopawiro

DAY 1 Drug Development and Nutraceutical Symposium

DAHLIA ROOM

Code	Title and Authors
	SYMPOSIUM SESSION II 15:30 – 17:10
D2-496	^{1}H-NMR Fingerprinting of Medicinal Herbs Contain Chemical Drug Material Allopurinol Adita Yuniati Puspitasari, Harno Dwi Pranowo, Respati Tri Swasono, and Tri Rini Nuringtyas
D2-032	Cytotoxicity of Tetrahydropentagamavunon-0 (THPGV)-0 and Tetrahydropentagamavunon-1 (THPGV-1) in Several Cancer Cell Lines Muthi Ikawati, Heri Purwanto, Niar Nurul Imaniyyati, Anis Afifah, Marrita Langgeng Sagiyo, Jasson Yohanes, Sismindari, and Ritmaleni
D2-124	Synthesis of 99mTc-rutin as Potential Radiotracer for the Development of Cancer Drugs from Flavonoid Eva Maria Widyasari, Rizky Juwita Sugiharti, Maula Eka Sriyani, Esty Kusumawardhany, and Muharam Marzuki
D2-487	Conjugation of Anti-EpCAM Antibody on Alginate-RIP MJ-30 Nanoparticle Through Carbodiimide Reaction as A Model of Targeted Protein Therapy Hilda Ismail, Ummi Ciptasari, Arief Ikhsan, Fidya Suryani, Sismindari Sismindari, and Ronny Martien, and Agustinus Yuswanto
D2-081	Genome Mining of Anticancer-Producing Streptomyces sp. GMY01 Isolated from Indonesia Marine Sample for New Bioactive Compounds Jaka Widada

DAY 1 Genetic Resources and Uses Symposium

IRIS ROOM

Code	Title and Authors
	SYMPOSIUM SESSION I 13:00 – 15:00
B-07	 Maarten van Zonneveld, Ph.D. *The World Vegetable Center, Taiwan*
B-08	 Ir. Glenn Pardede, MBA *East West Seed, Indonesia*
I1-653	Morphological and Molecular Characterization of 5 Accessions of *Camellia sinensis* (L.) O. Kuntze Exploited to Develop High Quality and Quantity Yield Nafila Alifia Azka, Hani Widhianata, and Taryono
	SYMPOSIUM SESSION II 15:30 – 16:50
I2-470	Characterization of Indonesian Pigmented Rice (*Oryza sativa* L.) Based on Morphology and SNPs (Single Nucleotide Polymorphisms) Nur Siti Kurniasih, Ratna Susandarini, Febri Adi Susanto, Tri Rini Nuringtyas, Glyn Jenkins, and Yekti Asih Purwestri
I2-889	Vegetative Characterization to Identify Oil Palm (*Elaeis guineensis* Jacq.) Plantlet Abnormalities Ernayunita, Hernawan Rahmadi, Yurna Yenni, Retno Diah Setiowati, and Iman Yani Harahap

DAY 2 Conference schedule

SATURDAY, 20 OCTOBER 2018

Time	Program	Venue
08:00–09:00	REGISTRATION	Ballroom lobby
	PLENARY SESSION III	
09:00–09:45	 Prof. Vinod Chandran *The Queensland University of Technology, Australia*	Ballroom
	DISCUSSION	
09:45–10:00	COFFEE BREAK	Ballroom lobby
	PLENARY SESSION IV	
10:00–11:20	 Dr. Pascal Montoro *CIRAD, France*	Ballroom
	 Prof. Shri Mohan Jain *University of Helsinki, Finland*	
	DISCUSSION	
11:20–13:00	LUNCH BREAK	Ballroom lobby
13:00–15:00	SYMPOSIA SESSION III 	Parallel rooms
15:00–15:30	COFFEE BREAK	Ballroom lobby

Time	Program	Venue
	CLOSING CEREMONY	
15:30–16:40	 TRADITIONAL DANCE PERFORMANCE *Universitas Gadjah Mada*	Ballroom
	BEST PAPER AWARDS	
	 drg. Ika Dewi Ana, Ph.D. *Vice Rector for Research and Community Services*	
16:40–16:50	PHOTO SESSION	

DAY 2 Bioinformatics and Biological Data Mining Symposium

CARNATION ROOM

Code	Title and Authors
	SYMPOSIUM SESSION III 13:00 – 15:00
C3-452	Prototype of Application Multi-Objective Genetic Algorithm Using Multi-Threading Strategy with Thinking Design Approach Method for Optimization Design DNA Primer and DNA Probe Cahyo Dwi Raharjo, Wayan Tunas Artama, Zainudin Zukhri, and Muryanto Muryanto
C3-491	Differential in Silico Expression of Hevea Brasiliensis COBRA Transcripts Riza Arief Putranto and Irfan Martiansyah
C3-774	Internet Search Activity for Leptospirosis in Yogyakarta Province: A Comparison with Official Leptospirosis Report Citra Indriani, Astri Choiruni, Atina Husnayain, Ira Dewi Ramadhani, Safira Ainun Ulumiyah, Ahmad Watsiq Maula, Anis Fuad, and Riris Andono Ahmad
C3-317	Development of Medical Props Production Towards Industry 4.0 Ignatius Luddy Indra Purnama, Alva Tontowi, Bertha Maya Sopha, and Herianto Herianto

DAY 2 Biomedical Science and Engineering Symposium

MAGNOLIA ROOM

Code	Title and Authors
	SYMPOSIUM SESSION III 13:00 – 15:00
M3-513	Vitamin D Reduces Myofibroblast Formation and Collagen 1 Expression Through Upregulating eNOS Expression in Kidney Fibrosis Model in Mice Nur Arfian, Santosa Budiharjo, Sagita Sekar Kencana, Edison Susanto, Devi Suhardi, Bianda Pramudita, Dwi Cahyani Ratna Sari, and Mansyur Romi
M3-587	Toward Cancer Antiangiogenic Therapy: A Strategy for Determining Optimal Inhibitor Dose Level Based on Mathematical Model Bobby Rian Dewangga, Hanung Adi Nugroho, and Samiadji Herdjunanto
M3-261	Enzymatic Modification of Cotton Fiber for Promising Smart Medical Based Material Maharani Pertiwi Koentjoro, Marisa Fitriana, Isdiantoni, and Endry Nugroho Prasetyo
M3-550	The Effect of Synbiotics *Lactobacillus casei* AP and Inulin Extract *Dahlia pinnata* L. in Diarrhea Management Nur Kusmiyati, Sunarti, Tutik Dwi Wahyuningsih, and Widodo
M3-174	Acute Phase Protein C-Reactive Protein as Early Detection of Type 1 Diabetes Mellitus Imron Rosyadi, Ella Ramadhona, Ajeng Tyas Utami Wahono, and Yayik Nur Hijrati

DAY 2 Biomedical Science and Engineering Symposium

ORCHID ROOM

Code	Title and Authors
	SYMPOSIUM SESSION III 13:00 – 15:00
O3-722	The Potential of Methanol and Ethyl Acetate Extracts of Corn Silk (*Zea mays* L.) as Sunscreen Rosalina Ariesta Laeliocattleya
O3-167	Acute Phase Protein Serum Amyloid-A (SAA) Profile in Diabetic Wistar Rats Induced Streptozotocin Imron Rosyadi, Yayik Nur Hijrati, Ajeng Tyas Utami Wahono, and Ella Ramadhona
O3-177	Fibrinogen Levels and Leukocytes in Diabetic Wistar Rats at 0 - 96 Hours Post-Induced by Streptozotocin Imron Rosyadi, Yayik Nur Hijrati, Ella Ramadhona, and Ajeng Tyas Utami Wahono
O3-690	Effect of Aldehyde Dehydrogenase 2 Gene Polymorphism on Liver Function Status of Alcohol Drinkers in Indonesia Suhartini, Yudha Nurhantari, Bambang Udji Djoko Rianto, Hendro Widagdo, Mustofa, and Idha Arfianti Wira Agni
O3-451	Phytochemical Screening and In-Vitro Antibacterial Activity of Sweet Basil Leaves (*Ocimum basilicum* L.) Essential Oil Against Cutibacterium Acnes ATCC 11827 Intan Putri Hapsari and Yoanni Maria Feroniasanti
O3-229	Polymorphism of Prohormone Convertase-1 and Pro-Opiomelanocortin Associated with Leptin Level in Javanese Ethnic of Indonesia Pramudji Hastuti, Tasmini, Afifah Cholid, and Ahmad Hamim Sadewa

DAY 2 Biomolecular and Biotechnology Symposium

SUNFLOWER ROOM

Code	Title and Authors
	SYMPOSIUM SESSION III 13:00 – 15:00
S3-382	Studies on Iridovirus Infection among Grouper Fish (*Epinephelus* sp) Cultured in Seribu Islands, Indonesia Kurniasih, Surya Amanu, and Ratih Ismayasari
S3-738	Effect of Freeze-Drying Process on Collagen-Activated Platelet-Rich Plasma into Platelet Derived Growth Factor-AB Level Kwartarini Murdiastuti, Fitri Yuniawati, Nunuk Purwanti, and Dahlia Herawati
S3-423	Isolation and Characterization of *Alcaligenes* sp. LS2T from Poultry Farm at Yogyakarta City and the Growth Ability in Animal's Urine Medium Nanung Fitriyanto
S3-614	Lactic Acid Bacteria (LAB) Isolated from Fermented Cocoa Beans Prevent the Growth of Model Food-Contaminating Bacteria Fahrurrozi, Eka Putri Rahayu, Imam Bagus Nugroho, and Puspita Lisdiyanti
S3-081	Photoperiode Effect on the Growth and Artemisinin Content of *Artemisia annua* Grown in Tropical Region Yuli Widiyastuti and Dyah Subositi
S3-144	Biofilm Growth on New Based Resin Matrix System for Dental Use Siti Sunarintyas, Widowati Siswomihardjo, and Jukka Pekka Matinlinna

DAY 2 Biomolecular and Biotechnology Symposium

LOTUS ROOM

Code	Title and Authors
	SYMPOSIUM SESSION III 13:00 – 15:00
L3-369	Cytoprotective Activity of Extracts of Tomato and Carrot Callus on Human Dermal Fibroblast Adult (HDFa) Rumiyati, Sismindari, Arief Nurrochmad, Dinar Prastiandari, Andrea Dhieta Utama, and Dianni Anggita Dewi
L3-580	The Effect of Orange, Pineapple, and Guava Waste Extract on the Phenolic Content in Green Betel (*Piper betle* L.) Elpri Eka Permadi and L. Hartanto Nugroho
L3-116	Organogenesis Responses of Tea (*Camellia sinensis* (L.) O. Kuntze) Var. Assamica and Sinensis Hani Widhianata and Taryono
L3-544	Effect of Growth Factor in Callus Induction and Bioactive Compounds in Seed Explant of Kaffir Lime (*Citrus hystrix* DC.) Woro Anindito Sri Tunjung, Vita Fatonah, Ghea Putri Christy, Sugeng Triono, Lisna Hidayati, Dwi Priyanto, Yekti Asih Purwestri, Aries Bagus Sasongko, Hennisa, Nur Faizah, and Ari Indrianto
L3-613	The Extract of Pink and Blue Ginger (*Curcuma aeruginosa*) Decrease Immunosuppresant Effect Induced by Doxorubicin Lisyaratih Anggriani, Arlieza Rozali Wulandari, Gigih Mukti Leksono, Muthi' Ikawati, and Edy Meiyanto

DAY 2 Drug Development and Nutraceutical Symposium

TULIP ROOM

Code	Title and Authors
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T3-157	Combination of Black Cumin (*Nigella sativa* L.) and Awar-Awar (*Ficus septica* Burm. F.) Inhibits Proliferation and Modulates Cell Cycle in HeLa Cells Ragil Anang Santoso, Amadea Sylva Lienaningrum, Eunice Dwininta Bangun, Hanna Gracia Reformatika, Ratna Asmah Susidarti, and Edy Meiyanto
T3-031	Effects of Tempeh on Proliferation and Senescence in Ovariectomized Rats Gergorius Gena Maran, Nadya Rizky Septaningrum, Raditya Wulandari, Rohmad Yudi Utomo, Adam Hermawan, and Edy Meiyanto
T3-588	Cytotoxicity Studies of Potential Fraction of Agarwood Leaves *Gyrinops versteegii* (Gilg.) Domke and *Aquilaria malaccensis* (Lamk). Against Breast (T47D) and Colon (WiDr) Cancer Cell Lines Lisna Hidayati, Riko Irwanto, Yulisty Soraya Fadhilah, Tri Rini Nuringtyas, Nastiti Wijayanti, and Sukarti Moeljopawiro
T3-712	In Vitro Study of the Combination of Doxorubicin, *Curcuma xanthorrhiza*, *Brucea javanica*, and *Ficus septica* as a Potential Novel Therapy for Metastatic Breast Cancer Ika Sutejo, Sri Handayani, Herwandhani Putri, Riris Jenis, and Edy Meiyanto
T3-843	Screening of Antibacterial and Anticancer Activity of Soft Corals from Togean Islands, Indonesia Muhammad Sulaiman Zubair, Subehan Lallo, Rusmianti, Arsa Wahyu Nugrahani, and Ibrahim Jantan
T3-623	a-Amilase Inhibitory Activity of Fraction of Lebui (*Cajanus cajan* (L.) Millsp.) Seed Extract Rumiyati, Dian Resti Setyaningrum, Agung Endro Nugroho, Yekti Asih Purwestri, Yudi Pranoto, Sri Widyastuti, Satrijo Saloko, and Muktasam

DAY 2 Drug Development and Nutraceutical Symposium

DAHLIA ROOM

Code	Title and Authors
	SYMPOSIUM SESSION III 13:00 – 15:00
D3-007	iCOX2: An Open Source and Offline Graphical-User-Interface Application to Identify Cyclooxygenase-2 Inhibitors Enade Istyastono, Nunung Yuniarti, and Puspaningtyas Adi
D3-795	Effect of Red Onion (*Allium cepa* var Ascalonicum) Skin Extract on the Motility and the Adhesion Index of *Pseudomonas aeruginosa* and Macrophage Phagocytosis Index Irma Prasety Ayu Nugraheni, Derana Widyastika, Sofia Maulida, Heni Susilowati, and Alma Linggar Jonarta
D3-978	Efficacy of Thymol and Eugenol Against Polymicrobial Biofilm Hasyrul Hamzah, Triana Hertiani, and Sylvia UtamiTunjung Pratiwi
D3-023	Inhibitory Activity of *Sargassum hystrix* Extract and Its Methanolic Fractions on Inhibiting a-Glucosidase Activity Wirdatul Azizi, Nurfitri Ekantari, and Amir Husni
D3-658	Inhibitory Effect of Ethanol Extract of Soursop (*Annona muricata*) Leaf on Acid Production and Adhesion of *Streptococcus mutans* ATCC 25175 Friska Ani Rahman

DAY 2 Genetic Resources and Uses Symposium

IRIS ROOM

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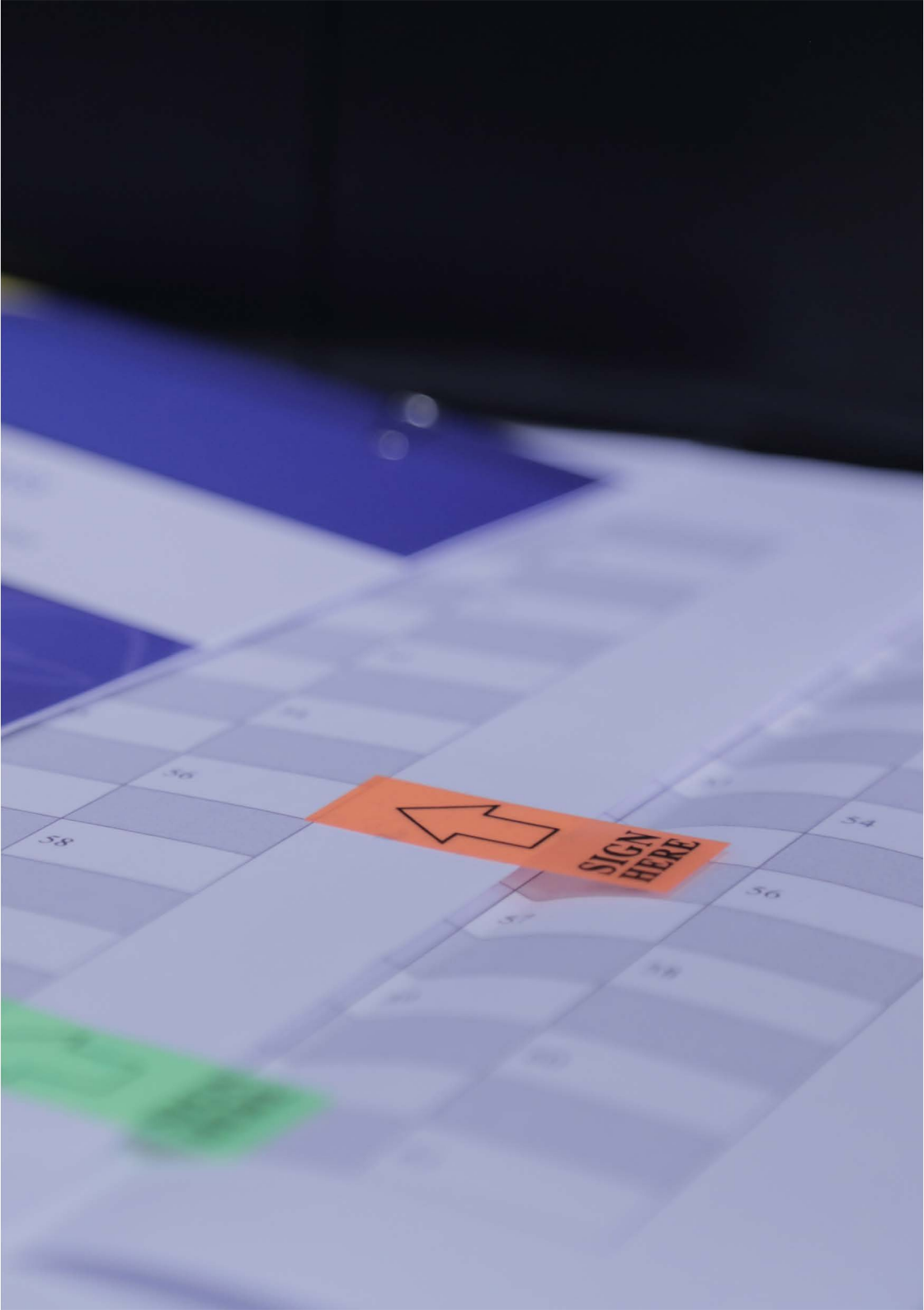
I3-337	Morphological Characters Identification at Early Vegetative Stage of 40 Cassava (*Manihot esculenta* Crantz) Accessions Rani A. Wulandari, T. Harjaka, R.H. Murti, A.D. Kurniasih, D. Kurniawati, and L. Ariansyah
I3-210	Coconut (*Cocos nucifera* L.) Diversity in Indonesia Based on SSR Molecular Marker Weda Makarti Mahayu and Taryono
I3-975	Phylogenetic and Variants Analysis of LCR HPV-58 in Cervical Cancer Patients from Dr. Hasan Sadikin General Hospital Bandung, Indonesia Ika Agus Rini, Siska Telly Pratiwi, Gita Widya Pradini, Edhyana Sahiratmadja, and Herman Susanto
I3-136	Saccharomyces Cerevisiae B18 as Antifungal and Aflatoxin Binder in Vitro Lusty Istiqomah, E. Damayanti, D. Arisnandhy, F.M.C. Sigit Setyabudi, and M. Anwar

LIST OF PARTICIPANTS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SPEAKERS

Dietmar Haltrich Universität für Bodenkultur Wien, Austria E-mail: dietmar.haltrich@boku.ac.at	13:00	Day 1	Sunflower	B-01	Page 64
Eni Harmayani Universitas Gadjah Mada, Indonesia E-mail: eniharmayani@ugm.ac.id	13:00	Day 1	Tulip	B-05	Page 68
Ferry Sandra Trisakti University, Indonesia E-mail: ferrysandra@gmail.com	13:00	Day 1	Tulip	B-06	Page 69
Glenn Pardede PT East West Seed Indonesia, Indonesia E-mail: glennpardede@panahmerah.id	13:00	Day 1	Iris	B-08	Page 72
Irfan Dwidya Prijambada Universitas Gadjah Mada, Indonesia E-mail: irfan_prijambada@mail.ugm.ac.id	13:00	Day 1	Sunflower	B-03	
Jun-Ya Kato Nara Institute of Science and Technology, Japan E-mail: jkata@bs.naist.jp	09:00	Day 1	The Grand Ballroom	A-01	Page 54
Maarten van Zonneveld AVRDC-The World Vegetable Center, Taiwan E-mail: maarten.vanzonneveld@worldveg.org; mvzonneveld@gmail.com	13:00	Day 1	Iris	B-07	Page 70
Masahiko Hatano Chiba University, Japan E-mail: hatanom@faculty.chiba-u.jp	10:00	Day 1	The Grand Ballroom	A-02	Page 55
Mitsunori Kirihata Osaka Prefecture University, Japan E-mail: kirihata@biochem.osakafu-u.ac.jp	13:00	Day 1	Tulip	B-04	Page 66
Montarop Yamabhai Suranaree University of Technology, Thailand E-mail: montarop@g.sut.ac.th	13:00	Day 1	Sunflower	B-02	Page 65
Pascal Montoro Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), France E-mail: pascal.montoro@cirad.fr	10:00	Day 2	The Grand Ballroom	A-05	Page 60
Piergiorgio Gentile Newcastle University, United Kingdom E-mail: piergiorgio.gentile@ncl.ac.uk	10:00	Day 1	The Grand Ballroom	A-03	Page 56
Shri Mohan Jain University of Helsinki, Finland E-mail: mohan.jain@helsinki.fi	10:00	Day 2	The Grand Ballroom	A-06	Page 62
Vinod Chandran The Queensland University of Technology, Australia E-mail: v.chandran@qut.edu.au	09:00	Day 2	The Grand Ballroom	A-04	Page 58

PRESENTERS

Adita Puspitasari Universitas Gadjah Mada, Indonesia Email: adita.yuniati@ugm.ac.id	15:30	Day 1	Dahlia	D2-496	Page 152
Ady Prakoso Universitas Gadjah Mada, Indonesia Email: ady.bayu.p@mail.ugm.ac.id	15:30	Day 1	Sunflower	S2-586	Page 123
Ajeng Tyas Utami Wahono Universitas Gadjah Mada, Indonesia Email: ajengtyasutami@gmail.com	13:00	Day 2	Orchid	O3-167	Page 114
Alif Zulfikar Bogor Agricultural University, Indonesia Email: zulfikar_alif7@apps.ipb.ac.id	13:00	Day 1	Carnation	C1-032	Page 78
Alma Jonarta Universitas Gadjah Mada, Indonesia Email: almajonarta@ugm.ac.id	13:00	Day 2	Dahlia	D3-795	Page 158
Alva Tontowi Universitas Gadjah Mada, Indonesia Email: alvaedytontowi@ugm.ac.id	13:00	Day 1	Orchid	O1-169	Page 106
Anis Fuad Universitas Gadjah Mada, Indonesia Email: anis.fuad@gmail.com	13:00	Day 1	Magnolia	M1-104	Page 91
Annisa Tsalsabila Bogor Agricultural University, Indonesia Email: annisa_tsalsabila@apps.ipb.ac.id	13:00	Day 1	Orchid	O1-538	Page 107
Arief Nurrochmad Universitas Gadjah Mada, Indonesia Email: ariefnr@ugm.ac.id	15:30	Day 1	Tulip	T2-562	Page 144
Asih Setiarini Indonesian Institutes of Science, Indonesia Email: asih002@lipi.go.id	15:30	Day 1	Orchid	O2-468	Page 111
Astri Choiruni Universitas Gadjah Mada, Indonesia Email: astri.choiruni@mail.ugm.ac.id	13:00	Day 2	Carnation	C3-774	Page 86
Bambang Wijatniko Universitas Gadjah Mada, Indonesia Email: bambangdw92@ugm.ac.id	15:30	Day 1	Tulip	T2-463	Page 143
Bobby Dewangga Universitas Gadjah Mada, Indonesia Email: bobby.rian.d@mail.ugm.ac.id	13:00	Day 2	Magnolia	M3-587	Page 100
Cahyo Raharjo Universitas Islam Indonesia, Indonesia Email: 13917210@students.uii.ac.id	13:00	Day 2	Carnation	C3-452	Page 84
Dewi Hidayati Universitas Gadjah Mada, Indonesia Email: dewi.noor.h@mail.ugm.ac.id	15:30	Day 1	Lotus	L2-406	Page 133
Dyah Widiasih Universitas Gadjah Mada, Indonesia Email: dyahaw@ugm.ac.id	15:30	Day 1	Magnolia	M2-388	Page 97

Ella Ramadhona Universitas Gadjah Mada, Indonesia Email: ella.ramadhona@mail.ugm.ac.id	13:00	Day 2	Magnolia	M3-174	Page 103
Elly Soedjito Institut Teknologi Sepuluh Nopember, Indonesia Email: ellyfitriana94@gmail.com	15:30	Day 1	Orchid	O2-925	Page 112
Elpri Permadi Universitas Gadjah Mada, Indonesia Email: elpri.eka.p@mail.ugm.ac.id	13:00	Day 2	Lotus	L3-580	Page 136
Enade Istyastono Sanata Dharma University, Indonesia Email: enade@usd.ac.id	13:00	Day 2	Dahlia	D3-007	Page 157
Endang Semiarti Universitas Gadjah Mada, Indonesia Email: endsemi@ugm.ac.id	15:30	Day 1	Lotus	L2-243	Page 132
Endang Wahyuningtyas Universitas Gadjah Mada, Indonesia Email: endang_wtyas2014@ugm.ac.id	13:00	Day 1	Magnolia	M1-592	Page 92
Erlina Mahanani Universitas Muhammadiyah Yogyakarta, Indonesia Email: erlina.sih@umy.ac.id	13:00	Day 1	Orchid	O1-336	Page 104
Ernayunita Indonesian Oil Palm Research Institute, Indonesia Email: ohoney.erna@gmail.com	15:30	Day 1	Iris	I2-889	Page 166
Eva Widyasari BATAN, Indonesia Email: evamaria@batan.go.id	15:30	Day 1	Dahlia	D2-124	Page 154
Farid Wajdi Universitas Gadjah Mada, Indonesia Email: farid.wajdi@mail.ugm.ac.id	13:00	Day 1	Orchid	O1-466	Page 105
Friska Rahman Universitas Gadjah Mada, Indonesia Email: friska_ani@ugm.ac.id	13:00	Day 2	Dahlia	D3-658	Page 161
Gergorius Maran Cancer Chemoprevention Research Center, Indonesia Email: gergorius.gena.m@mail.ugm.ac.id	13:00	Day 2	Tulip	T3-031	Page 147
Guntur Herwanto Universitas Gadjah Mada, Indonesia Email: gunturbudi@ugm.ac.id	13:00	Day 1	Carnation	C1-022	Page 80
Hani Widhianata Universitas Gadjah Mada, Indonesia Email: hani.widhianata@mail.ugm.ac.id	13:00	Day 2	Lotus	L3-116	Page 137
Hasyrul Hamzah Universitas Gadjah Mada, Indonesia Email: hasyrulhamzah@gmail.com	13:00	Day 2	Dahlia	D3-978	Page 159
Hermanita Lestari Universitas Gadjah Mada, Indonesia Email: hermanitaindah@mail.ugm.ac.id	15:30	Day 1	Tulip	T2-783	Page 142

Meidar Avizenna Universitas Gadjah Mada, Indonesia Email: meidar.hadi.a@mail.ugm.ac.id	13:00	Day 1	Carnation	C1-199	Page 76
Muhammad Zubair Tadulako University, Indonesia Email: sulaiman_zubair80@yahoo.co.id	13:00	Day 2	Tulip	T3-843	Page 150
Muthi' Ikawati Universitas Gadjah Mada, Indonesia Email: muthi_ikawati@ugm.ac.id	15:30	Day 1	Dahlia	D2-032	Page 153
Nafila Azka Universitas Gadjah Mada, Indonesia Email: nafila.alifia.a@mail.ugm.ac.id	14:20	Day 1	Iris	I1-653	Page 164
Nahar Taufiq Universitas Gadjah Mada & Sardjito Central General Hospital, Indonesia Email: naheart2000@yahoo.com	15:30	Day 1	Magnolia	M2-899	Page 98
Nanung Fitriyanto Universitas Gadjah Mada, Indonesia Email: nanungagusfitriyanto@ugm.ac.id	13:00	Day 2	Sunflower	S3-423	Page 128
Novi Febrianti Universitas Gadjah Mada & Universitas Ahmad Dahlan, Indonesia Email: novifebrianti@pbio.uad.ac.id	15:30	Day 1	Tulip	T2-777	Page 145
Nur Arfian Universitas Gadjah Mada, Indonesia Email: nur_arfian@ugm.ac.id	13:00	Day 2	Magnolia	M3-513	Page 99
Nur Kurniasih Universitas Gadjah Mada, Indonesia Email: nursitikurniasih@gmail.com	15:30	Day 1	Iris	I2-470	Page 165
Nur Kusmiyati Universitas Gadjah Mada, Indonesia Email: kusmiy4tinur@gmail.com	13:00	Day 2	Magnolia	M3-550	Page 102
Nur Nuzulia Bogor Agricultural University, Indonesia Email: aisyahnuzulia@apps.ipb.ac.id	13:00	Day 1	Orchid	O1-598	Page 108
Panji Mahardhika Institut Teknologi Sepuluh Nopember, Indonesia Email: psatrio9@gmail.com	15:30	Day 1	Magnolia	M2-094	Page 96
Pramudji Hastuti Universitas Gadjah Mada, Indonesia Email: pramudji.has@ugm.ac.id	13:00	Day 2	Orchid	O3-229	Page 118
Pudji Astuti Universitas Gadjah Mada, Indonesia Email: pastuti2@ugm.ac.id	15:30	Day 1	Orchid	O2-834	Page 110
R Laeliocattleya University of Brawijaya, Indonesia Email: deeochalina@gmail.com	13:00	Day 2	Orchid	O3-722	Page 113
Ragil Santoso Cancer Chemoprevention Research Center, Indonesia Email: ragil.anang.s@mail.ugm.ac.id	13:00	Day 2	Tulip	T3-157	Page 146

Woro Tunjung Universitas Gadjah Mada, Indonesia Email: wanindito@ugm.ac.id	13:00	Day 2	Lotus	L3-544	Page 138
Yayik Nur Hijrati Universitas Gadjah Mada, Indonesia Email: yayik.nur.h@mail.ugm.ac.id	13:00	Day 2	Orchid	O3-177	Page 115
Yenny Yustisia Universitas Jember, Indonesia Email: yennyyustisia.fkg@unej.ac.id	13:00	Day 1	Magnolia	M1-729	Page 94
Yuli Widyastuti National Institute Health Research and Development, Ministry of Health, Indonesia Email: ywidiyasis@gmail.com	13:00	Day 2	Sunflower	S3-081	Page 130

PARTICIPANTS

Afif Pranaya Jati
The University of Groningen, The Netherlands
Email: afifjatie@gmail.com

Gregorius Altius Pratama
Universitas Gadjah Mada, Indonesia
Email: gregorius.altius.p@gmail.com

Husna Nugrahapraja
Institut Teknologi Bandung, Indonesia
Email: nugrahapraja@sith.itb.ac.id

Mohamad Khoirul Anam
Universitas Gadjah Mada, Indonesia
Email: mohamad.khoirul.anam@mail.ugm.ac.id

Puspa Eosina
Universitas Ibnu Khaldun Bogor, Indonesia
Email: eosina@gmail.com

Setianing Wikanthi
Universitas Gadjah Mada, Indonesia
Email: setianingw@gmail.com

Suharyanto
Corporate R&D Sinarmas Forestry, Indonesia
Email: suharyanto.Suharyanto@sinarmasforestry.com

Wisnu Ananta Kusuma
Bogor Agricultural University, Indonesia
Email: ananta@apps.ipb.ac.id

Yoanni Maria Feroniasanti
Sanata Dharma University, Indonesia
Email: feroniasanti@usd.ac.id

ABSTRACTS

INVITED SPEAKERS

A-01

Drug development targeted on cancer metabolism

Jun-ya Kato
Graduate School of Biological Sciences, Nara Institute of Science and Technology, Japan
e-mail: jkata@bs.naist.jp

The relatively high levels of reactive oxygen species (ROS) contribute to tumor-specific properties such as accelerated proliferation and a high rate of mutation. Tumor cells have their own mechanism to control intracellular levels of ROS because extremely high levels of ROS provokes oxygen stress-mediated cell death and senescence. We previously showed that curcumin, a phytopolyphenol mainly found in turmeric (Curcuma longa), targeted multiple ROS scavenging enzymes that were overexpressed in leukemia cells, and inhibited leukemic cell growth by upregulating ROS levels and inducing cell senescence and death. We further developed and analyzed dozens of curcumin derivatives with improved characteristics. To control intracellular ROS levels is currently one of the most promising tactics for tumor suppression, and our data show that curcumin derivatives will be a good source for developing a novel type of anti-cancer drugs.

Keywords: cancer metabolism, curcumin, drug development, reactive oxygen species, tumor cells

Critical roles of enteric neurons in intestinal microbiota and barrier function

Masahiko Hatano[1, 2], Lisa Fujimura[1], Akemi Sakamoto[1, 2], Yukiko Ohara[3], Akio Matsumoto[4], Takako Osaki[5], Shigeru Kamiya[5], Masafumi Arima[6], Takeshi Tokuhisa[7]

[1]Biomedical Research Center, Chiba University, Chiba, JAPAN.
[2]Department of Biomedical Science, Graduate School of Medicine, Chiba University, Chiba, JAPAN.
[3]Department of Pediatric Surgery, Graduate School of Medicine, Chiba University, Chiba, JAPAN.
[4]Department of Pharmacology, Graduate School of Medicine, Chiba University, Chiba, JAPAN.
[5]Department of Infectious Diseases, Kyorin University School of Medicine, Tokyo, JAPAN.
[6]Department of Rheumatology, Dokkyo Medical University School of Medicine, Tochigi, JAPAN.
[7]Department of Developmental Genetics, Graduate School of Medicine, Chiba University, Chiba, JAPAN.
e-mail: hatanom@faculty.chiba-u.jp

Ncx (Hox11L1/Enx/Tlx2) encoded homeobox transcription factor is expressed specifically in neural crest-derived neurons such as enteric neurons. Ncx knockout (KO) mice exhibited increased enteric neuronal cells throughout the gastrointestinal tract and are regarded as a model of intestinal neuronal dysplasia (IND) in humans. We investigated the role of enteric neurons in epithelial barrier function and intestinal microbiota using Ncx KO mice. Ncx KO mice were susceptible to Dextran sodium sulfate (DSS)-induced colitis. Amount of neuronal nitric oxide synthase (nNOS) increased and expression of E-cadherin in colon epithelial cells decreased in the KO mice. Administration of nNOS inhibitor restored the E-cadherin expression suggesting that nitric oxide produced by enteric neuron was responsible for the barrier dysfunction. Furthermore, intestinal microbiota analysis revealed that nitric oxide reductase positive virulent bacteria increased in the feces of KO mice. Feces transfer from deficient to wild type mice exacerbated the DSS-induced colitis. These results suggest that enteric neurons play essential roles for regulation of barrier function and microbiota.

A-03

Honey-based layer-by-layer assembly for improving antibacterial properties of electrospun membranes for soft tissue regeneration

E. Mancuso[1], V. Pensabene[2], C. Tonda-Turo[3], Chiara Ceresa[4], Letizia Fracchia[4], P. Culmer[5], and P. Gentile[6]*

[1]Ulster University, School of Engineering, Belfast (UK)
[2]University of Leeds, School of Electronic and Electrical Engineering and School of Medicine, Leeds (UK), [3]Politecnico di Torino, Department of Aerospace and Mechanical Engineering, Turin (Italy)
[4]Università del Piemonte Orientale, Department of Pharmaceutical Sciences, Novara (Italy)
[5]University of Leeds, School of Mechanical Engineering, Leeds (UK)
[6]Newcastle University, School of Engineering, Newcastle Upon Tyne (UK).
e-mail: piergiorgio.gentile@newcastle.ac.uk

Introduction

Pelvic organ prolapse (POP) is a highly prevalent disease, occurring in up to 50% of women above the age of 50, and with a lifetime need for intervention approaching 20%1. Considering the limitations in conventional approaches and materials (mainly poor biocompatibility, low mechanical properties, and high risk of infection), the development of an implant that can address the current challenges is of paramount importance2. This work aimed to develop a biodegradable mesh that, by mimicking the three-dimensional (3D) architecture of the pelvic floor, can provide better biomechanical integration into the host tissue, promote its repair, and exert an antibacterial action in-site.

Materials and Methods

Polycaprolactone (PCL) meshes were produced by electrospinning technology. The meshes were aminolysed to obtain a positive charge on the surface by –NH2– grafting. Subsequently, a layer-by-layer (LbL) assembly was applied to obtain a multilayered electrostatic nano-coating, consisting of honey as polyanion and poly-(allylamine hydrochloride) (PAH) as polycation. As control, poly-(styrenesulfonate) (PSS) was used in combination with PAH due to their established potential to form biocompatible coatings. The physico-chemical and biological properties of the resulting nano-funtionalised polymeric meshes were then assessed.

Results and Discussion

After an accurate optimisation of the process parameters (ie. immersion time in the polyelectrolytes (PEs) solutions and number of layers), the procedure was finalised in order to obtain 18 nano-layers corresponding at 9 bilayers. SEM analysis, infrared (FTIR-ATR) and X-Ray photoelectron spectroscopy (XPS) demonstrated the successful

functionalisation at the nanoscale. In particular, SEM showed rougher fibre surface compared to unfunctionalised meshes, revealing the formation of a regular nano-coating (see Figure 1c); while FTIR-ATR showed the typical PE bands and peaks. XPS analysis on un-coated samples showed three peaks equivalent to the different carbon oxidation states (−C−H- or−C−C− bonds, −C−O-bond and -N-C=O bond). For the coated samples, the atomic concentration of C−C bonds increased whereas the C−O bond one decreased, that was due to the nanocoating formation. Finally, the biocompatibility of the electrospun functionalised meshes was assessed in terms of adhesion and proliferation of human endometrial stromal (ThESC) cells, showing cytoskeletal organization and viability.

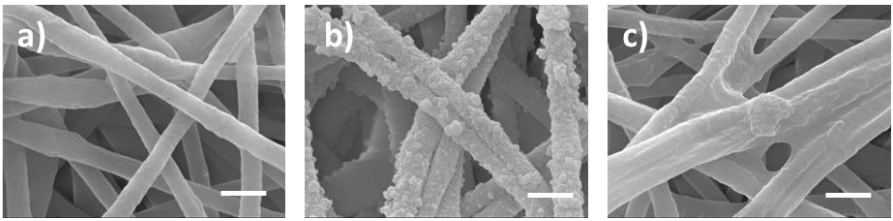

Figure 1 SEM micrographs of PCL electrospun meshes: a) with no coating; and after LbL functionalisation by using b) PSS/PAH, and c) honey/PAH.

Conclusions

Considered together, the results of this work are of interest for pelvic floor repair, since they demonstrated the possibility to successfully produce novel bioartificial surgical meshes as potential treatments for POP.

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Acknowledgments

This research is supported by the UK NIHR-EPSRC IMPRESS Network (EP/M000109/1 and EP/N027345/1) and by PROM project (Project number 748903), funded by H2020-MSCA-IF-2016.

A-04

On the role of bispectral analysis of biomedical signals in the context of highly effective convolutional neural networks and deep learning

Vinod Chandran
The Queensland University of Technology, Australia
e-mail: v.chandran@qut.edu.au

Deep learning and convolutional neural networks are setting new benchmarks in many machine learning problems with speech, images and video. Many biomedical signal classification problems are similar and many applications have already been reported. However, factors such as limitation of training data, high levels of noise, subtlety of information bearing changes, lack of direct human interpretation of the signal etc. may make some biomedical signal problems different. Will the more conventional analysis techniques continue to play an important role in the interpretation and understanding of hidden structure in biomedical signals? Spectral analysis has been a very useful tool in physics and signal processing. Understanding of the distribution of power as a function of frequency has led to the development of many applications such as the design of multiplexed communication systems and the interpretation of biological signals such as the EEG. Higher-order spectral analysis has been used to detect phase coupling, synchronization and de-synchronization phenomena that are present in some biological signals as correlates of responses to stimuli. A brief overview of bispectral analysis and a review of the application of bispectral analysis to biomedical signals are presented. Examples from time-varying bispectral analysis of multi-channel EEG evoked in response to stimuli are discussed. With appropriately collected data, such methods can be used to better understand human visual and auditory responses through EEG; and potentially help diagnose disorders associated with them. Bispectral analysis requires averaging in estimates for statistical reliability. For real-time processing, ensemble averaging is not possible and frequency merging leads to loss of frequency resolution and difficulty in theoretical tractability of estimates. Averaging over a block of consecutive windows can be applied in such cases. Techniques to select statistically reliable values can lead to reduced representations of the magnitude of the normalized bispectrum or bicoherence tracked in time. Some examples of such processing of sound are presented. Alternative methods for processing of cough sounds, ECG, etc. that could provide additional information can be developed in this manner. A brief discussion on whether higher order spectral representations could provide front ends of deep learning architectures and their pros and cons will conclude the presentation.

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A-05

Transcriptional and post-transcriptional regulation of genes involved in the production and scavenging of reactive oxygen species and antioxidant biosynthesis in *Hevea Brasiliensis* Laticifers

Pascal Montoro*, Yi Zhang, Florence Martin, Kuswanhadi, and Julie Leclercq
CIRAD, UMR AGAP, F-34398 Montpellier, France
AGAP, Univ Montpellier, CIRAD, INRA, Montpellier SupAgro, Montpellier, France
Indonesian Rubber Research Institute, Sembawa Research Centre, Palembang, Indonesia
e-mail: pascal.montoro@cirad.fr

Hevea brasiliensis is the main source of natural rubber accounting for 42 % of the worldwide rubber consumption. Natural rubber is synthesized in rubber particles of latex cells, which are differentiated from the vascular cambia and localized in the secondary phloem. Latex is collected by tapping the soft bark of rubber trees. Ethephon, an ethylene releaser, is applied on bark to stimulate latex flow and regeneration between two tappings. Above a certain threshold, environmental and harvesting stresses are known to induce an oxidative stress triggering Tapping Panel Dryness (TPD) [1]. TPD is a physiological syndrome affecting latex production through the agglutination of rubber particles. Four hundred and seven genes from thirty gene families related to reactive oxygen species (ROS) production and scavenging, and antioxidants biosynthesis genes were identified in the Hevea genome sequence [2]. Based on a transcriptome analysis [3], 161 ROS-related genes were found expressed in latex cells. Small RNA and degradome analysis revealed 13 genes targeted by 11 microRNAs and 15 genes targeted by 16 phased siRNA in latex. These post-transcriptional regulations dramatically affect their gene expression profile. HbRBOH2 was identified as the main source gene of ROS in latex, while HbCuZnSOD4 might be the most important ROS scavenging enzyme for ROS detoxification in latex. Overexpression of genes encoding a superoxide dismutase (HbCuZnSOD) and an enzyme of the glutathione biosynthetic pathway (EcGSH1) was successfully obtained in transgenic rubber plants. These latter showed an increase in plant growth and their tolerance to abiotic stress [4, 5]. This study revealed the crucial role of antioxidant in Hevea brasiliensis laticifers and suggests to seek genetic variability for antioxidant capacity in order to improve rubber tree for the tolerance to abiotic stress and TPD occurrence.

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A-06

Conservation and utilization of plant genetic resources facing climatic stress

S. Mohan Jain
Department of Agricultural Sciences, University of Helsinki, PL-27, Helsinki, Finland
e-mail: mohan.jain@helsinki.fi

The continuous change of global climate is having an adverse effect on sustainable food production and security, eventually will have greater impact on global food supply, cost of living, nutrition security, and human health. Recent trend in erratic climate change such as variation in annual rainfall, water deficit, flooding, global warming and melting of glacial etc., observed worldwide has negative impact on food and agriculture, and industry. These changes are directly having adverse impact on the developing countries due to poor infrastructure, lack of trained manpower, and weak economic conditions. Two major factors climate change and ever-growing human population are leading causes for the loss of genetic resources, arable land depletion, degradation of soil quality, and water shortages or lack of water availability for irrigation and drinking. Any small change in global temperature may develop new insect and pests, and disease as well as disappearance of some of the existing pests and diseases that would lead to devastate food and agriculture; and also shifting of insect and pests to different location or regions suitable for their growth and reproduction. Erratic rainfall and water wastage are major concerns of water shortages that would have negative impact on sustainable agriculture and food security.

Genetic diversity is the key for the survival, evolution of species, and utilization for crop improvement. Genetic variation within a species is important for its ability to adapt to a changing environment. Species having larger levels of genetic diversity have a better chance of adaptation, survival, and deployment over a wide range of environmental conditions. Appropriate levels of genetic variation should be maintained in the populations of a species for conservation planning and prevent genetic erosion.

The conservation of genetic resources should be based on the genetic architecture and phenology, and how genetic and phenotypic variation is organized and distributed within and among populations of a species. Induced genetic diversity is caused by radiation and chemical mutagens in most of the major crops, and used for developing new varieties with useful traits that had great economic benefit to growers and food supply chain. Gene/genome editing is a new approach for developing new crop plants with desirable traits. CRISPR/Cas9 (Clustered Regularly Interspaced Short Palindromic Repeats/CRISPR associated protein 9. This system is found in bacteria and involved in immune defense. Bacteria use CRISPR/Cas9 to cut up the DNA of invading bacterial viruses that might

otherwise kill them. Recently newly developed Cell grafting technique that mixes and wound callus tissue to transfer plastid or nuclear DNA between cells. This approach is considered as asexual hybridization.

Plant genetic diversity is conserved by cryopreservation (somatic embryos, embryogenic cell cultures), cold storage (seed and in vitro shoots) and in vivo (field gene banks), establish germplasm website for exchange and utilization. Plant regeneration from somatic embryos and embryogenic cell suspension is necessary for applying cryopreservation by using liquid nitrogen. In cold storage, shoot cultures are preserved at 4-5 °C, however subcultures are needed even though their number is reduced. In cryopreservation subculture is not needed and cultures are stored for longer period; soma clonal variation is prevented or reduced, virus free material can be produced, e.g. banana. Seed banks are commonly used in most of the seed crops. Field gene bank is alternate to *in vitro* conservation, and is being widely used, however has risk of insect and pest attack and natural disaster, e.g. hurricanes, floods, grazing by animals. The importance of genetic diversity conservation, climate change, and setting up of gene banks will be discussed.

B-01

The LAB cell factory: food-grade gene expression and display of proteins in lactobacilli

Dietmar Haltrich
Food Biotechnology Laboratory, BOKU University of Natural Resources and Life Sciences Vienna, Austria
e-mail: dietmar.haltrich@boku.ac.at

Lactic acid bacteria (LAB) are well known to be beneficial for food fermentations and, as probiotics, they are relevant for many aspects of health. However, their potential and applicability as microbial cell factories for recombinant gene expression and protein production is only emerging slowly. LAB are widely used in food preparation, and as such many of these strains are safe and carry the QPS (Qualified Presumption of Safety) or GRAS (Generally Recognised as Safe) status. This can be exploited when using LAB for the production of enzymes to be used in food or feed, yet these systems need to be adapted for food-grade expression. Here I will present examples of using *Lactobacillus plantarum* as expression host and a complementation strategy based on alanine racemase for the selection marker, thus avoiding the use antibiotic resistance as a marker. Further, LAB are promising and emerging vectors of choice to deliver active protein molecules to the host. To this end, a protein can be displayed at the surface of the expression host, typically by adding a signal peptide for secretion and a suitable anchor domain to the protein of interest. Here I will show different strategies of secreting and anchoring various proteins onto the surface of *L. plantarum*.

Keywords: *Lactobacillus plantarum*, alanine racemase, food fermentation, actic acid bacteria, recombinant gene expression

Bio-conversion of carbohydrate polymers from food wastes into novel functional oligosacharides

Montarop Yamabhai
School of Biotechnology, Suranaree University of Technology, Nakhon Ratchasima, Thailand
e-mail: montarop@g.sut.ac.th

Carbohydrate polymers or polysaccharides perform various roles in living organisms including storage of energy and structural components. Starch and sugars are the most important carbohydrates in human diet. Food wastes rich in polysaccharides are promising source of raw material for bio-conversion into high-value oligosaccharides with different functional activities. Adding value to agricultural and food wastes has become an important issue for sustainable economy and environment around the world. The demand for nutraceutical and functional foods poses challenge and opportunity for value creation of various food wastes. Enzyme is the key element of green and clean technology for creating competitive innovations that are environmentally friendly, highly suitable for bio-economy. Two attractive polysaccharides from food wastes in Asian countries are chitin, a structural component of arthropods, and mannan from copra meals, palm kernels and coffee beans. Glycoside hydrolases (GH), EC 3.2.1-, are families of enzymes that hydrolyse the glycosidic bonds in carbohydrate polymers. The IUMP enzyme nomenclature of GH is based mainly on their substrate specificity, while the classification of GH in families is based on amino acid sequence similarity because there is a direct relationship between sequence and folding similarities. Chitinases, ChiA (EC 3.2.1.14) and chitosanase, CsnA (EC 3.2.1.132) are enzymes that catalyse the hydrolysis of the -1,4 glycosidic backbone of chitin (-1,4 linked N-acetylglucosamine) and chitosan, partially deacetylated derivatives of chitin, respectively, creating various structures of chito-oligosaccharides (CHOS), depending on the substrates and the enzymes used in the bioconversion process. CHOS has been shown to have a wide variety of biological activities; consequently, various applications ranging from agricultural to medical sectors. -Mannanase, ManB (EC 3.2.1.78) is an enzyme that can catalyse random hydrolysis of -1,4 glycosidic linkage in the main chain of -1,4 mannas, glucomannans, and galactomannans. Bacillus licheniformis and B. subtilis have been shown to be good sources of appropriate hydrolytic enzymes for industrial applications. BlChi18A, BsCsn46A, and BlMan26B can be efficiently produced in E. coli expression system and their properties are suitable for bio-conversion of chitin, chitosan and mannan biopolymers, respectively. Certain biological functions of well-defined hydrolytic products using enzyme technology will be presented. The knowledge obtained from biological assays will be used to generate suitable bio-innovations that meet consumer expectations, which are the key for successful bio-economy.

Keywords: ß-mannanase, chitin, chitinase, chitosan, chitosanase, mannan

B-04

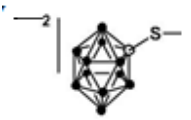
Recent development of Boron carrying pharmaceutical for Boron Neutron Capture Therapy (BNCT)

Design, synthesis and biological evaluation of new Boron amino acids containing *closo*-dodecaborate

Mitsunori Kirihata

Laboratory of Medicinal Chemistry for Boron Drug, OPU Research Center for Boron Neutron Capture, Osaka Prefecture University, Japan
e-mail: kirihata@biochem.osakafu-u.ac.jp

Boron neutron capture therapy (BNCT) is based on the nuclear fission reaction of 10B with low energy thermal/epithermal neutrons yielding high linear energy transfer (LET) α-particles (4He) and recoiling 7Li nuclei in tumor cells, and has attracted attention as a potential treatment for malignant brain tumors. For a boron pharmaceutical to be successful as a boron carrier in BNCT, the following criteria must be met: i) high tumor-targeting selectively (T / N ratio >3) ; ii) low systemic toxicity; and iii) tumor concentrations of ～20μg 10B/g tumor tissues. Although many kinds of boron-containing compounds such as amino acid, nucleic acids, and porphyrins have been reported as boron delivery agents for BNCT, only two compounds are used for the treatment of brain tumors via BNCT: p-borono-L-phenylalanine (BPA) and mercapto-closo-dodecaborate (BSH). As a part of our studies on novel boron delivery agents for BNCT, we designed and synthesized thiododecaborate ([B12H11]2--S-) unit containing L-amino acids which constitute a new class of tumor seeking and water soluble amino acids. The in vitro of the cytotoxicity, killing effects by neutron irradiation, and micro distribution analysis was performed by our group suggested that BSH-AA might be a potential delivery agent for BNCT. On the other hand, α, α-cycloalkyl amino acids radiolabeled with 18F, such as 1-aminocyclobutane-1-carboxylic acid (ACBC), are useful positron emission 1 8 F-A CB Ctomography (PET) probes for brain cancer diagnosis, since unusual amino acid with small aa-alkyl rings are selectively incorporated via L-type amino acid transporter (LAT) and are temporarily retained in cancer cells. Here, I'd like to talk about the design, synthesis and biological evaluation of two thiododecaborated α,α-cycloalkyl amino acids, cis and trans-ACBC-BSH (2a, 2b) with no asymmetric carbon atoms.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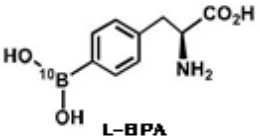
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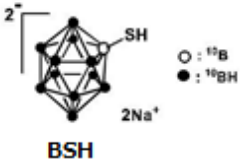
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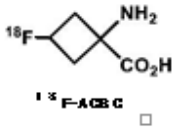
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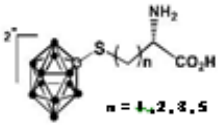
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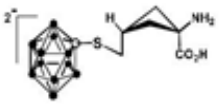
n = 1, 2, 3, 5
BSH-AA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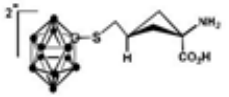
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B-05

Development of glucomannan extracted from Porang (*Amorphophallus oncophyllus*) as functional food ingredient

Eni Harmayani
Faculty of Agricultural Technology, Universitas Gadjah Mada
e-mail: eniharmayani@ugm.ac.id

Consumers awareness to improve the quality of life lead them to consume food that can provide health and wellness. Recently, functional food consumption has increased significantly. The term functional food was first used in Japan referred to food products fortified with special constituents that possess advantageous physiological effects. According to Functional Food Science in Europe (FUFOSE) functional food has been defined as a food that can give beneficial functions in the body to improve health and/or to decrease the risk of disease beyond sufficient nutrition. Functional food can be natural or processed food that has been enriched by biologically active compounds for example vitamins, minerals, probiotics and prebiotics including dietary fiber. One of natural dietary fiber is glucomannan which can be extracted from Porang an Indonesian local tuber of Amorphophalus oncophyllus. Glucomannan is water soluble polysaccharide consisted of mannose and glucose residues linked by β–1,4 bonds with some acetyl group on the C-6 position. Native and modified glucomannan have been used for diverse food and non-food application such as thickener, emulsifier, encapsulation, nutritional supplements including functional food ingredient. Our study indicated that glucomannan extracted from Porang has prebiotic and immunostimulatory activities and anti-allergy effect. Application of Porang glucomannan as functional ingredient to produce several functional food products has been done with improved functional performance.

Keywords: *Amorphophalus oncophyllus*, functional food, Glucomannan, prebiotics, porang

Anti-cancer potency and mechanism of human umbilical cord blood stem cell

Ferry Sandra
Department of Biochemistry and Molecular Biology, Division of Oral Biology,
Faculty of Dentistry, Universitas Trisakti, Indonesia
e-mail: ferrysandra@gmail.com

Human umbilical cord blood (hUCB) as a useful source of stem cell, has been kept in the stem cell bank and serves as a useful source as the last treatment option for a severe illness in the future. In regards to immunogenicity, it has been reported that hUCBSC has a low expression of HLA class I and II. In general, stem cell mechanism is not only through the incorporation of stem cell into the tissue, but stem cell can also secrete factors that can affect the surrounding cells. hUCBSC can induce apoptosis in cervical and lung cancer cells. hUCBSC can inhibit growth of leukemic, cervical cancer and glioma cells. In addition, hUCBSC can inhibit invasion of glioma and lung cancer cells. Most of the reports showed that hUCBSC transplants are aimed for hematologic malignancies. There were low rates of malignant relapse after hUCBSC transplantation, suggesting that for patients at high relapse risk, hUCBSC could be the better option. hUCBSC showed as a good source for both dendritic and NK cells. Due to its high potency, hUCBSC should be develop further for treatment of breast and other type of cancers.

Keywords: cancer, cord blood stem cell, dendritic cell, immunogenicity, HLA, NK cell

B-07

Diversity and ex situ conservation status of traditional vegetables in Southeast Asia

Maarten van Zonneveld[1], Marti Pottorff[2], Tien-hor Wu[1], and Svein Ø. Solberg[2]
[1] World Vegetable Center, Genetic Resources and Seed Unit, HQ, Shanhua, Taiwan
[2] World Vegetable Center, East and Southeast Asia/Oceania, Kamphaeng Saen, Thailand
e-mail: maarten.vanzonneveld@worldveg.org

Traditional vegetables have regained relevance in the development of sustainable food systems because these crops could help diversify diets, generate income for farmers, and make farming systems more resilient to climate change. These crops, however, have been under the radar in agricultural research and development for many decades. As a consequence, the plant genetic resources of these crops have been poorly conserved compared with staple crops and commercial vegetables. It can be anticipated that urban migration in Southeast Asia is leading to extirpation of traditional knowledge on growing and cooking traditional vegetables. These crops are therefore are at risk to disappear from our diets and from farmer fields. On the other hand, new business opportunities arise for traditional vegetables with growing urban markets for vegetables and healthy food.

We evaluate the diversity, ex situ conservation status, and collection gaps of traditional vegetables in SE Asia. The analysis will support safeguarding plant genetic resources of traditional vegetables by targeting collection gaps of germplasm that is not yet maintained ex situ. This germplasm is vulnerable to extirpate because of urban migration, replacement of new crops or varieties, among other threats.

Vegetables were scored on the basis of their inclusion in three key references of traditional vegetables 1–3 . Vegetables that were included in at least two references were prioritized in the final analysis. The ex situ conservation status was determined with data from the 2017 FAO WIEWS database and Genesys, gateway to plant genetic resources. Species records were retrieved from the Global Biodiversity Information Facility, WorldVeg genebank, and FAO WIEWS. Geographic Information Systems and R Statistical software were used to identify geographical patterns of diversity and to identify collection gaps that need to be targeted for germplasm collection.

Fifty-two traditional SE Asian vegetables were prioritized of a total list of 276 species. These prioritized species were included in at least two of the three key references. Most important traditional Asian vegetables included in all 3 references were: wax gourd (*Benincasa hispida*); winged bean (*Psophocarpus tetragonolobus*); black nightshade (*Solanum americanum*); snake gourd (*Trichosanthes cucumerina*); water dropwort (*Oenanthe javanica*); slippery cabbage (*Abelmoschus manihot*); and waterleaf (*Talinum*

fruticosum). The GIS analysis shows high sampled richness of traditional vegetables of Southeast Asia in south China, Taiwan, Laos, North Vietnam, North Australia, and PNG. The largest genebank collections of traditional vegetables of Southeast Asia are maintained by the World Vegetable Center and The National Bureau of Plant Genetic Resources in India.

Even though some important genebank collections of traditional vegetables have been established, there are still many collection gaps in Southeast Asia and many traditional vegetables are underrepresented in these genebank collections. To explore the full potential of traditional vegetables, it is therefore essential to safeguard the genetic resources of traditional vegetables through germplasm collection and the promotion of use of these crops in food systems.

Funding for this research was provided by long-term strategic donors to the World Vegetable Center: Republic of China (Taiwan), UK aid from the UK government, United States Agency for International Development (USAID), Australian Centre for International Agricultural Research (ACIAR), Germany, Thailand, Philippines, Korea, and Japan.

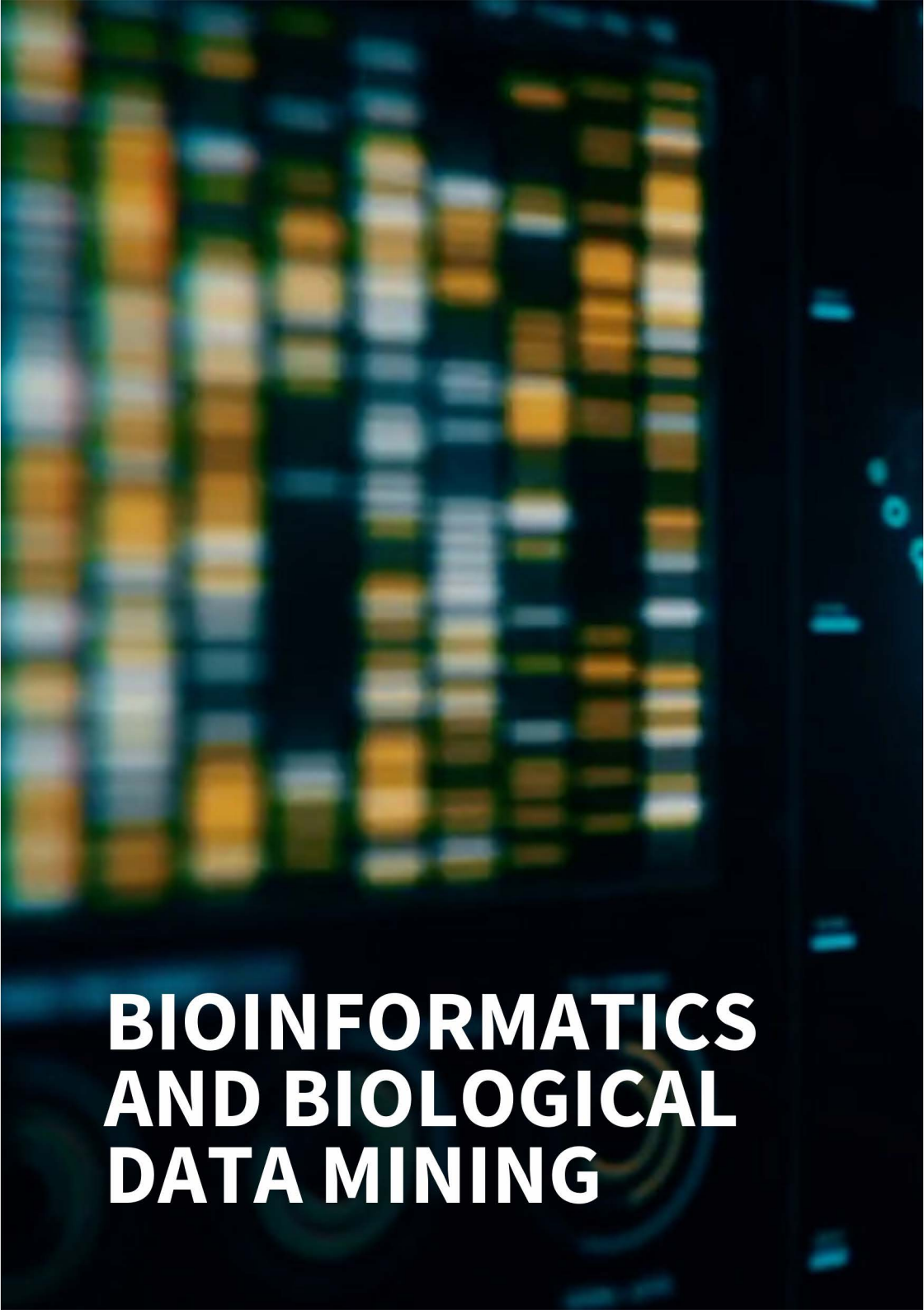
Keywords: conservation status, genebank, germplasm, GIS analysis, traditional vegetables

B-08

Genetic resources to support Indonesia food security program

Glenn Pardede
Deputy of Horticulture department at Indonesia Employers Association (APINDO)
e-mail: glennpardede@panahmerah.id

Based on conservation International, Indonesia is part of biodiversity hotspots; its mean Indonesia is a region in the world that has extraordinary natural wealth. Indonesian population was reach 258 million on 2017. Some policies had been created and launched to support food security programs. Food security is a crucial need to continuously increase along with the increasing number of people, especially to increase production. Vegetables potentially contribute on the food security program, as a source for vitamins, minerals, antioxidants, and natural fiber. In fact, the consumption level of vegetables per capita is only 40.35 kg/year, far below the recommendations of the Food Agriculture Organization of 73 kg/capita/year. Since 2014, Minister of Health of Indonesia, release regulation No. 41 concerning implementation of balanced nutrition, recommends the consumption of fruits and vegetables covering 50% of total food consumed. Producing high quality seeds requires genetic resources availability. Local landraces used for agronomical superiority source, meanwhile, resistance trait of most diseases comes from other center of origin. Extreme climate conditions causes the spread and development of the disease will be faster, so we are chasing between producing quality varieties and withstanding disease with the development of the disease itself. Compatibility of taste, aroma, and other agronomic characters, can easily be found in local lines. But now its existence is increasingly worrying because most of them have no resistance to pests and diseases.



BIOINFORMATICS AND BIOLOGICAL DATA MINING


DNA ANALYSIS
Analyzing Core

C1-199

Classification of brain magnetic resonance images based on statistical texture

Meidar Hadi Avizenna, Indah Soesanti, and Igi Ardiyanto
Department of Electrical Engineering and Information Technology Faculty of Engineering, Universitas Gadjah Mada, Indonesia
e-mail: meidar.hadi.a@mail.ugm.ac.id, indahsoesanti@ugm.ac.id, igi@ugm.ac.id

Magnetic Resonance Image (MRI) is a medical technique commonly used by radiologists to visualize organ structures in humans without surgery, MRI provides a wealth of information about human soft tissue, which helps to diagnose brain tumors, early detection of brain tumors is helpful to doctors to determine the action will be done. However, the diagnosis is very subjective because it depends on radiological ability. To assist the radiologist in the early detection of brain tumors, a computerized system is needed to perform the feature extraction and MRI image classification. This study aims to classify FLAIR MRI images of the brain by classifying abnormal and normal MRI images based on statistical texture analysis, 44 abnormal datasets of BRATS 2017 training data and 4 normal datasets from Patient Contributed Image Repository (PCIR). At the beginning of the step, pre-processing of the image is followed by the histogram equalization method to extract the feature with statistical texture analysis by calculating the mean, variance, deviation, skewness, kurtosis, energy, entropy and smoothness. Finally, a multinomial logistic regression model with a ridge estimator is used to classify abnormal and normal MRI images and evaluated by k-fold validation. The results obtained from the proposed method of accuracy, sensitivity, and specificity reached 100 %. This shows the method used to do a good classification in this case.

Keywords: MRI, feature extraction, statistical texture, classification, logistic regression

Analysis of retinal fundus images for classification of glaucoma

Maria Ulfa Muthmainah, Hanung Adi Nugroho, Bondhan Winduratna, and Ilcham
Department of Electrical Engineering and Information Technology,
Faculty of Engineering, Universitas Gadjah Mada, Indonesia
e-mail: maria.ulfa.m@mail.ugm.ac.id, adinugroho@ugm.ac.id, windurat@ugm.ac.id,
ilcham.mti15@mail.ugm.ac.id

An early sign of glaucoma can be seen from the presence of damage to the retinal nerve fibers. In retinal fundus image, the damage of nerve fibers is represented as a dark area. Several researchers have been done this research with various analysis, one of those used texture. Thus, this paper aims to classify glaucoma and healthy images by analyzing textures with a first-order statistical approach. Initially, the image is cropped to get the region of interest (ROI), then the blood vessels and optic disc are removed. Image without blood vessels and optic disc will be extracted the features using first-order statistics. The features obtained are selected using Relief to get the best among them. There are four selected features which classified using the support vector machine (SVM) and k-Nearest Neighbor (k-NN). The performance results of both classifiers show that k-NN performs better than SVM with average of accuracy, sensitivity, specificity, PPV, and NPV are 93.3 %.

Keywords: classification of glaucoma, k-NN, region of interest (ROI), relief, retinal nerve fibers

C1-032

Identification of significant protein diabetes mellitus type 2 with fuzzy C-means and topological analysis

Alif Ahmad Zulfikar[1], Mohammad Romano Diansyah[1], Azka Ardhya Rizqa Effendie Putri[2], and Wisnu Ananta Kusuma[1]

[1]Department of Computer Science, Bogor Agricultural University, Indonesia
[2]Department of Biochemistry, Bogor Agricultural University, Indonesia
e-mail: zulfikar_alif7@apps.ipb.ac.id, romano_diansyah@apps.ipb.ac.id, azkarizqa@gmail.com, ananta@apps.ipb.ac.id

Computation approach for identifying significance of proteins related to a certain disease was proposed as one of the solutions from the problem of experimental method application which is generally cost and time consuming. The case of study was conducted on Diabetes Melitus (DM) disease. The purpose of this research is to identify significant proteins that causes diabetes mellitus type 2 by applying Fuzzy C-Means clustering algorithm and topological analysis from graph theory. A total of 100 proteins were obtained, some of them were identified as most significant proteins such as GCK, GCG, HNF4A, INSR, SLC30A8, ALB, IL6, PPARG, ADIPOQ and IRS1. It is expected that this results can be used by pharmacology researcher to screen the candidates of active compounds that have association with those proteins that representing Diabetes Melitus (DM) disease.

Keywords: significant protein, diabetes mellitus type 2, fuzzy c-means, topological analysis

K-Nearest Neighbor (KNN) analysis on genes expression datasets of Maize Nested Association Mapping (NAM) showed confident classification on organ-specific expression

Ika Fitria Widiawati[1], Husna Nugrahapraja[2], and Rohmatul Fajriyah[1]
[1]Department of Statistics, Universitas Islam Indonesia, Indonesia
[2]SITH, Bandung Institute of Technology, Indonesia
e-mail: 14611193@students.uii.ac.id, nugrahapraja@sith.itb.ac.id, rfajriyah@uii.ac.id

Genes expression data in large data matrix provide challenges in applying analytical methods, interpreting, and drawing conclusions. This study aims to evaluate genes expression classification on different maize lines and different organs (Apex, Root, Shoot, Ear, and Tassel) based on Maize Nested Association Mapping (NAM) datasets using K-Nearest Neighbor (KNN) approach. As a result, we obtained the accuracy value and AUC value of 0.926 and 0.992 respectively from KNN analysis with k = 5. Besides, we showed the classification of genes expression datasets to distinguish organ specific expression.

Keywords: accuracy, AUC, classification, Genes Expression, KNN

C1-022

A parallel ClustalW algorithm on multi-raspberry pis for multiple sequence alignment

Fathurrochman Habibie[1], Afiahayati[1], Guntur Budi Herwanto[1],
Aufaclav Zatu Kusuma Frisky[2], and Sri Hartati[1]
[1]Department of Computer Science and Electronics Universitas Gadjah Mada, Indonesia
[2]Faculty of Informatics Technische Universitat Wien Vienna, Austria
e-mail: fhabibie14@gmail.com, afia@ugm.ac.id, gunturbudi@ugm.ac.id, aufaclav@cvl.tuwien.ac.at, shartati@ugm.ac.id

Along with the development of technology in the field of bioinformatics, the cost of DNA sequencing from year to year is getting cheaper. This causes the growth of the genetic database to rise beyond Moore's Law. The rapid growth of genetic databases is one of the main obstacles in conducting sequence alignment. Multiple sequence alignment (MSA) is one important method in analyzing DNA or protein. One of the popular MSA methods among practitioners is Clustal. In sequential programming to process large data, it certainly takes a long time. In addition, sequential programming has limited memory, so it can cause the stack in the program. One way to speed up processing performance is to use parallel programming. MPI is one of the popular parallel computing technologies. In this study a parallel process was run on a cluster consisting of four Raspberry Pi computers. The experiment used sequence data from BAliBase version 3. From the results of the research, it was shown that at the distance matrix calculation stage it could reach 12.7 times, while at the progressive alignment stage it could reach 5.71 times faster than the sequential process.

Keywords: multiple sequence alignment; parallel computing; message passing interface, ClustalW, Raspberry Pi

Data mining and comparative analysis of human skin microbiome from EBI metagenomics database

Matin Nuhamunada[1], Gregorius Altius Pratama[1], Setianing Wikanthi[2], Mohamad Khoirul Anam[1], R. Ludhang Pradhipta Rizki[3], and Nastiti Wijayanti[1]
[1]Department of Tropical Biology, Universitas Gadjah Mada, Indonesia
[2]Department of Agricultural Microbiology, Universitas Gadjah Mada, Indonesia
[3]Department of Medical Microbiology, Universitas Gadjah Mada, Indonesia
e-mail: matin_nuhamunada@ugm.ac.id, gregorius.altius.p@mail.ugm.ac.id, setianingwikanthi@mail.ugm.ac.id, mohamad.khoirul.anam@mail.ugm.ac.id, ludhang@ugm.ac.id, nastiti_wijayanti@ugm.ac.id

Human skin microbiome profile is affected by many factors including geographical location, environment, behaviour, and genetics. To understand more about the distribution of human skin microbiome across the globe, we compare several skin microbiome studies available in the EBI metagenomics database. Based on the RESTful API of the database, we demonstrate programmatic access to obtain study and sample information based its respective metadata such as sex, geographical location, and body site. The biological observation matrix from the analysis result of the selected samples was compared using MEGAN Community Edition. Of the 7 studies found, comparative study was conducted for scalp samples between the USA and Brazilian populations, and foot samples between the USA and Australian populations. PCoA and biplot analysis showed difference microbiome profile between studies. Co-occurrence network analysis showed major difference between scalp sample of the USA and Brazilian population due to the difference in microbiome richness and abundance. Foot samples between the USA and Australian samples, even though differ in profiles, suggest a similar pattern in the network of bacterial interaction.

Keywords: comparative analysis, data mining, EBI metagenomics, human skin, microbiome

C2-341

Screening of oxamic acid similar 3D structures as candidate inhibitor *Plasmodium falciparum* L-lactate dehydrogenase of Malaria through molecular docking

Sahal Sabilil Muttaqin[1] and Jaler Sekar Maji[2]
[1]Faculty of Biology, Universitas Gadjah Mada, Indonesia
[2]Faculty of Mathematics and Natural Sciences, Universitas Gadjah Mada, Indonesia
e-mail: sahal.sabilil.m@mail.ugm.ac.id, jaler.sekar.m@mail.ugm.ac.id

The rise of strains of malarial parasite resistant to customary medication treatment has invigorated ongoing looks for antimalarials with novel methods of activity. A contender for this approach in the battle against malaria is the L-lactate dehydrogenase from Plasmodium falciparum (PfLDH). P. falciparum LDH is a fundamental catalyst for vitality age inside the parasite. Lactate dehydrogenase (pfLDH) is a key chemical in the glycolytic pathway of P. falciparum, lessening pyruvate to lactate with the guide of NADH. Oxamate is a non competitive inhibitor of the binding of pyruvate to LDH, and a few oxamic derivates have been created as lead mixes for specific pfLDH inhibitors like 1LDG. The purpose of our study was to screen for oxamic acid-like structures as PfLDH inhibitors by docking method so as to enrich the inhbitor alternative PfLDH and to discover a lead intensify that presentations specific action against pfLDH. Our method by preparation of 3D structure of 1LDG obtained from RCSB PDB (Protein Data Bank) then ligand removed from the structure of oxamic acid by using PyMol Software, new ligands oxamic acid-like structures are obtained from the Pubchem open chemistry database website, virtual screening and docking by Pyrx, and visualization by PyMol software. In this study it was found that the binding affinity of 2-Oxopropanehydrazide was the largest with a value of -5.2 Kcal · mol^{-1}, but in this case only 2,2-diffluoro-2-hydroxyacetic acid is a candidate inhibitor that occupies a region close to oxamate even attached to NADH. In each of the best ligand results that the rmsd/ub and rmsd/ib value are 0.

Keywords: *Plasmodium falciparum,* candidate inhibitor, dehydrogenase, docking, malaria

Comparison study of melanocortin 4 receptor in cattle, buffalo, sheep and goat based on genbank data

Latifah[1], Dyah Maharani[1], Kustantinah[2], and Tety Hartatik[1]
[1]Department of Animal Breeding and Reproduction, Faculty of Animal Science, Universitas Gadjah Mada, Indonesia
[2]Department of Animal Nutrition and Feed Science, Faculty of Animal Science, Universitas Gadjah Mada, Indonesia
e-mail: latifah.pt@mail.ugm.ac.id, d.maharani@ugm.ac.id, kustantinah@ugm.ac.id, tety@ugm.ac.id

We compare the partial genomic sequences from Genbank in NCBI of cattle, 4 goats, sheep, and buffalo MC4R genes. Genomic DNA was obtained from Genbank in NCBI of 8 cattles, 2 buffaloes, 4 sheep and 4 goats. According to the results of data analysis, we found 110 variation of MC4R in 4 specieses. The variation include 12 at 5'UTR, 72 located in exon and 26 found at 3'UTR. The results of this study are further evidence for the role of MC4R as an candidate gene in ruminant.

Keywords: buffalo, cattle, goat, MC4R comparison, sheep

C3-452

Prototype of application multi-objective genetic algorithm using multi-threading strategy with thinking design approach method for optimization design DNA primer and DNA probe

Cahyo Dwi Raharjo[1], Wayan Tunas Artama[2], Zainudin Zukhri[1], and Muryanto[3]
[1]Fakultas Teknologi Industri, Universitas Islam Indonesia, Sleman, Yogyakarta
[2]Fakultas Kedokteran Hewan, Universitas Gadjah Mada, Yogyakarta, Indonesia
[3]Biotech, PT East West Seed Indonesia, Purwakarta, Jawa Barat
e-mail: 13917210@students.uii.ac.id, artama@ugm.ac.id, zainudin@uii.ac.id, muryanto@panahmerah.id

Application prototype with design thinking approach method using 5 stages Empathise, Define, Ideate, Prototype and Test. The design thinking approach involves several experts. Expert of Genetic Algorithm, Molecular Biology and some Experts from East West Seed Indonesia company who is user of this application. The result of design thinking approach with some experts is the application can design some Deoxyribonucleic Acid (DNA) primer and DNA probe in 1 time process for each sequence, and sequences are inserted into the application will be more than 1. Design DNA primer and DNA probe have many parameters. The parameters are Product Length, DNA Length, Repetition, Temperature Melting, GC Content, GC Clamp, Primary Secondary Structure, Self and Pair Complementary, Specificity and Mismatch. Multi Objective Genetic Algorithms (MOGA) with a multi threading strategy can solve this problem. MOGA in this case is the number of objective functions possessed Genetic Algorithm (GA). The objective function is the parameter used for the design DNA primer and DNA probe. Multi objective is used to calculate the fitness value, where each objective function will be summed to be the fitness value. The design process for Any DNA sequence inserted into the application will be given 1 thread, or n sequence = n thread. This multi threading strategy can accelerate the design with many DNA sequences for a one-time process. Currently development of application prototype has been completed. The next stage of testing, improvement and recommendations. Testing and improving the design of the DNA primer and DNA probe based on the parameters, for recommendation is experiment result of variation of combination of GA parameter.

Keywords: design DNA primer, design DNA probe, multi objective genetic algorithm, multi threading, thinking design approach method

Differential *in silico* expression of *Hevea brasiliensis* COBRA transcripts

Riza-Arief Putranto and Irfan Martiansyah
Indonesian Research Institute for Biotechnology and Bioindustry Bogor, Indonesia
e-mail: rizaputranto@iribb.org, irfan.martiansyah@iribb.org

In this paper, the expression values of 13 *HbCOBL* transcripts have been analyzed using the Tuxedo Software Suite protocol in two sets of tissue and treatments in *Hevea brasiliensis*. The first was in bark and latex of rubber clone Reyan 7-33-97 without ethrel treatment and the second was in ethrel-treated mature trees. A mapping of the transcriptomic data from those two sets was carried out against the reference genome Reyan 7-33-97. Two *HbCOBL* transcripts (*HbCOBL-E* and *HbCOBL-P*) showed significant differences of expression in bark but not in latex suggesting that these genes might be involved in the differentiation of laticifers. In addition, no *HbCOBL* transcripts were differentially regulated by ethylene suggesting that these genes might be regulated by another hormonal pathway in rubber tree.

Keywords: *Hevea brasiliensis*, bark, COBRA, ethylene, latex, transcript

C3-774

Internet search activity for leptospirosis in Yogyakarta province: a comparison with official leptospirosis report

Citra Indriani[1], Astri Choiruni[2], Atina Husnayain[3], Ira Dewi Ramadhani[2], Safira Ainun Ulumiyah[2], Ahmad Watsiq Maula[1], Anis Fuad[1], and Riris Andono Ahmad[1]
[1]Department of Biostatistic, Epidemiology and Population Health, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Indonesia
[2]Master Program of Health Management Information System, Graduate Program of Public Health, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Indonesia
[3]E-Health Division Center for Health Policy and Management, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Indonesia
e-mail: citraindriani@ugm.ac.id, astri.choiruni@mail.ugm.ac.id, atina.husnayain@mail.ugm.ac.id, ira.dewi.r@mail.ugm.ac.id, safira.ainun.u@mail.ugm.ac.id, ahmad.watsiq.m@mail.ugm.ac.id, anisfuad@ugm.ac.id, risandono.ahmad@gmail.com

Leptospirosis is a widespread and potentially fatal zoonosis that is endemic in many tropical regions and causes large epidemics. In Indonesia, Yogyakarta province has the highest fatality rate. Google Trends have been considered as an alternative data source for disease surveillance program. This study is aimed to explore Google Trends data as an alternative source for leptospirosis surveillance in Yogyakarta. Five years monthly data of information searching pattern from Google started from 2013 to 2017 were extracted, with search terms “leptospirosis”. Case notification reports from Provincial Health Office were used to validate the data. Pearson Correlation was used to compare time series data. This study showed moderate correlation (r = 0.54, *P*-value = 0.000) between Google Trend and surveillance program data, and it indicated similarity pattern and Google Trends is potential to be used as an alternative source for leptospirosis surveillance in Yogyakarta Province.

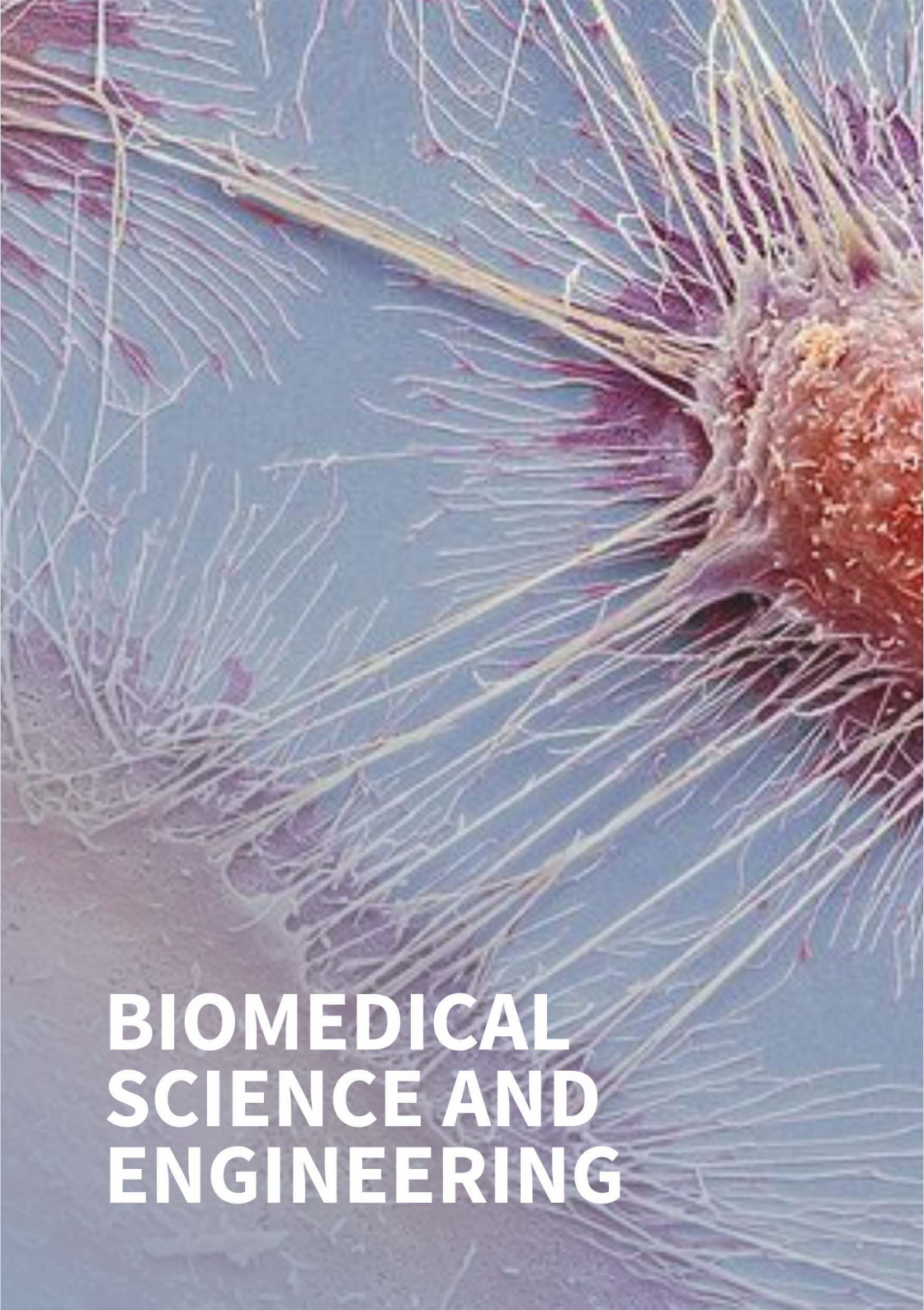
Keywords: Google trends, leptospirosis, surveillance, public health informatics

Development of medical props production towards industry 4.0

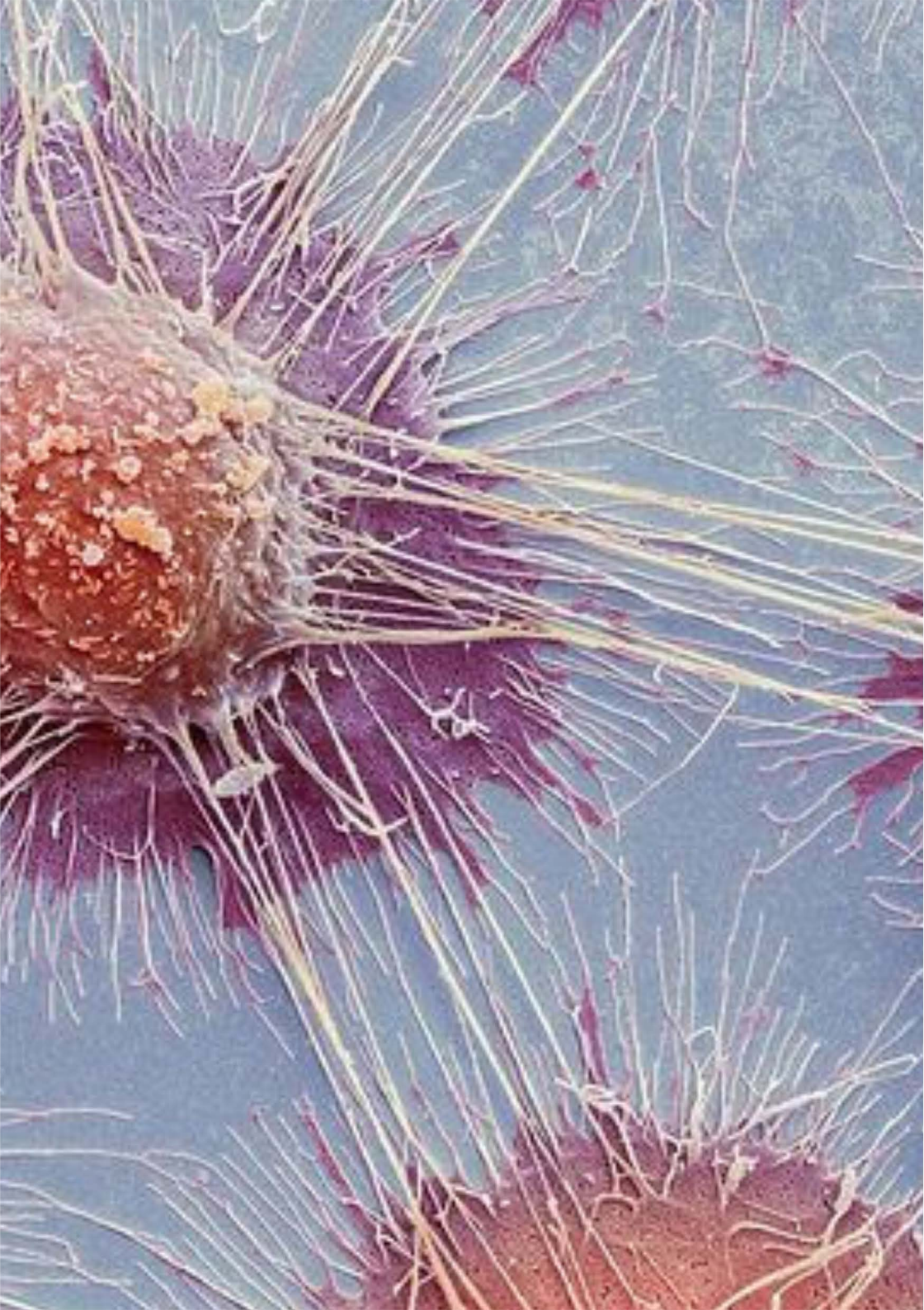
Ignatius Luddy Indra Purnama[1], Alva Edy Tontowi[2], Bertha Maya Sopha[2], and Herianto[2]
Faculty of Industrial Technology, Universitas Atma Jaya Yogyakarta, Indonesia
Department of Mechanical & Industrial Engineering, Universitas Gadjah Mada, Indonesia
e-mail: luddy_indra@staff.uajy.ac.id, alvaedytontowi@ugm.ac.id, bertha_sopha@ugm.ac.id, herianto@ugm.ac.id

The use of medical props is very important in education as well as on the general public. This paper aims to identify the development of medical props production towards industry 4.0. The model and data are taken from the actual manufacturing process by using Invesalius software, Cura software, 3D printer, and the data are transfered manually using human and media SD-Card. The simulation uses Arena software (student version) to find utility for every process. The results show that the high utility are solidification process with Invesalius software and printing process with 3D Printer. Developing medical props process towards Industry 4.0, we use artificial intelegent (especially neural network algorithm) to combine solidification, slicing and make GCode process. Transfer data, with human movement process, can be change with internet of things. For loading material and unloading product from 3D printer, we can use robot arm.

Keywords: 3D Printer, industry 4.0, Invesalius software, medical props, simulation



BIOMEDICAL SCIENCE AND ENGINEERING



M1-598

The differences between the transverse, compressive and tensile strengths of cold polymerized acrylic resin materials with various thickness

Laelia Dwi Anggraini[1,*] and Soenarno[2]
[1]Department Paediatric Dentistry, Faculty of Medicine and Health Sciences
Universitas Muhammadiyah Yogyakarta, Indonesia
[2]Universitas Gadjah Mada, Indonesia
e-mail: laelia_dentist@yahoo.com

Acrylic resin is a common material which is frequently used for denture in dentistry. It has different resin based on its curing method. Cold curing acrylic resin is one of them. This material has the benefit of short curing period, even though mechanical properties were compromised. However the lack of mechanical properties could be improved by increasing acrylic base plate. The aim of the study is to investigate the difference between transverse, compressive, and tensile strengths of cold polymerized acrylic resin material with various thicknesses. This study was an experimental laboratory study with one way ANOVA statistical analysis. A total of 40 specimens of cold polymerized acrylic resin were fabricated. The results of the study showed that the transversal strength of acrylic resin with a thickness of 1 mm was 110.15 N / mm2, thickness of 1.5 mm was 112.01 N / mm2, thickness of 2 mm was 118.00 N / mm2 and thickness was 2.5 mm. 116.82 N / mm2. The results of the compressive strength of cold polymerized acrylic resin with a thickness of 1 mm was 22.42N / mm2, thickness of 1.5 mm was 35.09 N / mm2, thickness of 2 mm was 52.15 N / mm2 and thickness of 2.5 mm was 114.48 N / mm2 . The results of the tensile strength of cold polymerized resin with a thickness of 1 mm was 30.01 N / mm2, thickness of 1.5 mm was 34.98 N / mm2, thickness of 2 mm was 43.98 N / mm2 and thickness was 2.5 mm. 49.67 N / mm2. The thickness addition on the cold polymerized acrylic resin plate has an effect on transverse strength, compressive strength and tensile strength. At a thickness of 2 mm it has the greatest transverse strength. At a thickness of 2.5 mm it has the greatest compressive strength and tensile strength.

Keywords: cold polymerized acrylic resin, compressive strength, tensile strength, transverse strength

Financial sources options for telemedicine program within Universal Health Coverage (UHC) era in Indonesia

Anis Fuad[1,*], Siti Setyawati Mulyono Putri[2], Mei Neni Sitaresmi[3], and Diah Ayu Puspandari[4]
[1]Department of Biostatistics, Epidemiology and Population Health,
Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Indonesia
[2]Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Indonesia
[3]Department Pediatrics, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Indonesia
[4]Department of Health Policy and Management, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Indonesia
e-mail: anis.fuad@gmail.com

Indonesia faces serious challenges to inequity of healthcare services. Entering this disruptive era, telemedicine offers opportunities to increase access to healthcare and enhancing the quality of health care to disadvantages populations. However, among the major challenges for implementation, financing system was considered as the bottleneck. National policy on health insurance that was enacted since 2014 expects to achieve universal health coverage (UHC) in 2019. Our research aim is to explore the potential financing options for implementation of telemedicine in Indonesia under the auspice of the UHC policy. We conducted desk review and focus group discussion with key stakeholders and regulator related to this subject. Telemedicine system already implemented in Indonesia through pilot project initiated by the Ministry of Health and telemedicine by Makassar local government. Limited studies and evidences were recorded regarding the firm regulation on financial sources to sustain telemedicine. However, options for telemedicine sources are available. These includes capitation scheme in primary care, diagnostic related group in secondary care, or fee for service. Beyond the healthcare services-related origin, other potential sources include research/grant, charity, special allocation fund or general allocation fund allocated in districts. Various sources for telemedicine within UHC era are available. These include BPJS compensation fund, deconcentration fund from national health budget, special allocation fund from national health budget, research grant and charity. Technical guidelines to apply these options are urgently required to address inequity of healthcare access in Indonesia.

Keywords: health care, health financing, health insurance, health policy, telemedicine

M1-592

Stichopus hermanni collagen with local hydroxyapatite as bone substitute material toward osteoclast number and toxicity

Endang Wahyuningtyas* and Erwan Soegiatno
Prosthodontics Department Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
e-mail: endang_wtyas2014@ugm.ac.id

Denture wearing is very important after tooth extraction, because it can rehabilitate mastication, phonetic and aesthetics. After tooth extraction, alveolar bone resorption has disturbing the stabilization and retention of denture. Hydroxyapatite has several weaknesses has high bone density. Stichopus hermani collagen is a product of tripang emas collagen extraction which contains 80 % collagen. The purpose is to observe the effect of Stichopus hermanni collagen with local hydroxyapatite as bone substitute material toward osteoclast number and toxicity. The subject was 75 male of *Rattus Sprague Dawley*, each was 3 m.o. The subject was divided into three groups. The group I was Stichopus hermanni collagen and local hydroxyapatite, the group II was Stichopus hermanni collagen, and group III was collagen. Each of subject was decapitated after 3 d, 7 d, 14 d, 28 d, and 56 d after treatment. The defect was made on the femur condyle of *Rattus Sprague Dawley*. The histological slides was made from defect area. The trinocular microscope was used to measure of osteoclast. The data was analyzed using two ways ANOVA test. The toxicity test of the lever and renal was done with made histological slide and measured it with trinocular microscope. The data was analyzed using Kruskal Wallis test. The result is the two ways ANOVA test showed there is significant difference between group of Stichopus hermanni collagen and local hydroxyapatite, group of Stichopus hermanni collagen and group of collagen after 3 d, 7 d, 14 d, 28 d, and 56 d treatment on the number of osteoclast ($p < 0.05$). The Kruskal Wallis test showed there is no significant difference between group of Stichopus hermanni collagen and local hydroxyapatite, Stichopus hermanni collagen and collagen after 3 d, 7 d, 14 d, 28 d, and 56 d treatment on lever and renal toxicity ($p > 0.05$). Stichopus hermanni collagen with local hydroxyapatite as bone substitute material increased osteoclast compare with Stichopus hermanni collagen, and collagen. Stichopus hermanni collagen with local hydroxyapatite does not cause systemic toxicity.

Keywords: collagen, local hydroxyapatite, osteoclast, *Stichopus hermanni* collagen, toxicity

The fibroin cocoon *Bombyx mori* L is cytocompatible with human primary pulp cells

Sartika Puspita[1,2,*], Marsetyawan H.N.E. Soesatyo[3], Siti Sunarintyas[4], and Ema Mulyawati[5]
[1]Department of Oral Biology, School of Dentistry, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta, Indonesia
[2]Doctoral program, Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
[3]Department of Histology and Cells Biology, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Indonesia
[4]Department of Biomaterial, Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
[5]Department of Conservative Dentistry and Endodontic, Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
e-mail: sartika.puspita@umy.ac.id

Fibroin cocoons (*Bombyx mori* L) attracts many researchers to undertake various studies especially in the field of medicine for example as suturing materials, bone graft, and artificial ligaments because they contain proteins consisting of 18 amino acids. However, there is still a need for further research because there are no researchers have addressed the application of fibroin as pulp capping materials. In this study we investigate the cytocompatibility of fibroin cocoon *Bombyx mori* L by determine the viability of dental pulp cells to some concentrations of fibroin extract. Because in the future fibroin would be used as pulp capping material. The method of this study was laboratory experimental in vitro use primary pulp cells of human teeth that were extracted for orthodontic purposes. The concentration of fibroin was 100 µgr/ml; 50 µgr/ml; 25 µgr/ml; 12.5 µgr/ml; 6.25 µgr/ml; 3.125 µgr/ml and 1.56 µgr/ml. 96 well plates of MTT assay and absorbance values were determined by ELISA reader with 595 nm wavelength. And the response of pulp cell is calculated with the formula. The results showed, the viability of fibroblast pulp cells at concentration 100 µgr/ml was 104 %, 50 µgr/ml was 108 %, 25 µgr/ml was 114 %, 12.5 µgr/ml was 120 %, 6.25 µgr/ml was 116 %, 3.125 µgr/ml was 112 % and 1.56 µgr/ml was 92 %. The conclusion of this research is the response of fibroblast pulp cells to fibroin among 92 % to 100 %. Further analysis, the consentration of fibroin doesn't influence the viability of cells, in other hand fibroin is cytocompatible with human pulp cells.

Keywords: cells viability, cocoon *Bombyx mori* L, fibroblast pulp cells, fibroin, human teeth

M1-729

Effect of *Bombyx mori's* sericin immobilization over poly (L-Lactic Acid) surface on mesenchymal stem cells attachment and proliferation

Yenny Yustisia[1,*], Siti Sunarintyas[2], and Rina Susilowati[3]

[1]Department of Oral Biology, Faculty of Dental Medicine, Universitas Jember, Indonesia
[2]Department of Biomaterial, Faculty of Dental Medicine, Universitas Gadjah Mada, Indonesia
[3]Department of Histology and Cell Biology, Faculty of Medicine, Universitas Gadjah Mada, Indonesia
e-mail: yennyyustisia.fkg@unej.ac.id

Poly (L- lactic acid) or PLLA as one of tissue engineering material have demonstrated low cell interaction capability due to its hydrophobicity. *Bombyx mori's* sericin, a polymer protein that has strongly polar side groups such as hydroxyl, carboxyl and amino groups, has been known to accelerate cells attachment and proliferation. The aim of this study was to investigate the effect of *Bombyx mori's* sericin immobilization with different concentration over PLLA surface on attachment and proliferation of mesenchymal stem cells (MSCs). Three concentration of sericin (2.5, 5, and 10 mg · ml^{-1}) were applied on PLLA surface modification using carbodiimide chemistry. Surface characterization using Fourier Transform-Infrared Spectroscopy (FTIR) and water contact angle was performed to observe the changes on surface-modified PLLA. The MSCs attachment after 4 hours in culture and proliferation rate in 2 days was determined using haemocytometer. FTIR graphs showed that sericin was successfully immobilized on PLLA surface. Contact angle measurement showed significant increases of the hydrophilicity on sericin-modified PLLA surfaces. MSCs attached to sericin-modified PLLA was higher in number than the cell attached on control PLLA ($p < 0.05$), but there was no difference between the treatment groups ($p > 0.05$). However, the proliferation rate of sericin-modified PLLA has no significant differences with control PLLA ($p > 0.05$). The conclusion was *Bombyx mori's* sericin application over PLLA surface enhanced MSCs attachment, but did not enhance their proliferation rate.

Keywords: Sericin, PLLA, MSCs, attachment, proliferation

Preparation and characterization of Hyroxyapatite based on human teeth with various of calcination

Rani Deliana Panggabean* and Yusril Yusuf
Department of Physics, Universitas Gadjah Mada, Indonesia
e-mail: rani.d@mail.ugm.ac.id

Human teeth based on hydroxyapatite (HAp) with vary of calcination temperature has been prepared at temperature of 650 ℃, 800 ℃, 950 ℃, 1100 ℃, and 1250 ℃ for 4 h. Fourier Transform Infrared (FTIR), X- Ray Diffraction (XRD), and Scanning Electron Microscope-Energy Dispersive X-Ray (SEM-EDX) were used to analysis the characteristics of HAp. The spectra FTIR of HAp confirmed the existence of various functional groups such as phosphate, hydroxyl, and carbonate. The XRD results revealed that calcination temperature had affected HAp phase. There were diffraction peaks of HAp with the impurity of tricalcium phosphate (TCP). Crystallite size of HAp tended to increase by increasing calcination temperature (32.695 to 40.950 nm). Morphology of HAp changed from irregular to regular form with the increase of calcination temperature that indicated there was calcination increase crystallinity in HAp sample. In addition, EDX results pointed the presence of Ca and P with the Ca/P ratios from 1.55 to 1.68. Therefore, HAp based human teeth was potential to be used for bone graft application.

Keywords: Hydroxyapatite, human teeth, calcination, temperature, tricalcium phosphate

M2-094

Power grip exoskeleton design as rehabilitation devices for post-stroke survivors

Djoko Kuswanto*, Bambang Iskandriawan, and Panji Satrio Mahardhika
Department of Industrial Design, Institut Teknologi Sepuluh Nopember, Indonesia
e-mail: crewol@prodes.its.ac.id

Stroke is a disease that is often encountered, generally at age 65 years above. Riskesdas data from 2013 shows a tendency of increasing prevalence of stroke every year in Indonesia. This results in an increasing number of stroke survivors who suffers a post-stroke problem in their limbs. Rehabilitation process can help the patient's body to get their muscle function back. However, in hand muscle rehabilitation, sometimes the patient has different levels of recovery and requires regular therapy. Using exoskeleton in rehabilitation can be used as an alternative patient to perform therapy independently and regularly without having to rely on the therapist. Mechanism analysis of exoskeleton and drive system (actuator) must be completed to develop an exoskeleton in accordance with standard and medical regulations. In addition, since the majority of stroke survivors are elderly, it is also necessary to designing the exoskeleton according to the preferences and requirements of the elderly patients in order to be used by them optimally. The need for design and ergonomics studies is an important part of the elderly being able to use the exoskeleton regularly every day. With the design of exoskeleton that meets the criteria of light, adjustable and powered through the analysis of mechanism, actuator, weight and ergonomically shape, the need for rehabilitation process above can be overcome.

Keywords: exoskeleton, independent, regular, rehabilitation, post-stroke

Early detection of leptospirosis by using loop-mediated isothermal amplification (LAMP) method

Dyah Ayu Widiasih[1,*], Heru Susetya[1], and Rini Widayanti[2]
[1]Department of Veterinary Public Health, Faculty of Veterinary Medicine, Universitas Gadjah Mada, Indonesia
[2]Department of Biochemistry , Faculty of Veterinary Medicine, Universitas Gadjah Mada, Indonesia
e-mail: dyahaw@ugm.ac.id

Leptospirosis is a zoonotic disease caused by bacteria infection of the genus Leptopsira sp. It is recognized as endemic diseases in tropical areas. In this study, we developed simple Loop-Mediated Isothermal Amplification (LAMP) method in order to use as an early detection of the disease. A number of 8 cattle 's urine samples from Wijimulyo Sub-District, and 6 samples from Moyudan Sub-District, Kulon Progo District, Yogyakarta Special Province. All samples were treated by using centrifugation and boiling method, then the isolated DNA were applied into thermocycler. The result shows the ability of Loop-Mediated Isothermal Amplification (LAMP) as an early alternative diagnostic method of leptospirosis which is quickly, accurately and economically.

Keywords: cattle urine, Kulon Progo, Leptospirosis, Loop-Mediated Isothermal Amplification (LAMP), zoonotic

M2-899

Geometric stent design mapping of commercial coronary stent in Indonesia

Nahar Taufiq[1,2,*], Marsetyawan H.N.E. Soesatyo[3], Alva Edy Tontowi[4], Budi Yuli Setianto[2], and Widowati Siswomihardjo[1,5]

[1]Department of Biomedical Engineering School of Graduate Studies, Universitas Gadjah Mada, Indonesia
[2]Department of Cardiology and Vasculare Medicine, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Indonesia
[3]Department of Histology-Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Indonesia
[4]Department of Mechanical and Industrial Engineering, Universitas Gadjah Mada, Indonesia
[5]Department of Dental Biomaterial, Dentistry Faculty, Universitas Gadjah Mada, Indonesia
e-mail: nahar@ugm.ac.id

The Coronary Artery Disease (CAD) is still a major health problem due to high morbidity and mortality. Coronary stenting is accepted as an interventional procedure to reduce morbidity and mortality due to CAD. One of the most common complications is restenosis which correlated with geometric properties of stent. Interventional cardiologists have the authority to choose the stent that is best for their patients. This study was to look at the geometric stent design mapping of existing commercial stent in Indonesia, from the perspective of an interventional cardiologist. Geometric stent design was the reason for choosing the stents when the proportion of use in teaching hospitals and non-teaching hospitals was the same and occupied the top 3 most used. There were 4 teaching hospitals and 12 non-teaching hospitals from different cities in Indonesia with the use of stent for a year by 11,813 coronary stents. Absorbable stents, bare-metal stents (BMS), and drug-eluting stents (DES) were 1.1 %, 2.9 % and 96 %, respectively. The proportion of the number of stents used in teaching hospitals was 51 % while that in non-teaching hospitals was 49 %. Of the 11,813 stents, 49 commercial stent brand names were obtained with 41 types of geometric stent design produced by 21 manufacturers. Based on the collected data, there were 10 types of geometric stent design which were similar in prevalence between teaching hospitals and non-teaching hospitals, but the frequency of use was small. Meanwhile, the number of stents used in large numbers did not show the same prevalence between the two groups of hospitals. It can be concluded that geometric stent design is not yet the main reason for interventional cardiologists in determining the choice of coronary stents used for patients with coronary heart disease.

Keywords: CHD, corronary, stent, geometric stent design, interventional cardiologist

Vitamin D reduces myofibroblast formation and collagen 1 expression through upregulating eNOS expression in kidney fibrosis model in mice

Nur Arfian[1,*], Santosa Budiharjo[1], Sagita Mega Sekar Kencana[2], Edison Hery Susanto[2], Devi Yuliana Suhardi[2], Bianda Dwida Pramudita[2], Dwi Cahyani Ratna Sari[1], and Muhammad Mansyur Romi[1]

[1]Department of Anatomy, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Indonesia
[2]Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Indonesia
e-mail: nur_arfian@ugm.ac.id

Kidney fibrosis lead to myofibroblast formation with vascular remodeling and activation of Endothelin-1 (ET-1) and eNOS pathways. Vitamin D has renoprotective effect, however its role in ET-1 and eNOS pathways haven't been elucidated yet. Investigate the role of vitamin D in kidney fibrosis model through attenuating vascular remodeling and ET-1/eNOS pathway. We performed Unilateral Ureteral Obstruction (UUO) in right kidney of male Swiss Webster mice (8 wk.o; 30–50 gram; n= 25), which were divided into three groups: sham operation (SO) group, UUO group, and UUO with i.p injection of 0.5 μg · kg^{-1} BW of Calcitriol/VitD (UUOD) group. Mice were terminated at day 7 post operation, right kidneys were harvested and used for paraffin making, immunostaining, and RNA extraction. Paraffin sections were deparaffinized and stained with Sirius Red (SR) to quantify lumen area and Lumen/Wall area ratio (LWAR). Immunostaining was done for quantification of myofibroblast number. Reverse Transcriptase PCR (RT-PCR) was done to examine preproEndothelin-1 (ppET-1) and endothelial NOS (eNOS) mRNA expression. UUO induced a significant increase of myofibroblast cell number that was indicated by positive staining of α-SMA. Meanwhile, it was lower in UUOD group. RT-PCR revealed higher expression of Collagen 1 mRNA in UUO group compared to SO group. In the meantime, Vitamin D downregulated Collagen 1 mRNA expression compared to UUO group. UUO and UUOD groups demonstrated significantly higher expression of ET-1 mRNA compared to SO with no significant difference between UUO and UUOD group. eNOS in UUO group was slightly higher in UUO group compared to SO with UUOD group was significantly higher than SO and UUO group. Vitamin D attenuates kidney fibrosis through attenuating myofibroblast formation, vascular remodeling, and upregulating eNOS.

Keywords: vitamin D, kidney fibrosis, collagen, vascular remodeling, eNOS, myofibroblast

M3-587

Toward cancer antiangiogenic therapy: a strategy for determining optimal inhibitor dose level based on mathematical model

Bobby Rian Dewangga*, Hanung Adi Nugroho, and Samiadji Herdjunanto
Department of Electrical Engineering and Information Technology, Faculty of Engineering, Universitas Gadjah Mada, Indonesia
e-mail: bobby.rian.d@mail.ugm.ac.id

Antiangiogenic therapy belongs to a modern cancer therapy and has several advantages over conventional cancer therapies. A strategy to determine optimal inhibitor dose level of antiangiogenic therapy is proposed based on nonlinear mathematical model of tumor growth dynamics. Specifically, inspired by optimal control design, a discrete LQR is carried out on the feedback-linearized model of the nonlinear tumor growth dynamics. The least level of inhibitor dose can be determined by adjusting a weighting scalar in the discrete quadratic cost function which corresponds to the feedback-linearized model input. To verify the proposed strategy, simulations are performed for a total treatment duration of 50 d and the inhibitor dose level is saturated at 50 mg · kg^{-1} based on physiological limitation. The result shows that a weighting scalar corresponding to the feedback-linearized model input of 10 gives the least inhibitor dose level of 1372.1 mg · kg^{-1} which shows the optimal inhibitor dose level.

Keywords: antiangiogenic therapy, cancer, discrete LQR, feedback linearization, nonlinear mathematical model, optimal control, tumor

Enzymatic modification of cotton fiber for promising smart medical based material

Maharani Pertiwi Koentjoro[1,*], Marisa Fitriana[2], Isdiantoni[3], and Endry Nugroho Prasetyo[2]
[1]Study Program of Medical Laboratory Technology, University of Nahdlatul Ulama, Indonesia
[2]Department of Biology, Institute Technology of Sepuluh Nopember, Indonesia
[3]Faculty of Agriculture, University of Wiraraja, Indonesia
e-mail: maharani@unusa.ac.id

Color removal (bleaching) is an oxidation process whereby the undesirable inherent coloring component removal in organic material. Hydrogen peroxide (H_2O_2) is a fundamental stage used bleaching agent in industry and the medical field. As an oxidizing agent, H_2O_2 has merited significant attention since it leads to degradation of reactive dyes and may increase dye hydrolysis so that remaining peroxide residues on material have a negative influence on result of dying. In addition, it requires considerable energy and resources. Therefore, other alternatives method for bleaching is necessary. Bio-bleaching, employing enzymatic bleaching technique, is now considered to be one of the preferred methods. Laccase is considerable as a bio-bleaching agent for promising a smart medical based material. Therefore, in this study laccase is used from *Trametes versicolor* which are widely applied in industry as bio-bleaching agents. The purpose of the study is to determine the potential laccase produced by *T. versicolor* in the cotton fibers bio-bleaching. We compared H_2O_2, laccase and laccase-ABTS as bleaching agent for cotton fiber. The brightness and functional groups of cotton fiber were characterized by FTIR. The result show that laccase have enzyme activity as 1,400.07 U · mL^{-1}. The highest brightness level of bio-bleaching of cotton fiber was obtained from 2 % of laccase treatment was 85.68 %. Cotton fiber bio-bleaching by laccase attacked aromatic functional groups had confirmed by IR spectra. The result indicated that bio-bleaching for cotton fibers using laccase is enviro-friendly with minimums remain residues and suitable for medical purposes.

Keywords: *Trametes versicolor*, bio-bleaching, cotton fibers, H_2O_2, laccase

M3-550

Effect of synbiotics *Lactobacillus casei* AP and inulin extract *Dahlia pinnata* L. in enteropathogenic *Escherichia coli* - induced diarrhea

Nur Kusmiyati[1,2], Sunarti[1,3], Tutik Dwi Wahyuningsih[1,4], and Widodo[1,5]
[1]The Graduate School of Biotechnology, Universitas Gadjah Mada, Indonesia
[2]Department of Biology, Faculty of Science and Technology, State Islamic University Malang, Indonesia
[3]Faculty of Medicine, Universitas Gadjah Mada, Indonesia
[4]Department of Chemistry, Faculty of Mathematics and Natural Science, Universitas Gadjah Mada, Indonesia
[5]Faculty of Animal Science, Universitas Gadjah Mada, Indonesia
e-mail: kusmiy4tinur@gmail.com, sunarti@ugm.ac.id, tutikdw@ugm.ac.id, widodohs@ugm.ac.id

The purpose of this study was to evaluate the effect of synbiotic products extract of inulin dahlia tuber and L.casei AP on mice Balb-C strain induced enteropathogen escherichia coli. The steps of this study were the preparation of EPEC bacteria cell suspension and synbiotic products; treatment in an animal, weigh of mice, fecal and pH value; IgA level by ELISA and SCFA analysis by GC and GC-MS. This study shows that synbiotic products can reduce diarrhea in these experimental animals by increasing body weight (24.05 g), feces weight (785.35 mg) and decreased fecal pH (7.08). Total of the LAB in mice's fecal 9.01 (log CFU/g) was higher than total Escherichia coli 7.45 (log CFU/g) after treatment by synbiotic product. IgA levels in the duodenum (1.65 ng/mL) and ileum (1.45 ng/mL) were higher than jejunum (1.36 ng/mL). SCFA analysis with GC and GC-MS showed that the difference in a metabolite of treatment group 2 dose of diarrhea compared to other groups due to butyric acid, isobutene and 2- methyl propionic. The synbiotic effect is stimulating microbial shift, IgA, and production of metabolite optimally at dose 2.

Keywords: EPEC, IgA, inulin, *L.casei* AP, SCFA, synbiotic

Acute phase protein C-reactive protein as early detection of type 1 diabetes mellitus

Imron Rosyadi*, Ella Ramadhona, Ajeng Tyas Utami Wahono, and Yayik Nur Hijrati
Department of Clinical Pathology, Faculty of Veterinary Medicine, Universitas Gadjah Mada, Indonesia
e-mail: imron.rosyadi@ugm.ac.id

Diabetes mellitus is a series of disease process that originated from tissue damage, mainly in the pancreas where is characterized by the appearance of acute phase proteins. The acute phase response is a specific and complex reaction of an organism that occurs shortly after tissue injury. In mammals, one of the dominant concentrations of acute phase proteins is C-reactive protein. Acute phase proteins are ideal biomarkers for early identification of inflammation or injury, and to monitor the outcome of the disease process. The aim of this study was to find correlation between C-reactive protein and blood glucose enhancement in order to be used as biomarker in streptozotocin-induced diabetic rats. Rats used were 20 male Wistar rats were divided into two groups, each group of 10 rats as treatment group (I) and control group (II). Group I was administered single dose of streptozotocin 40 mg · kg^{-1} body weight dissolved in a 0.1 M sodium citrate pH 4.5 after 24 h fasting. The rats were drawn the blood sample at the 0 h, 6 h, 12 h, 24 h, 48 h, 60 h, 72 h, 84 h, and 96 h post of diabetic induction for measuring the blood glucose levels. The two highest blood glucose levels rats every hour above were taken it's blood about 0.5 mL as sample for C-reactive protein measurement. The results showed that the average blood sugar level of rat was increased sharply by 348.3 ± 33.2 mg · dL^{-1} at the 24 h until the end of the study 503.1 ± 90.8 mg · dL^{-1}. This is consistent with the average C-reactive protein levels which are increased at 24 h about 53.50 ± 0.28 mg · dL^{-1} and increased significantly until 145.10 ± 0.42 mg · dL^{-1} at 72 h. The correlation analysis between CRP and blood glucose levels did not have a significant relationship ($P > 0.025$). However, the direction of the relationship is positive and strong enough that is 0.4 or 40 %. The results of this study show that the acute phase protein of C-reactive protein can be used as a marker in diabetic-induced rat but it will not be specific.

Keywords: acute phase protein, C-reactive protein, diabetes mellitus, streptozotocin, Wistar rats

O1-336

The effects of platelet rich plasma incorporation towards swelling profile and gel fraction of synthetic coral scaffold

Mahanani E.S.[1,*], Farda N.[2], Tejaningasih I.[2], and Khairunissa N.[2]
[1]Department of Biomedical Dental Science, Faculty of Medicine and Health Science, Universitas Muhammadiyah Yogyakarta, Indonesia
[2]Dental Hospital, Faculty of Medicine and Health Science, Universitas Muhammadiyah Yogyakarta, Indonesia
e-mail: erlina.sih@umy.ac.id

Platelet Rich Plasma (PRP) contains of bioactive molecule which is able to incorporate to scaffold for promoting bone healing. Scaffold will absorb PRP, with the result that it may affect the structural stability, shape, and degradation process itself. Consequently, this study aim is to observe the influence of incorporated PRP to synthetic coral scaffold towards the swelling profile and gel fraction. Platelet-rich plasma was prepared by a double-spinning method. The blood sample was taken from lateral tail vein of Rattus norvegicus. The synthetic coral scaffolds were made of gelatin and calcium carbonate (CaCO3). They were divided into two groups. First is PRP incorporation group and the second is non-PRP synthetic coral scaffolds as control group. The incorporation process was done by shedding scaffold into 70µl of PRP for 15 minutes. Swelling observation was examined by soaking scaffold in phosphate buffer saline and incubated in 37 C degrees for 24 hours. Scaffold weight was measured in every 30 minutes to observe the profile swelling and gel fraction. Used data analyzing was Independent T test. The result showed no significant differences between two groups. However, the initial measurement graphic showed the PRP incorporated scaffold swelling profile had higher number compared to the non-incorporated one. According to this study, it can be concluded that the incorporation of PRP in synthetic coral scaffold affects its swelling profile and gel fraction.

Keywords: gel fraction, incorporation, platelet rich plasma, swelling, synthetic coral scaffold

Finite element investigation of GO reinforced PLLA stent deployment

Farid Wajdi[1,2,*], Alva Edy Tontowi[1], Indraswari Kusumaningtyas[1], and Andi Rahadiyan Wijaya[1]

[1]Department of Mechanical and Industrial Engineering, Universitas Gadjah Mada, Indonesia
[2]Department of Industrial Engineering, Universitas Serang Raya, Indonesia
e-mail: farid.wajdi@mail.ugm.ac.id

The introduction of biodegradable polymeric stents is an important development in the treatment of atherosclerosis. This study investigated the potential of poly-l-lactic acid (PLLA) and graphene oxides (GO) nanocomposites material for stent application. In this study, we compared the mechanical behavior of PLLA and PLLA-GO 2 % material models in a balloon-expanded stent design using finite element method. The stress and deformation of the stents were evaluated for the expansion, recoiling, and foreshortening studies. The elevated balloon pressures resulted in the increased stent displacement, recoil, and foreshortening for both models. The maximum stent diameters of the PLLA and PLLA-GO stent models reached 3.4 mm and 3.5 mm respectively. The ratio of residual stress of PLLA-GO and PLLA was 1.55:1. The stent recoil (22 % vs. 21 %) and foreshortening (21 % vs. 23 %) for both models were relatively similar. Compared to the pristine PLLA stent model, incorporating of nanofillers in PLLA matrices has improved the mechanical performance and possibly could obtain a thinner stent strut size.

Keywords: finite element, graphene oxide, PLLA, stent

O1-169

Biocomposite of hydroxyapatite/gelatin/PVA for bone graft application

Alva Edy Tontowi[1,*], Adhi Anindyajati[2], Rina Tangkudung[3], and Punto Dewo[4]
[1]Department of Mechanical and Industrial Engineering, Universitas Gadjah Mada, Indonesia
[2]School of Aerospace, Mechanical and Mechatronic Engineering, The University of Sydney, Australia
[3]Graduate School of Biomedical Engineering, Universitas Gadjah Mada, Indonesia
[4]Department of Ortho & Traumatic, Universitas Gadjah Mada, Indonesia
e-mail: alvaedytontowi@ugm.ac.id

A porous block composite of hydroxyapatite/gelatin/polyvinyl alcohol has been successfully fabricated as a bone graft. The porous block of composite was examined to investigate its compressive strength, micro structure and callus formation. Materials for the composite were hydroxyapatite synthesized from calcite (coHA), commercial hydroxyapatite (HA-200), gelatin (G) and polyvinyl alcohol (PVA). The porous block composite was prepared from a solution, by mixing the loading material and distilled water with ratio of 5 %, 15 %, and 25 % w/v. The loading material was made by blending of HA (coHA or HA-200), G and PVA with weight composition ratio of 1/1/0.15. To develop a porous block, the solution of composite was casted in a mold and freezed overnight prior to freeze-drying for 6 h at 0.02 Bar and –50 °C. Tests were performed on compression strength, microstructure, pore size and in vivo. The in vivo test was carried out by observing a callus growth within cancellous bone of white rat for 14 d and 21 d. The results showed that the graft composed by coHA and HA-200 had average pore size of < 10 μm up to 300 μm with compressive strength of 3 MPa to 5 MPa. These strengths were in the range of trabecular bone strength. From the in vivo test composite of [HA200/G/PVA] showed better callus growth compared to [CoHA/G/PVA] and the control.

Keywords: bonegraft, composite, in vivo, porous, strength

Synthesis silicon substituted hydroxyapatite using microwave irradiation

Annisa Tsalsabila*, Yessie Widya Sari, and Akhiruddin Maddu
Department of Physics, Bogor Agricultural University, Indonesia
annisa_tsalsabila@apps.ipb.ac.id

Hydroxyapatite is commonly used as bone implant material due to its similarity to bone chemical composition. However, hydroxyapatite has low reactivity with existing bone (bioactivity). Ionic substitution to hydroxyapatite structure may improve its bioactivity. One of ionic substitutions can be conducted using silicon. The aim of this study is to obtain silicon substituted hydroxyapatite with variation concentration of silicon. The variation concentrations are 0, 0.4, 0.8 and 1.2wt % silicon. Silicon substituted hydroxyapatite was prepared by precipitation method assisted microwave irradiation. Calcium source was obtained through calcination of duck eggshell, phosphor source from phosphate acid, and silicon from tetraethyl orthosilicate. Hydroxyapatite and silicon substituted hydroxyapatite were evaluated with XRD and SEM EDAX. XRD characterization showed that hydroxyapatite and silicon substituted hydroxyapatite has lattice parameters close enough to theory. Hydroxyapatite with 0.4wt % silicon substitution has lattice parameter close enough to lattice parameter in bone. Crystallite size in hkl (002) showed that silicon substitution to hydroxyapatite structure reduced crystallite size. SEM characterization showed that particle size of silicon substitution hydroxyapatite was 103 nm whereas hydroxyapatite without silicon was 209 nm. Silicon substitution to hydroxyapatite decreased particle size of hydroxyapatite. EDAX characterization showed that the molarity ratio of Ca/P hydroxyapatite sample was 1.68 and molarity ratio of Ca/(P + Si) silicon substituted hydroxyapatite sample was 1.33.

Keywords: bioactivity, hydroxyapatite, SEM EDAX, silicon substituted hydroxyapatite, XRD

O1-598

Synthesis of duck eggshells-based fluorapatite by using microwave irradiation

Nur Aisyah Nuzulia*, Yessie Widya Sari, and Desi Riah Sari
Department of Physics, Bogor Agricultural University, Indonesia
e-mail: aisyahnuzulia@apps.ipb.ac.id

In this study, fluorapatite (FA) was synthesized by using microwave irradiation with various molarity of P/F. Duck eggshells was used as calcium source due to the high percentage of calcium carbonate. The obtained fluorapatite was characterized by using XRD, FTIR and SEM-EDX. Based on the result, fluorapatite was successfully obtained shown by the formation of FA peak in x-ray diffraction pattern and the presence of hydroxyl functional group in liberation mode in FTIR spectra. Moreover, the higher P/F molar ratio forms more FA peaks and tends to decreased the intensity of calcium oxide (CaO) and calcium hydroxide ($Ca(OH)_2$). The optimum FA was formed at the highest P/F molar ratio of 12 that is supported by EDX results with Ca/P and P/F ratio close to the theory.

Keywords: calcination, fluorapatite, FTIR, SEM-EDX, XRD

β-carotene gingival mucoadhesive patch to prevent panoramic radiography exposure's effect on GCF

Rurie Ratna Shantiningsih[1,*], Silviana Farrah Diba[1], and Anggun Dwi Andini[2]
[1]Department of Dentomaxillofacial, Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
[2]Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
e-mail: rurieratna@ugm.ac.id

In the previous study, β-carotene mucoadhesive gingival patch was supposed as a radiation protection agent, but its optimal level still limited to prevent the micronucleus increasing number in human. Further study is needed to find the other parameters in gingival mucosa in order to confirm its efficacy. Gingival crevicular fluid (GCF) is an exudate which secreted from gingival mucosa. The aim of this study is to observe the radioprotection effect of β-carotene mucoadhesive gingival patch on GCF after panoramic radiography exposure. Twenty subjects who required a panoramic exposure were divided into two groups, sample and control. β-carotene gingival mucoadhesive patch was applied on the sample's gingival mucosa of tooth #11 and #21 before panoramic exposure but not applied to the control group. Five minutes after exposure, GCF was gathered for each subject from labial side of tooth #11 and #21. Volume was measured after staining by 2 % ninhydrin. 8-oxo-dG level measurement was done by Enzyme-Linked Immunosorbent Assay (ELISA). Student t-test was used to analyze the statistical difference between groups. Subjects with gingival patch had significantly lower GCF volume and 8-oxo-dG level compared to control subjects ($p<0.05$). It is associated with β-carotene antioxidants properties that prevent oxidative reaction also inflammation. The conclusion is β-carotene gingival mucoadhesive patch could be suggested to prevent panoramic radiography exposure effect on GCF.

Keywords: β-carotene gingival mucoadhesive patch, GCF volume, panoramic exposure, radiography, tooth

O2-834

Determination of estrus phase in cattle using electronic nose

Pudji Astuti[1,*], Claude Mona Airin[1], Slamet Widiyanto[2], Norman Prayogo[3], and Kuwat Triyana[4]

[1]Faculty of Veterinary Medicine, Universitas Gadjah Mada, Indonesia
[2]Faculty of Biology, Universitas Gadjah Mada, Indonesia
[3]Center of Maritime and Bioscience, Jenderal Soedirman University, Indonesia
[4]Faculty of Mathematics and Science, Universitas Gadjah Mada, Indonesia
e-mail: pastuti2@ugm.ac.id

The timing of artificial insemination relies on estrus behavioral observation, the problem is that not all cattle show signs of estrus significantly, so the accuracy of insemination is not accurate. Recently, determination of estradiol levels as an indicator of estrus is done by observation of physical signs and ELISA which is expensive and wasting time. In order to solve these problems an estrus detector tool will constructed using Electronic Nose (eNose). The aim of this research was to determine whether the stage of estrus can be detected using eNose. The sample used in the study was the urine of Ongole Crossbred cattle (PO) derived from adult female who had BCS between 3 to 4, maintained in Kuwang, Sleman district, Yogyakarta. The urine sample was collected shortly before injection of dinoprost as an estrous synchronization material and repeated when cattle was on estrus. The eight elements gas sensors arrays were tested such as methane, propane, butane, alcohol, water contaminant, hydrogen sulfide, saturated vapor of organic solvent and ammonia. All of elements gas sensor can be detected by the eNose by various of peak and sensitivities. Using 2D score plot was shown 96.1 % accounted, whereas using 3D score plot, it was accounted for 98.9 % of the variance in data set. Thus, the eNose is very prospect used as a detector estrus in cattle. Furthermore, our eNose has been able to distinguish between estrus and non-estrus clearly.

Keywords: cattle, detector, dinoprost, eNose, estrus

Wireless ankle rehabilitation for post-stroke recovery based on calf muscle strength

Asih Setiarini[1,*], Hanum Arrosida[2], and Basuki Winarno[3]
[1]Research Center for Electronics and Telecommunications Indonesia, Institute of Sciences Bandung, Indonesia
[2]Control Computer Engineering, Department of Engineering, State Polytechnic of Madiun, Indonesia
[3]Electrical Engineering, Department of Engineering, State Polytechnic of Madiun, Indonesia
e-mail: asih.setiarini@lipi.go.id

In this paper, wireless ankle rehabilitation for post-stroke recovery based on calf muscle stress is newly proposed. All the functions and performance of the proposed wireless ankle rehabilitation for post-stroke recovery based on calf muscle strength are successfully tested and proven through measurements. The angular velocity of DC motor for ankle rehabilitation device depends on the PWM value. The PWM signal for muscle scale 1, 2, and 3 is 50 or 19 % of duty cycle value otherwise, use 100 of PWM signal value for scale 4 and 5 or 39 % of a duty cycle. The muscle strength of healthy people is above 11 kPa that equivalent to scale 5, whereas people who are paralyzed have muscle strength below 9.5 kPa that equivalent to below scale 3. The average of increasing muscle strength after four days of therapy is 0.15 kPa. The proposed method is effective for an individual and a therapist who can determine and evaluate the patient muscle strength. This ankle rehabilitation system is a robust system, user-friendly and safe to use. The Android application makes easier to operate the device and read the data results. This system is suitable for post-stroke recovery for hemiplegic in the leg.

Keywords: ankle, calf muscle, post-stroke, rehabilitation, wireless

O2-925

Bicycle design for children with spastic cerebral palsy to enhance interaction between children and parents

Bambang Iskandriawan*, Djoko Kuswanto, and Elly Fitriana Soedjito
Department of Industrial Product Design, Faculty of Architecture, Design, and Planning,
Institut Teknologi Sepuluh Nopember, Indonesia
e-mail: bisk@prodes.its.ac.id

Cerebral Palsy (CP) is a disorder that causes a person's motor skills to become disabled. In Indonesia, the number of children suffering from CP reaches 5.5 per 1000. Although it can't be cured, their motor skills can be improved by therapy, including a bicycle for the development of their functional skills. However, according to deep interview with one of therapist in Surabaya, Indonesia, the implementation of therapy using the bike still has not received attention because it has to import from abroad or modify it by themselves. In addition, the current bicycle is still a bicycle used by the child himself so its interaction function with their parents is less achieved. The method is done by doing an in-depth interview with the therapist as well as doing observation to the target users. To test the product is done by making a prototype and usability test. This results in adding the handle to the back of the bicycle so parents can interact with the child by driving the bicycle together. It also has innovation in rear-steering and waist support mechanism that is different from previous design.

Keywords: bicycle, cerebral palsy, fun therapy, interaction, motor skills

The potential of methanol and ethyl acetate extracts of corn silk (*Zea mays* L.) as sunscreen

Rosalina Ariesta Laeliocattleya
Department of Agricultural Product Technology, Faculty of Agricultural Technology
Brawijaya University, Indonesia
e-mail: deeochalina@gmail.com

The aim of this study is to determine the bioactive compounds and SPF value of corn silk in methanol and ethyl acetate extracts. By knowing the SPF value so their potential as sunscreen will represent. Corn silk powder was macerated with methanol and ethyl acetate solvents to obtain corn silk methanol extract (E1) and corn silk ethyl acetate extract (E2). The content of total phenolic that were 25072.54 mg · kg^{-1} and 7439.34 mg · kg^{-1}. The content of total flavonoids were 176.03 mg · $kg^{-1}$and 24.36 mg · kg^{-1}. The content of beta carotene were 8.35 mg · $kg^{-1}$and 35.42 mg · kg^{-1}. Determination of SPF value performed by in vitro using a spectrophotometer. The controls were pure of quercetin (C1) and β-carotene (C2). SPF values of E1, E2, C1 and C2 were obtained respectively on 14.75; 20.32; 38.7 and 39.15. Based on the result, it showed that type of solvents of methanol and ethyl acetate affected on the content of bioactive compounds and SPF value of corn silk extract. The SPF value of ethyl acetate extract was higher than that of methanol extract. It showed that ethyl acetate was a better solvent than methanol in corn silk extract as sunscreen.

Keywords: corn silk, ethyl acetate, methanol, SPF, sunscreen

O3-167

Acute phase protein Serum Amyloid-A (SAA) profile in diabetic Wistar rats induced streptozocin

Imron Rosyadi*, Yayik Nur Hijrati, Ajeng Tyas Utami Wahono, and Ella Ramadhona
Department of Clinical Pathology, Faculty of Veterinary Medicine, Universitas Gadjah Mada, Indonesia
e-mail: imron.rosyadi@ugm.ac.id

Diabetes mellitus is a disease caused by the destruction of pancreatic β cells that leads to loss of insulin secretion. Diabetes mellitus is associated with an inflammatory state characterized by the appearance of acute phase protein. In mammals, one of the dominant acute phase proteins is Serum Amyloid A (SAA). This study aims to determine acute phase protein SAA levels and it's correlation with blood glucose levels in diabetic rats induced with streptozotocin, so it can be used as biomarkers of diabetes mellitus. Rats used were 20 male Wistar rats, 2 m.o. and weight 180 g to 250 g. Rats were divided into two groups, each group consist of ten rats which group I as treatment and group II as control. Group I was fasted for 24 h and then injected 1 mg streptozotocin once at doses 40 mg · kg^{-1} BW dissolved in 0.1 M sodium citrate buffer pH 4.0. The rats blood were being collected at 0 h, 6 h, 12 h, 24 h, 36 h, 48 h, 60 h, 72 h, 84 h, and 96 h post diabetic induction for blood glucose and SAA protein examination. The results showed that Serum Amyloid A (SAA) protein levels had positive correlation with blood glucose levels in diabetic rats induced with strepzotocin, so SAA can be used as biomarkers in diabetic rats especially at 24 h to 60 h post induction.

Keywords: blood glucose, diabetes mellitus, serum amyloid A, streptozotocin, Wistar rats

Fibrinogen levels and leukocytes in diabetic Wistar rats at 0 h to 96 h post-induced by streptozotocin

Imron Rosyadi*, Yayik Nur Hijrati, Ella Ramadhona, and Ajeng Tyas Utami Wahono
Department of Clinical Pathology, Faculty of Veterinary Medicine, Universitas Gadjah Mada, Indonesia
e-mail: imron.rosyadi@ugm.ac.id

Diabetes mellitus is a metabolic disease called silent killer because the patient usually known when it becomes severe. Research is needed to know what are changes during early diabetes as a marker of diabetes such as fibrinogen and leukocytes that quickly respond when there are any changes in the body. Twenty Wistar rats were divided into two groups of treatments and controls. Treatments rats become diabetes induced by streptozotocin and control rats are not induced. Blood samples were taken at 0 h, 6 h, 12 h, 24 h, 36 h, 48 h, 60 h, 72 h, 84 h, and 96 h for testing blood glucose, fibrinogen, leukocyte and differential leukocyte. Than the data are processed using SPSS correlate bivariate and compare mean-independent samples T test. From the calculation, it is known that the treatment and control rats have significance of blood sugar level 0.001, fibrinogen levels of 0.000, total leukocyte count 0.017, neutrophil of 0.161, monocyte of 0.008 and lymphocyte of 0.023. There is a very strong correlation between blood sugar levels with fibrinogen of 0.91 and a very weak correlation between blood sugar levels and leukocytes by 0.659. It was concluded that fibrinogen can be an excellent marker and leukocytes are poor markers for early diabetes.

Keywords: blood sugar level, diabetes mellitus, differential leukocyte, fibrinogen, leucocyte, streptozotocin

O3-690

Effect of aldehyde dehydrogenase 2 gene polymorphism on liver function status of alcohol drinkers in Indonesia

Suhartini[1,*], Mustofa[2], Yudha Nurhantari[1], Bambang Udji Djoko Rianto[3], Hendro Widagdo[1], and Idha Arfianti Wira Agni[1]

[1]Department of Forensic Medicine and Medicolegal, Faculty of Medicine, Universitas Gadjah Mada, Indonesia
[2]Department of Pharmacology and Therapy, Faculty of Medicine, Universitas Gadjah Mada, Indonesia
[3]Department of Otorhinolaryngology, Faculty of Medicine, Universitas Gadjah Mada, Indonesia
e-mail: suhartini@ugm.ac.id

Alcohol abuse also occurs in the younger generation of Indonesia. This study aimed to determine the effect of the Aldehide Dehidrogenase 2 gene polymorphism on the liver function status of alcohol drinkers in Indonesia. This study used a cross-sectional research design. Blood samples were derived from 97 alcohol drinkers and 103 non-drinkers in Yogyakarta, Indonesia. Aldehide Dehidrogenase gene polymorphisms were determined by PCR-RLFP. The liver function status was determined from observation of: serum glutamic oxaloacetic transaminase, serum glutamic pyruvate transaminase and gamma glutamyl transferase with spectrophotometric. The data analyzed descriptively, and Chi2 test. The Aldehide Dehidrogenase (ALDH2) gene polymorphism in alcohol drinkers and non-drinkers of Javanese ethnicity were respectively ALDH2*1 (17.7 %, 35.9 %); ALDH2*2 (82.3 %, 63.1 %); ALDH2*1/2*2 (0.0 %, 0.1 %), $p < 0.05$. ALDH2 gene polymorphisms influence the liver function status of drinkers and non-drinkers with blood chemistry values SGOT and SGPT ($p > 0.05$), while the value of GGT was ($p < 0.05$). The most common type of ALDH2 gene polymorphism found both in alcohol drinkers and non-drinkers was ALDH2*2. Only the value of GGT statistically showed significant difference in influencing liver function status.

Keywords: *ALDH2*, Asian alcoholism, Javanese, liver, polymorphism

Phytochemical screening and *in-vitro* antibacterial activity of sweet basil leaves (*Ocimum basilicum* L.) Essential oil against *Cutibacterium acnes* ATCC 11827

Intan Putri Hapsari* and Y.M. Lauda Feroniasanti
Department of Biology Education, Faculty of Teacher Training and Education
Sanata Dharma University, Indonesia
e-mail: intanputrihap@gmail.com

The Sweet basil leaves (*Ocimum basilicum* L.) essential oil has antibacterial power against bacteria. The objective of this research was to evaluate the phytochemical compounds, antibacterial properties of sweet basil essential oil against *Cutibacterium* (formerly *Propionibacterium*) *acnes*, Minimum Inhibitory Concentration (MIC), and Minimum Bactericidal Concentration (MBC). Research was started with determining antibacterial activity of solutions containing 4 % v/v, 6 % v/v, 8 % v/v, and 10 % v/v sweet basil leaves essential oil using disc diffusion method. The MIC was assessed using pour plate method. Lastly, the MBC was assessed using streak plate method. The results revealed the major compounds of sweet basil essential oil namely neral, citral, alpha-humulene, beta-caryophyllene, linalool and germacrene-d. Furthermore, sweet basil essential oil showed antibacterial activity against *C. acnes* growth. The MIC and MBC values for sweet basil essential oil against *C. acnes* were 2 % v/v and 3.5 % v/v, respectively.

Keywords: *Cutibacterium acnes, Ocimum basilicum* L., antibacterial activity, essential oil, phytochemical screening

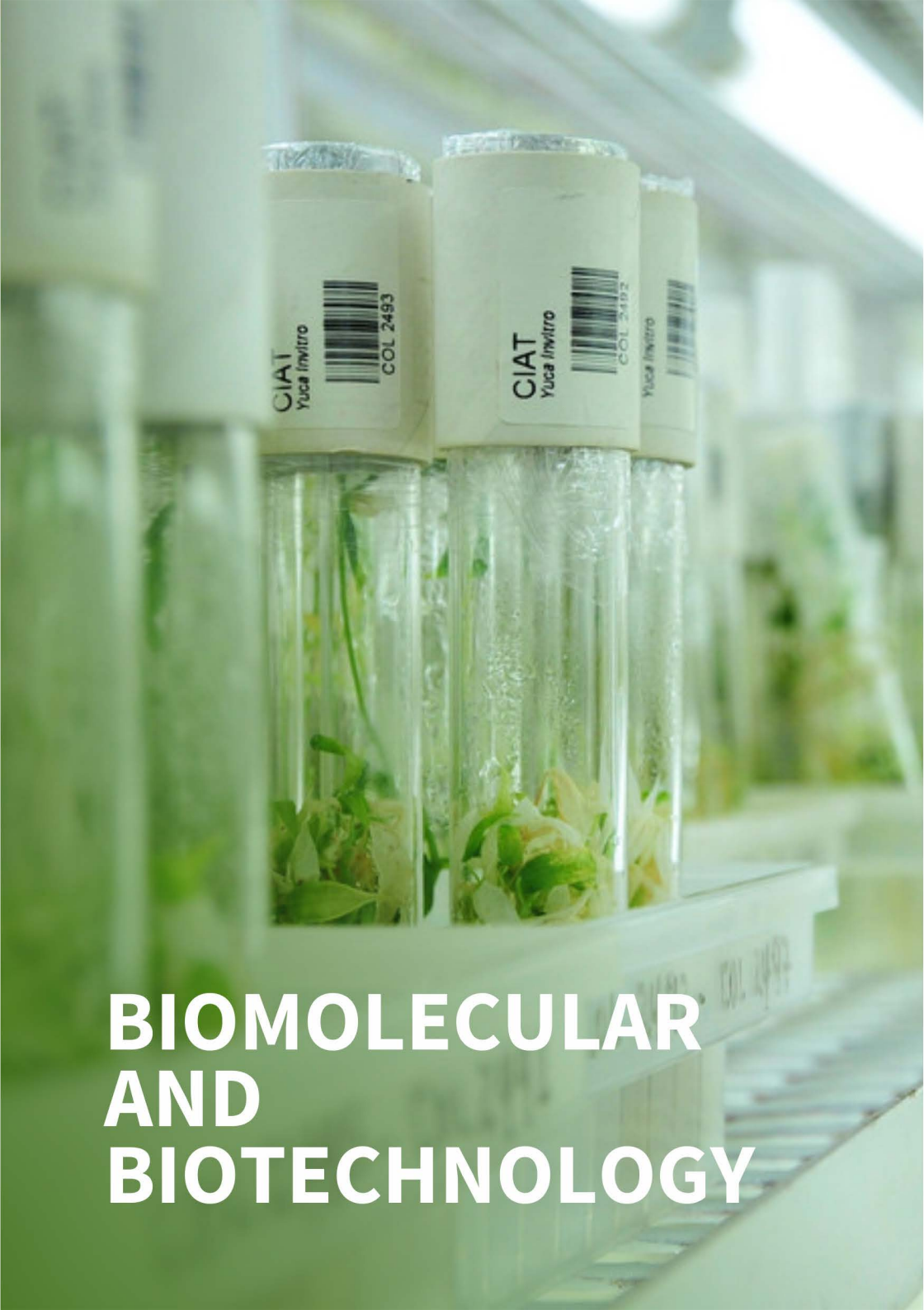
O3-229

Polymorphism of prohormone convertase-1 and pro-opiomelanocortin associated with leptin level in Javanese ethnic of Indonesia

Pramudji Hastuti[1,*], Tasmini[1], Afifah Cholid[2], and Ahmad Hamim Sadewa[1]
[1]Department of Biochemistry, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Indonesia
[2]Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada, Indonesia
e-mail: pramudji.has@ugm.ac.id

Java is one of the islands in Indonesia with large number of an overweight and obese population. Obesity is caused by higher energy food intake that is more than needed and is influenced by environment and genetics. This study examined the relationship between polymorphism of K121Q prohormone convertase 1 (PC1) and Pro-opiomelanocortin (POMC) (C8246T) genes in correlated with leptin level in obese people compared with a controls of Javanese ethnic. Subjects consisted of 112 healthy people, involving 56 obese and 56 controls. Determinations of PC-1 and POMC genotypes were done by polymerase chain reaction and restriction fragment length polymorphism (PCR-RFLP). Determinations of leptin and insulin levels were done with Elisa, and blood sugar levels by GOD-PAP method, with significance set if $p > 0.05$. The result was higher and significantly different in blood pressure and leptin level in the obese group compared to the control group. There were no significant differences in POMC and PC1 genotypes between obese and control groups. Carriers of CC and TC genotype in POMC gene had higher leptin levels and were statistically significantly different than control group. Carriers of GG genotype in PC1 gene had higher leptin levels in obese group compared to the control group. Polymorphism of POMC (C8246T) and K121Q PC-1 genes can be correlated with leptin level in obese groups of sample Javanese population in Indonesia. Further research is needed to confirm the results of this study and to develop a more comprehensive model of genetic polymorphism related to leptin levels and obesity in ethnic genotypes of Asia.

Keywords: Javanese ethnic, leptin, polymorphism, prohormone convertase, pro-opiomelanocortin



BIOMOLECULAR AND BIOTECHNOLOGY

S2-453

Identification of single nucleotide polymorphism of GDF9 gene in Garut sheep

Resti Yuliana Rahmawati, Sumadi, and Tety Hartatik*
Department of Animal Breeding and Reproduction, Faculty of Animal Science,
Universitas Gadjah Mada, Indonesia
e-mail: restiyuliana.r@gmail.com, sumadi@ugm.ac.id, tety@ugm.ac.id

Growth differentiation factor 9 (GDF9) gene has been shown to have major impacts on ovulation rate and litter size in sheep. The aim of this study was to identify the single nucleotide polymorphisms (SNPs) of GDF9 gene in Garut sheep. For this purpose, 59 ewes of this ecotype were sampled. Primer sequences were designed based on the result of alignment from genbank data of GDF9 gene, including AF078545.2; DQ301499.1; NM_001142888.2; KT853039.1; FJ429111.1. A pair of primers was designed according to the sheep GDF9 sequences (Genbank Acc. No. AF078545.2): primer forward: (5'-CTGCTGTTTAACCTGGATCGTG-3) and primer reverse: (5'- GGAGAGCCATACCGATGTCC-3) (3326 bp to 4095 bp). As a result, five SNPs were identified (SNP g.54C→T, SNP g.60G→A, SNP g.304G→A, dan SNP g.333G→A). All genotypic distributions were under Hardy-Weinberg equilibrium. These SNPs may thus be considered as valuable genetic markers for further study in Garut sheep.

Keywords: chi-square, Garut sheep, GDF9, genotype, prolificacy, single nucleotide polymorphism (SNP)

Molecular detection of *Colletotrichum* spp. on postharvest commodities of horticulture in Central Java and Yogyakarta, Indonesia

Ady Bayu Prakoso, Suryanti, and Ani Widiastuti
Plant Protection Department, Faculty of Agriculture, Universitas Gadjah Mada, Indonesia
e-mail: adybayu.434@gmail.com, suryanti.faperta@ugm.ac.id, aniwidiastuti@ugm.ac.id

Postharvest commodities are easily damaged by pathogen infection whether in field or during handling process. One of important pathogens of postharvest commodity is *Colletotrichum* spp. complex. Morphologically among species *Colletotrichum* spp. are difficult to be distinguished. This study aimed to identify *Colletotrichum* spp. from some postharvest commodities molecularly using specific primers *C. gloeosporioides* (CgInt, ITS4), *C. acutatum* (CaInt2, ITS2) and *C. capsici* (CcapF, CcapR). Isolates were taken from Yogyakarta Province and Temanggung Regency, covering 11 commodities infected by *Colletotrichum* spp. Result of molecular identification indicated that the six isolates were *Colletotrichum gloeosporioides*, 10 isolates are *Colletotrichum acutatum*, while the remaining isolates are unknown.

Keywords: *Colletotrichum*, horticulture, molecular identification, pathogen infection, postharvest commodities

S2-086

Isolation and characterization of *Metuf* promoters gene from cassava (*Manihot esculenta* Crantz.)

Sony Suhandono[1,*], Iqbal Mitryadinillah[1], Annisa Rizkia[1], and Tati Kristianti[2]
[1]School of Life Sciences and Technology, Institut Teknologi Bandung, Indonesia
[2]Institut Pendidikan Indonesia, Indonesia
e-mail: sony@sith.itb.ac.id

Eukaryotic elongation factor Tu, EF-Tu protein, plays an important role in protein synthesis, catalyzing the binding of aminoacyl-tRNA to the A-site of the ribosome by a GTP-dependent mechanism. Elongation factor Tu (EF-Tu) protein encoded by tuf gene family has been known to be up-regulated and act as chaperone molecule. Therefore the promoters for regulating that gene are expected to have heat stress related response. This research was conducted in order to isolate and characterize the *Metuf* gene promoter from cassava (*Manihot esculenta* Crantz). EF-Tu promoter gene from cassava was successfully isolated, named as *Metuf* (1617 bp). Sequence analyses showed that this promoter contain heat stress element (HSE) which involved in heat stress response. This promoters was constructed translationally with uidA gene encoding β-glucuronidase (promoter:uidA fusion) in pBI 121 binary vector to build a new binary vector using Overlap Extension PCR Cloning (OEPC) technique. Plant transformation for in vivo promoter characterization was conducted using *Agrobacterium tumefaciens* AGL101 harboring constructed binary vector into tobacco (*Nicotiana tabaccum*) plant. The histochemical assay showed that *Metuf* promoter could regulate gene expression in root, stem and leave of *Nicotiana tabaccum*.

Keywords: *Agrobacterium tumefaciens*, *Manihot esculenta*, *Nicotina tabaccum*, cassava, metuf promoter

Virtual screening of natural inhibitors from kaffir lime (*Citrus hystrix* DC) on estrogen receptor (ER) and Erbb2 (HER2) in breast cancer

Lisna Hidayati*, M. Adnan, Indah Nuraini, and Woro Anindito Sri Tunjung
Faculty of Biology, Universitas Gadjah Mada, Indonesia
e-mail: liztna@gmail.com

Kaffir lime (*Citrus hystrix* DC) is a medicinal plant native to Indochinese and Malesia regions. Traditionally, kaffir lime leaves are used to treat flu, fever, hypertension, abdominal pains and diarrhea in infants. Previous studies reported that essential oil from kaffir lime leaves exhibited anti-proliferative activity on human mouth epidermal carcinoma (KB) and murine leukemia (P388) cell lines1 activities. Kaffir lime leaves extract is reported to exhibit cytotoxic effects on cervical cancer and neuroblastoma cell lines, erythroid leukemic cell line (K562), human monocytic leukemia (U937) and human lymphoblastic cell line (Molt4).

Keywords: *Citrus hystrix* DC, breast cancer, Erbb2, estrogen receptor, kaffir lime

S3-382

Studies on iridovirus infection among grouper fish (*Epinephelus* sp.) cultured in Seribu Islands, Indonesia

Kurniasih[1,*], Surya Amanu[2], and Ratih Ismayasari[3]
[1]Department of Pathology, Faculty of Veterinary Medicine, Universitas Gadjah Mada, Indonesia
[2]Department of Microbiology, Faculty of Veterinary Medicine, Universitas Gadjah Mada, Indonesia
[3]BKIPM, Tanjung Priok, Minister of Fisheries and Marine, Indonesia
e-mail: kurniasih_1951@yahoo.co.id

Iridovirus infection has spread an outbreak in several islands of Indonesia. The cumulative mortality because of the disease sometimes reached 50 % to 90 % over two months. The disease is often attack the grouper marine cultures, and is difficult to eradicate. Aim of study was to identify the virus based on clinical signs, co-agglutination test, molecular test, and histopathological changes. Number of thirty grouper fish from several marine culture suffered from iridovirus infection with clinical signs such as anorhexia, mucoid and opaque faecal casting and a darkened body was used as samples. Co-agglutination test was using in-house anti-iridovirus rabbit sera coupled to protein A of *Staphylococcus aureus*. Organs of infected fish such as gill, spleen, liver, gonade, eye were tested by sero-diagnostic kit (own product), and also examined by reverse-transcriptase polymerase chain reaction. Primers used were a forward primer 5'-CTC AAA CAC TCT GGC TCA TC-3', and a reverse primer 5'-GCA CCA ACA CAT CTC CTA TC-3'. Histopathological changes of those organs were also examined. Positive Iridovirus infection with co-agglutination test was look likes a lump of sand, from those organs. Molecular analysis appeared the sharp band on 570 bp from spleen, gonads, gill, and liver. The histopathological changes showed inflammation and some small–size inclusion body bearing cell of spleen, gonade, gill and liver. Iridovirus is not only transmitted horizontally but also vertically through infected gonade.

Keywords: co-agglutination test, histopathology, inclusion body, iridovirus, RT-PCR

Effect of freeze-drying process on collagen-activated platelet-rich plasma into platelet derived growth factor-AB level

Kwartarini Murdiastuti[1,*], Fitri Yuniawati[2], Nunuk Purwanti[3], and Dahlia Herawati[1]
[1]Department of Periodontology, Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
[2]Clinical Dentistry Magister Program, Periodontology, Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
[3]Department of Dental Biomedical Science, Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
e-mail: kmurdiastutiugm.ac.id, fitri.yunia@gmail.com

Platelet-Rich Plasma (PRP) is an alternative choice of regenerative material because of its superiority, that is a high growth factor content. However, one of the disadvantage of PRP is should be use immediately after preparation. It's most effective if PRP can be made and stored, so it can used multiple times in different treatment times. Freeze-drying is known as a way to preserve food and drugs that can maintain material stability in the long term. Storage of PRP by the freeze-dying process allows the maintenance of growth factors as an important substance contained therein. In this study we used collagen as an activator material that stimulates of growth factor's release. Platelet Derived Growth Factor-AB (PDGF-AB) is a growth factor contained in PRP that stimulates fibroblasts, chemotaxis, stimulation of TGF-β growth factor, collagen production, and increased protein synthesis. The purpose of this study was to assess whether growth factor content, especially PDGF-AB, would be preserved after the freeze-drying process. PRP was produced from the human's peripheral blood by two centrifugation, activated by collagen, then divided into 3 groups: collagen-activated PRP which followed by freeze-dried process (FD PRP+C); collagen-activated PRP without freeze-dried (PRP+C) and fresh PRP as a baseline. The level of PDGF-AB was measured using ELISA method. The data were analyzed by using one way ANOVA. The results showed that there were significant differences between FD PRP+C with other groups. The PDGF-AB of FD PRP+C group was highest level than others.

Keywords: collagen, freeze-drying, growth factor, PDGF-AB level, platelet-rich plasma

S3-423

Isolation and characterization of *Alcaligenes* sp. LS2T from poultry farm at Yogyakarta City and the growth ability in animal's urine medium

Nanung Agus Fitriyanto[1,*], Ricky Gutama[1], Theresia Galuh Wandita[1], Yuny Erwanto[1], Takashi Hayakawa[2], and Tomoyuki Nakagawa[2]

[1]Faculty of Animal Science, Universitas Gadjah Mada, Indonesia
[2]Faculty of Applied Biological Science, Gifu University, Japan
e-mail: nanungagusfitriyanto@ugm.ac.id, ricky.gutama@mail.ugm.ac.id, theresia.galuh.w@mail.ugm.ac.id, yunyer@ugm.ac.id@ugm.ac.id, hayakawa@gifu-u.ac.jp, t_nakaga@gifu-u.ac.jp

This experiment aimed to identify isolates and to evaluate their capability for growing in ammonium and animal's urine high content medium. A nitrifying bacterium, strain LS2T, was isolated from soil in the odorous region of poultry farms in Yogyakarta City. Based on morphology and biochemical identifications, as well as molecular identification (16S rRNA sequence), strain LS2T was classified into the genus *Alcaligenes*, close to *Alcaligenes faecalis* SS1, and it was identified as species *Alcaligenes* sp. LS2T. The 16S rRNA gene sequences were also compared using BLASTN, and strain LS2T showed high similarity to *Alcaligenes* (99 %). The cells of strain LS2T were rod-shaped ((0.5–1.0) × (0.5–2.6) μm, Gram-negative, and confirmed as oxides positive. Strain LS2T has the ability for growing in ammonium sulfate and animal's urine; it showed that strain LS2T could tolerate ammonium at high concentration. These result suggested the possibility of strain LS2T in deodorization plants for enhancing the efficiency of deodorization.

Keywords: *Alcaligenes* sp., *Alcaligenes faecalis*, deodorization, growth ability, urine medium

Lactic acid bacteria (LAB) isolated from fermented cocoa beans prevent the growth of model food-contaminating bacteria

Fahrurrozi[1,*], Eka Putri Rahayu[2], Imam Bagus Nugroho[1], and Puspita Lisdiyanti[1]
[1]Research Center for Biotechnology, Indonesian Institute of Sciences, Bogor, Indonesia
[2]Nutrition and Food Technology Department, Surya University, Indonesia
e-mail: fahrurrozi.izzuddin@gmail.com

The application of lactic acid bacteria (LAB) for fermentation increases the quality of food ensuring the palatability, shelf-life, and safety for consumption. This research aimed to identify the LAB isolated from fermented cocoa beans and conduct antibacterial assays against food-borne bacterial contaminants. The LAB isolates were rejuvenated on De Man–Rogosa–Sharpe (MRS) media supplemented with 0.5 % calcium carbonate and grown in 30 °C for 48 h. The supernatants from cell homogenates were collected and tested against *Escherichia coli*, *Bacillus subtilis*, and *Staphylococcus aureus*. Four isolates of LAB namely, IDI-L009, IDI-L017, IDI-L039, and IDI-L049 demonstrated inhibitions against all three tested bacterial strain. The ability of supernatant from strain IDI-L009 to inhibit bacterial growth was abolished after neutralization by 1 N NaOH to pH 6.8 to 7. Furthermore, the supernatants of IDI-L017, IDI-L039, and IDI-L049 showed intact inhibition effect even after neutralization. It demonstrated that the three later LAB strains could produce secondary metabolite beyond common organic acids, e.g. lactic acid inhibiting the tested bacterial strains. The identification of LAB strains revealed that IDI-L009 was closest to a *Pediococcus acidilactici*, while IDI-L049 was closest to a *Lactobacillus plantarum* subsp. *plantarum*. Additionally, the IDI-L017 and IDI-L039 were closest to a *Lactobacillus pentosus*.

Keywords: *Lactobacillus pentosus*, *Lactobacillus plantarum*, *Pediococcus acidilactici*, *Theobroma cacao*, antibacterial activity

S3-081

Photoperiode effect on the growth and artemisinin content of *Artemisia annua* grown in tropical region

Yuli Widiyastuti* and Dyah Subositi
Medicinal Plant and Traditional Medicine Research and Development Center,
National Institute Health Research and Development, Ministry of Health, Indonesia
e-mail: ywidiyasis@gmail.com

Artemisia annua is medicinal plant species producing artemisinin, the bioactive compound used as antimalaria. This plant is native to China and North Asia and has been introduced to Indonesia since 90's. Due to the low content of artemisinin in *Artemisia annua* which are growth in the tropical region, great efforts have been devoted to improve artemisinin production. The research has been carried out to improve the growth, yield and artemisinin content by manipulated of photoperiod during the cultivation. Each of 100 individual plants is grown in the greenhouse for treatment of photoperiod and in the field for normal daylight. The photoperiodicity manipulation was used the LED lamp within the greenhouse with the time duration of 16 h. The growth of Artemisia was monitor during the experiment and biomass production was recorded after harvested time as well as the artemisinin and volatile oil content. The result of the research shows that photoperiod manipulation during the vegetative growth of *Artemisia annua* affects strongly on the growth, yield and artemisinin content. The 16 h of light was able to increase the yield of dry matter of *Artemisia annua* 20 % more compare to the natural daylight. Further, the artemisinin content also increased significantly by the treatment of 16 h of light.

Keywords: *Artemisia annua*, antimalaria, artemisinin, photoperiod, tropical region

Biofilm growth on new based resin matrix system for dental use

Siti Sunarintyas[1,*], Widowati Siswomihardjo[1], and Jukka Pekka Matinlinna[2]
[1]Department of Dental Biomaterial, Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
[2]Dental Material Science, The University of Hong Kong, Hong Kong
e-mail: sunarintyassiti@ugm.ac.id, widowati@ugm.ac.id

E-glass fiber reinforced composite (FRC) resin becomes populary used for bridgework in dentistry. Any new based material provides new environment for oral microorganism to grow. The objectie of this research was to determine the effect of a new based resin matrix system for dental FRC to biofilm growth including Streptococcus mutans and Candida albicans growth. Two composition of 1,6-hexanediol dimethacrylate (HDDMA) based resin matrix systems (exp-1, exp-2) and control group of bis-phenol-A-glycidylmethacrylate (bis-GMA) based were evaluated. The results showed that there was significantly different of Streptococcus mutans growth among the tested groups ($p < 0.05$): control group bis-GMA based (7.6667 ± 0.5774 CFU mL^{-1}) > exp-2 group HDDMA based (7.5467 ± 3.2145 CFU mL^{-1}) > exp-1 group HDDMA based (7.3334 ± 1.5275 CFU mL^{-1}). The growth of Candida albicans was significantly difference among the tested groups ($p < 0.05$): control group bis-GMA based (10.3334 ± 0.5774 CFU mL^{-1}) > exp-2 group HDDMA based (10.3240 ± 2.9841 CFU mL^{-1}) > exp-1 group HDDMA based (10.1344 ± 4.6585 CFU mL^{-1}). By this finding, it was concluded that the resin matrix systems influence the biofilm growth including Streptococcus mutans and Candida albicans growth on E-glass FRC. The new based resin matrix system of HDDMA provided less biofilm growth than bis-GMA on E-glass FRC surface.

Keywords: *Candida albicans*, *Streptococcus mutans*, biofilm, bis-GMA, HDDMA

L2-243

Application of CRISPR/Cas9 genome editing system for molecular breeding of orchids

Endang Semiarti[1,*], Aziz Purwantoro[2], Jaka Widada[2], Yasushi Yoshioka[3], Shogo Matsumoto[4], Aries B. Sasongko[1], Matin Nuhamunada[1], Windi Mose[1], Muhammad Dylan Lawrie[1], Yuli Setiawati[1], Sri Nopitasari[1], Kana Ninomiya[3], and Yuki Asano[4]

[1]Faculty of Biology, Universitas Gadjah Mada, Indonesia
[2]Faculty of Agriculture, Universitas Gadjah Mada, Indonesia
[3]Graduate School of Science, Nagoya University, Japan
[4]Graduate School of Bioagricultural Sciences, Nagoya University, Japan
e-mail: endsemi@ugm.ac.id

Orchid is an important ornamental plant in Indonesia, so plant breeding must always be improved. The objective of this study was to find an effective method to change the character of orchids through the method of CRISPR/Cas9 genome editing system. Three weeks old protocorms of *Phalaenopsis amabilis* grown on NP medium were immersed in the culture of *A.tumefaciens* harbored T-DNA construct in pKIR1.1 vector carring single guide RNA (sgRNA) for *HDR* target site 2 (T2), *PDS3* target site 1 (T1), and *PDS3* target site 2 (T2) genes. Detection for transformants were conduted by PCR using Cas9 primers that amplified 4 kb. The results showed that 5 /579 (0.86%) *HDR*T2-targeted transformants, 17/ 636 (2.79%) *PDS3*T1-targeted transformants, and 9 out of 656 (1.42%) *PDS3*T2-targeted transformants had been obtained. Compared to non-transformant plants, some transformants showed pale color of leaves. This suggests that the target genes could be truncated by CRISPR/ Cas9 system and it can be applied for functional gene editing in orchids.

Keywords: CRISPR/Cas9, genome editing, HDR, molecular breeding, orchid

The establishment of PCR cloning and sequencing of *Glycoprotein D* gene of *Bovine herpesvirus-1* (BHV-1) isolated from field case in Indonesia

Dewi Noor Hidayati[1,2,*], Eko Agus Srihanto[3], Tri Untari[1], Michael Haryadi Wibowo[1], Widya Asmara[1], and Koichi Akiyama[4]

[1]Department of Microbiology, Faculty of Veterinary Medicine, Universitas Gadjah Mada, Indonesia
[2]PUSVETMA (Pusat Veteriner Farma), The Ministry of Agriculture of The Republic of Indonesia
[3]Veterinary Disease Investigation Lampung (BVet Lampung), Indonesia
[4]Advanced Research Support Centre (ADRES), Ehime University, Japan
e-mail: dewi.noor.h@mail.ugm.ac.id, eko_dvm@yahoo.com, t_untari@ugm.ac.id, mhwibowo@ugm.ac.id, wied_as@ugm.ac.id, akiyama.koichi.mu@ehime-u.ac.jp

Considering the increasing incidence of infectious bovine rhinotracheitis (IBR) in Indonesia it was necessary to conduct a more in-depth study of *Bovine herpesvirus-1* (BHV-1) as the cause of IBR disease. A final report of previous research showed that the subtype found in Indonesia was subtype 1.1. IBR field case detection in Indonesia still used serological method (ELISA) that might give false positive results and could not explain virus subtype. Studies to determine the virus subtype required clear and readable sequences of data. This study presented the detecting method of the recent field isolate by cloning *Glycoprotein D* genes into the PGEMT plasmid to obtain robust sequence data to describe the characterization of Indonesian isolate. Our finding showed that the recent isolate found in recent field case was different from the previous one. It was similar (100 %) with subtype 1.2 strain SP1777 and SM023.

Keywords: *Bovine herpesvirus-1*, ELISA, *Glycoprotein D* gene, infectious bovine rhinotracheitis, PCR cloning

L2-190

Development of CRISPR/Cas9 plasmid for multiple sites genome editing in oil palm (*Elais guineensis* jacq.)

Victor Aprilyanto*, Chris Darmawan, Condro Utomo, and Tony Liwang
Biotechnology Department, Plant Production and Biotechnology Division, PT SMART Tbk., Indonesia
e-mail: biotechnology@sinarmas-agri.com

Genome editing technology via CRISPR/Cas9 system is a versatile technique with numerous potential applications particularly in agriculture. In this study, we attempted to develop a CRISPR/Cas9 plasmid containing four sgRNA to allow for multiple editing in oil palm genome. In the first step, we used in silico approach to find optimum 20-nt guides from four gene regions across oil palm genome. These guides were later joined with promoter and tracr-RNA sequence to construct a 472-bp module, and together with three tetranucleotide linkers and restriction sites at both terminals gave an insert of length 1918-bp. This insert was then incorporated into CRISPR/Cas9 vector and the final plasmid was sequence validated.

Keywords: CRISPR/Cas9, genome editing, golden gate assembly, oil palm, sgRNA

Cytoprotective activity of extracts of tomato and carrot callus on human dermal fibroblast adult (HDFa)

Rumiyati*, Sismindari, Arief Nurrochmad, Dinar Prastiandari, Andrea Dhieta Utama, and Dianni Anggita Dewi
Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
e-mail: rumiyaris@ugm.ac.id

Reactive oxygen species (ROS) exposure could lead to aging of human cell. Tomato (*Solanum lycopersicum* L.) and carrot (*Daucus carota* L.) callus ethanolic extract are flavonoid-rich, meanwhile tomato and carrot callus aqueous extract are suggested to contain protein that play a role in cell regeneration against free radical. This study was aimed to evaluate the cytoprotective activity of tomato and carrot callus in preventing hidrogen peroxide (H2O2)-induced cell cycle arrest in G0/G1 phase and inhibiting apoptosis. Apoptosis examination of Human Dermal Fibroblast adult (HDFa) cells was performed using double staining method. Apoptosis inhibition showed in 0.15 mg · mL^{-1} and 0.25 mg · mL^{-1} of tomato callus ethanolic extract (TCEE) pre-treatment; besides 1.0 mg · mL^{-1} of tomato callus aqueous extract (TCAE), 0.15 mg · mL^{-1} of carrot callus ethanolic extract (CCEE) and 0.50 mg · mL^{-1} of carrot callus aqueous extract (CCAE) pre-treatment showed higher cell apoptosis inhibition compared with the other dose. The result of cell cycle analysis using FACS flow cytometry showed that TCEE, TCAE, CCEE and CCAE ((0.15; 1.0; 0.15; 1.0) mg · mL^{-1}) pre-treatment has inclination to reduce accumulation of cell in G0/G1.

Keywords: *Daucus carota*, *Solanum lycopersicum*, free radical, human dermal fibroblast adult, reactive oxygen species

L3-580

The effect of orange, pineapple, and guava waste extract on the phenolic content in green betel (*Piper betle* L.)

Elpri Eka Permadi[1,*] and L. Hartanto Nugroho[2]
[1] Faculty of Biology, Universitas Gadjah Mada, Indonesia
[2] Laboratory of Plant Structure and Development, Universitas Gadjah Mada, Indonesia
e-mail: elpri.eka.p@mail.ugm.ac.id, hartantonugroho2005@ugm.ac.id

Green betel (*Piper betle*) known as the famous traditional medicinal plant. Many secondary metabolites were identified from genus Piper, such as phenolic compound. Phenolic compounds have an important role as antioxidant, anti-inflammation, anti-cancer, and prevent cell mutation. Some research has discovered that plant phenolic content can be induced by salicylic acid treatment. Salicylic acid was contained in many fruits such as guava, pineapple, and orange that abundantly found in Indonesia. In many cases, these fruits were found as the rotten fruit waste in the traditional market. This research aimed to know the effect of the rotten fruit waste extract of orange, pineapple, and guava on phenolic compound content in *Piper betle*. The SA treatment was used to evaluate the optimal increasing of phenolic content of *Piper betle* L. A series of treatment of the ethanol extract of fruits were performed to *Piper betle* L. plants. The analysis methods used for this study were histochemical analysis on stem and leaf of *Piper betle* and the total phenolic analysis using the Folin-Ciocalteau method. Based on this study, the optimum concentration of SA which could increase the content of the phenolic compound in *Piper betle* was 1.5 mM. Based on histochemical and total phenolic analysis, orange was the best fruit which could increase the content of the phenolic compound, was in 50% concentration. All of the analysis showed that the best treatment for increase the phenolic compound in *Piper betle* was the orange waste extract.

Keywords: *Piper betle* L., fruit waste, phenolic compound, salicylic acid, waste extract

Organogenesis responses of tea (*Camellia sinensis* (L.) O. Kuntze) var. Assamica and Sinensis

Hani Widhianata* and Taryono
Program of Plant Breeding, Department of Agronomy, Universitas Gadjah Mada, Indonesia
e-mail: hani.widhianata@mail.ugm.ac.id, tariono60@ugm.ac.id

Effective methods, simple and reliable of in vitro organogenesis of tea plants continue to be improved. Different varieties of tea have different responses of organogenesis. Half-strength Murashige and Skoog (MS) medium showed the best pre-medium for shoot culture of tea. The initiation of shoots in culture of shoot tip and axillary buds was remarkably accelerated in the media that added with BAP (3 mg · L^{-1}) and GA3 (0.5 mg · L^{-1}). Differentiation of organs was observed on adventitious buds cultured on the media containing BAP (3 mg · L^{-1}) and GA3 (0.5 mg · L^{-1}), respectively. The growth of shoots in culture of shoot tips and axillary buds was remarkably accelerated when the media were mixed with the combination of BAP (3 mg · L^{-1}) and GA3 (0.6 mg · L^{-1}). And it was observed that the shoot tips and axillary bud culture provided an effective method, which was easier, simpler and quicker in securing the growth of shoots. Shoot tips culture provided a more effective method than axillary bud culture in var. Assamica (Cinyuruan-147, Kiara-8, and TRI-2025) and var. Sinensis (*Tambi Jingga*). Otherwise, axillary bud culture provided a more effective method than shoot tips culture in var. Sinensis (*Tambi* and *Tambi Jingga*).

Keywords: *Camellia sinensis*, in vitro, micropropagation, organogenesis, tea

L3-544

Effect of growth factor in callus induction and bioactive compounds in seed explant of kaffir lime (*Citrus hystrix* DC.)

Woro Anindito Sri Tunjung[1,*], Vita Fatonah[1], Ghea Putri Christy[1], Sugeng Triono[2], Lisna Hidayati[1], Dwi Priyanto[1], Yekti Asih Purwestri[1], Aries Bagus Sasongko[1], Hennisa[1], Nur Faizah[1], and Ari Indrianto[1]

[1]Faculty of Biology Universitas Gadjah Mada, Indonesia
[2]Department of Chemistry, Faculty of Mathematic and Sciences, Universitas Gadjah Mada, Indonesia
e-mail: wanindito@ugm.ac.id

Our previous study showed that kaffir lime leaf extracts may have anti-cancer properties. However, production of bioactive compounds is affected by environmental factors. Here, we present a method to control environmental conditions using in vitro culture techniques such as callus induction. Calluses were induced from seed embryo explants of kaffir lime on MS medium with combinations of 2,4-D and BAP at concentrations 1:0.5; 1:1; and 2:1, respectively. Fourty and 60 d.o. calluses were extracted using chloroform and ethyl acetate and analyzed by GC-MS. Results showed all combinations of 2,4-D and BAP were able to induce callogenesis from seed embryo explants of kaffir lime with no significant differences of callus initiation time, biomass, morphology and growth rates. However differences were detected in the bioactive compound profiles. In kaffir lime callus, both fatty acids and secondary metabolites were detected. Specifically, in 40 d.o. calluses (exponential growth phase) we detected α-pinene and 1.8–cineole in plants treated with 2,4-D: BAP at concentration 1:0.5 and 2:1. In 60 d.o. calluses (stationary phase) we detected a number of compounds in plants treated with 2,4-D: BAP at concentrations of 1:0.5 and 2:1, including caryophyllene, linoleoyl chloride, thiogeraniol, stigmasterol, clianosterol, citronellal, neo-isopulegol, citronellol, geraniol, eugenol, cyclopropane, elemol and farnesol.

Keywords: *Citrus hystrix*, 2,4-D (2,4-diclorophenoxyacetic acid); BAP (Benzyl amino purine), bioactive compounds, callus, Rutaceae

The extract of pink and blue ginger (*Curcuma aeruginosa*) decrease immunosuppresant effect induced by doxorubicin

Lisyaratih Anggriani[1], Arlieza Rozali Wulandari[1], Gigih Mukti Leksono[1], Muthi' Ikawati[2], and Edy Meiyanto[2,*]

[1]Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[2]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
e-mail: edy.meiyanto@gmail.com

Doxorubicin is a chemotherapy drug which has been widely approved and effective to suppress cancer cell growth however it also possesses side effect regarding to immune system suppression. Pink and blue ginger (*Curcuma aeruginosa*) contains various monoterpen and sesquiterpene compounds which have been proved to exert immunostimulant activity. This research aims to explore the potency of pink and blue ginger (*Curcuma aeruginosa*) rhizome as the immunostimulant agent after immune response suppression following chemotherapy with doxorubicin. Pink and blue ginger extract (PBGE) was obtained using steam distillation extraction method for 5 h. The cytotoxic examination of doxorubicin showed the IC50 value of PBGE was 2 μM against primary lymphocyte cell and in 10 μg · mL^{-1} to 50 μg · mL^{-1} concentration of PBGE proved to increase primary lymphocyte cell viability. Combination of doxorubicin and PGBE significantly increase cell viability compared to doxo-treated and untreated groups. Flow Cytometry results showed that PBGE at concentration of 10 μg · mL^{-1} could increase the percentage of CD4+ and CD8+ cells compared to CD4+ and CD8+ in normal cells. Molecular docking examination showed docking score of major compound of PBGE (curdione) to CD95 is lower than CD95's native ligand. Based on the results, PBGE is potencial to be an immunostimulant agent to fight back the immune system suppression induced by chemotherap agent, doxorubicin.

Keywords: *Curcuma aeruginosa*, pink and blue ginger, primary lymphocyte cell, immunostimulant, doxorubicin

DRUG DEVELOPMENT AND NUTRACEUTICAL

T2-783

Antioxidant and cytotoxic activity of ethanolic extract of curry leaf (*Clausena excavate* Burm. F.) against cervical cancer cells (HeLa) *in vitro*

Madina Alfi Manaroh, Tri Rini Nuringtyas*, Warisatul Ilmi, and Hermanita Indah
Faculty of Biology, Universitas Gadjah Mada, Indonesia
e-mail: tririni@ugm.ac.id

Cervical cancer is a cancer with the highest prevalence in Indonesian women. Cancer treatment with chemotherapy or hormone induction has negative effects to reduce quality of life and cause drug resistance. Therefore, an alternative medicine with natural ingredients is needed. Curry (*Clausena excavata* Burm.f.) is one of the plants that have been used by the society as a traditional alternative medicine. However, scientific research on the properties contained in these plants especially the leaves has not been widely studied. This study aims to determine the profile of secondary metabolites, antioxidant activity, and cytotoxic activity of leaves extract of Curry on cervical cancer cells (HeLa). Active content of dried curry leaves was extracted by maceration method with ethanol solvent. Flavonoid content in crude extract was evaluated by Thin Layer Chromatography (TLC) using Silica gel GF60 as a stationary phase and butanol:acetic acid:water (3:1:1) as a mobile phase. Determination of flavonoid compounds was conducted by observing stains formed on visible light, UV254 nm and UV365 nm rays. Measurement of antioxidant activity was conducted by DPPH (2,2-diphenyl-1-picryl-hydrazyl) method with ascorbic acid as a positive control. In vitro cytotoxicity tests were performed on HeLa cells and evaluated with MTT assay. Changes in cell morphology before and after treatment of the extract were observed with an inverted microscope. The results of TLC showed that curry leaf ethanolic extract contained flavonoid compounds. The extract has quite high antioxidant activity with IC_{50} 52.63 µg . $µL^{-1}$. Curry leaf ethanolic extract showed high cytotoxic activity against HeLa cells with IC_{50} 73.72 µg . mL^{-1}.

Keywords: *Clausena excavata*, antioxidant activity, cytotoxic, HeLa cells, TLC

Antioxidant activity of bioactive peptides derived from the hydrolysates of Jack Bean (*Canavalia ensifromis* (L.) DC) protein isolate

Bambang Dwi Wijatniko* and Agnes Murdiati
Department of Food and Agricultural Product Technology, Faculty of Agricultural Technology, Universitas Gadjah Mada, Indonesia
e-mail: bambangdw92@ugm.ac.id

Jack Bean (*Canavalia ensiformis* (L.) DC.) is commonly cultivated in Indonesia, but it is not so much available commercially due to the presence of anti-nutritional factors (hydrogen cyanide, tannin, canavanine) and low protein bioavailability. Considering that it is rich in protein, however we investigated physiological functions in the enzymatic hydrolysates of Jack Bean (JB) protein isolate. The objective of this study was to investigate the antioxidant properties of bioactive peptides released after enzymatic hydrolysis of jack bean protein isolate with pepsin and pancreatin enzyme. The jack bean protein isolate obtained after extraction was digested by pepsin and pancreatin enzyme separately with time course (15, 30, 45, 60, and 120) min. Biological active peptides presenting antioxidant activity was evaluated by analyze the activity of free radical scavenging by DPPH and reducing power. The result indicated that pancreatin enzyme was able to hydrolyze the Jack Bean protein better than pepsin as shown by the higher degree of hydrolysis after pancreatin digestion than pepsin. The highest degree of hydrolysis achieved at 120 min digestion (28.08 %) with pancreatin. We remarkbaly found that the Jack Bean protein hydrolysate after pancreatin digestion showed higher DPPH sacvenging activity than pepsin. In contrary with DPPH assay, jack bean protein hydrolysate after pepsin digestion exhibited higher reducing power than pancreatin, with the highest reducing power at fraction 30 min hydrolysis. It thus follows that the JB protein isolate contains some physiologically functional peptides with antioxidant effects, leading to a beneficial material as develpoment for nuttaceutical agent in promoting of health.

Keywords: anti-nutritional factors, antioxidant, bioactive peptide, Jack bean, protein hydrolysates

T2-562

Effects of anti-collagenase, anti-elastase, anti-tyrosinase and antioxidant activities of the extract and fraction from *Turbinaria decurrens* Bory.

Arief Nurrochmad[1,*], Wirasti[1,2], Arifin Dirman[1,3], Endang Lukitaningsih[4], Adillah Rahmawati[1], and Nanang Fakhrudin[5]

[1]Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[2]STIKES Muhammadiyah Pekajangan, Indonesia
[3]Dinas Kesehatan Daerah Kota Palu, Indonesia
[4]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[5]Department of Pharmaceutical Biology, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
e-mail: ariefnr@ugm.ac.id

Brown macroalgae which content fucoxanthin exhibited high antioxidant activity. This study performed to examine antioxidant, anti-collagenase, anti-elastase, anti-tyrosinase activities, and effect on cell viability of Human Dermal Fibroblast adult (HDFa) of brown macroalgae, *Turbinaria decurrens* Bory. Extract (ETD) and a fraction of *T. decurrens* (FTD) macerated by ethanol and further performed column chromatography. Then, fucoxanthin content was accomplished using HPLC. Further, the antioxidant activities, anti-collagenase, anti-elastase, and tyrosinase inhibitory assay were performed. The effect of ETD and fucoxanthin on cell viability were conducted on HDFa cell-induced by hydrogen peroxide (H_2O_2). The HPLC analysis showed that ETD and FTD contain fucoxanthin (284.9 ± 3.3) μg . g^{-1} dry-weight and (653.4 ± 30.6) μg . g^{-1} dry-weight, respectively. The antioxidant assay showed that ETD and FTD produced high antioxidant activity by ferric reducing antioxidant power (FRAP) and β-carotene bleaching (BCB) methods. The antioxidant assay showed that ETD and FTD produced high antioxidant activity by ferric reducing antioxidant power (FRAP) and β-carotene bleaching (BCB) methods that were comparable to fucoxanthin. ETD exhibited high tyrosinase inhibitory than kojic acid significantly (p<0.01), while for FTD had a comparable effect to kojic acid. The result also revealed that ETD and FTD produced anti-elastase and anti-collagenase (matrix metalloproteinase-1 (MMP-1)) (p<0.05; p<0.001). Fucoxanthin and ETD were able to maintain cell viability on HDFa cell-induced H_2O_2. This study suggests that *T. decurrens* may be effective to prevent skin aging and wrinkle formation, possibly through the antioxidant activity and maintain cell viability of fibroblast.

Keywords: *Turbinaria decurrens* Bory, anti-collagenase, anti-elastase, anti-tyrosinase, antioxidant, fucoxanthin

Antioxidant potency of red dragon fruit flesh and peel extracts prepared by different extraction methods

Novi Febrianti[1,2], Purwanti Pratiwi Purbosari[2], Triana Hertiani[3], Sukarti Moeljopawiro[4], and Sofia Mubarika[5,*]

[1]Department of Biotechnology, Graduate School, Universitas Gadjah Mada, Indonesia
[2]Department of Biology Education, Faculty of Teacher Training and Education, Universitas Ahmad Dahlan, Indonesia
[3]Department of Pharmaceutical Biology, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[4]Department of Biochemistry, Faculty of Biology, Universitas Gadjah Mada, Indonesia
[5]Department of Histology and Cell Biology, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Indonesia
e-mail: rikaharyana@ugm.ac.id

Red dragon fruit (*Hylocereus polyrhizus*, [Weber] Britton & Rose) is widely consumed in Indonesia nowadays. Peel and flesh of red dragon fruit contain many bioactive compounds at high antioxidant activity. The objectives of this research were to determine total phenolic content (TPC), total flavonoid content (TFC), as well as the antioxidant activity of various extract of peel and flesh of red dragon fruit that prepared by different methods. TPC was analyzed by Folin-Ciocalteau method and total flavonoid by spectrophotometry UV-Vis with $AlCl_3$. Antioxidant activity was determined by 2,2-diphenyl-1-picrylhydrazyl (DPPH) and β-carotene bleaching (BCB) test. Results showed that ethanolic extract of blended-peel had the highest total phenolic content, as well as antioxidant activity. The highest content of total flavonoid was found in ethanolic extract of the dried peel.

Keywords: antioxidant activity, extraction, flavonoid, phenol, red dragon fruit

T3-157

Combination of black cumin (*Nigella sativa* L.) and awar-awar (*Ficus septica* Burm. F.) inhibits proliferation and modulates cell cycle in HeLa cells

Ragil Anang Santoso[1], Amadea Sylva Lienaningrum[1], Eunice Dwininta Bangun[1], Hanna Gracia Reformatika[1], Ratna Asmah Susidarti[2], and Edy Meiyanto[1,2,*]

[1]Cancer Chemoprevention Research Center (CCRC), Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia

[2]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia

e-mail: meiyan_e@ugm.ac.id

Cervical cancer is the second leading cause of death in the world and the treatment of this cancer is still causing many adverse side effects. Thymoquinone in black cumin extract (BCE) and tylophorine in awar-awar extract (AAE) can inhibit the growth of cervical cancer cell lines, HeLa. The aims of this study are to explore the potential combination of BCE and AAE as a chemotherapeutic agent in HeLa cells and to formulate it into nanoemulsion dosage form. Based on TLC result the main content of AAE was tylophorine with hRf value 95. GC-MS result also showed the presence of thymoquinone content in BCE. Thymoquinone and tylophorine exhibited considerable affinity compared with IKK receptor proteins through molecular docking measurements. Single cytotoxic tests of BCE and AAE showed both these extracts are cytotoxic in HeLa cells with the IC_{50} of 577 µg . mL^{-1} and 177 µg . mL^{-1}, respectively. The combination of BCE and AAE in the concentration 36 µg . mL^{-1} and 88 µg . mL^{-1} decreased cell viability up to 31.67 %. Cell cycle analysis by PI-flowcytometry revealed either a single treatment and combination of BCE and AAE modulated cell arrest in G2/M phase. Concerning the potential and synergistic effects of the BCE and AAE combinations, we developed a nanoemulsion formulation containing combination BCE and AAE. The nanoemulsion preparation obtained has a mean particle size of 63.8 nm and sterically stabilized with zeta potential value -23.8 mV. In conclusion, combination of BCE and EAA is a potential chemotherapeutic agent for cervical cancer treatment.

Keyword: awar-awar, black cumin, cell cycle, HeLa, proliferation

Effects of tempeh on proliferation and senescence in ovariectomized rats

Gergorius Gena Maran[1], Nadya Rizky Septaningrum[1], Raditya Wulandari[1], Rohmad Yudi Utomo[1], Adam Hermawan[1,2], and Edy Meiyanto[2]*

[1]Cancer Chemoprevention Research Center, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[2]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
e-mail:meiyan_e@ugm.ac.id

Hormon replacement therapy (HRT) is an evolving therapy for estrogen deficiency, but the long-term use possesses side-effect such as induction to breast cancer. Genistein, a phytoestrogen that contained in tempeh, exerts estrogenic activity. This research aims to know the effects of tempeh to uterine weight and the breast proliferation of ovariectomized female rat. One of tempeh product which the quality have been standardization is used in this research. Female rats Sprague-Dawley strain aged 7 wk to 8 wk divided to seven groups of treatment (negative, OVX baseline, positive control, OVX + tempeh 500 mg. kg^{-1}BW, OVX + tempeh 1000 mg . kg^{-1}BW) and had been treated for two weeks. At the end of treatment, rats are necropsized and the uterines and breasts are isolated. Ratio of uterine weight to rats weight showed that on the OVX + tempeh 500 mg . kg^{-1}BW and OVX +1000 mg . kg^{-1}BW of treated groups were relative higher than OVX group. HE stainning on breast tissue, showed enhancement of lobules on OVX + tempeh 1000 mg . kg^{-1}BW (26 th lobules) was higher than negative group and baseline (9 th lobules). The result of the AgNOR staining showed that OVX + tempeh 1000 mg . kg^{-1}BW showed show enhancement on the number of blackdot along with dose increase, 3.07 and 3.31 mAgnor per 100 cells respectively, was higher than baseline of 2.18 mAgnor per 100 cells. Based on these results, it was concluded that tempeh has the potential to be developed as phytoestrogens in menopausal women.

Keywords: ovariectomy, phytoestrogen, proliferation, tempeh, uterine weight

T3-588

Cytotoxicity studies of potential fraction of agarwood leaves *Gyrinops versteegii* (Gilg.) Domke and *Aquilaria malaccensis* (Lamk) against breast (T47D) and colon (WiDr) cancer cell lines

Lisna Hidayati*, Riko Irwanto, Yulisty Soraya Fadhilah, Tri Rini Nuringtyas, Nastiti Wijayanti, and Sukarti Moeljopawiro

Faculty of Biology, Universitas Gadjah Mada, Indonesia
e-mail: liztna@gmail.com

Gyrinops versteegii (Gilg.) Domke and *Aquilaria malaccensis* (Lamk) known as the most popular agarwood plants in Indonesia. The leaves have a high antioxidant activity and believed to have a healthy effect for human. The purposes of this research were to identify toxic compounds of the best fraction between two species of agarwood on breast cancer cell line T47D and colon cancer cell line WiDr. Agarwood leaves were collected from agarwood orchard in Klaten, Jawa Tengah. Sample was extracted using soxhletation method with two solvents such as chloroform and ethanol, and infusion method with aquadest. The cytotocixity of this extract was examined on breast cancer cell line T47D and colon cancer cell line WiDr using MTT assay. The most potent extract was separated using vaccum liquid chromatoghrapy (VLC) method. The specificity of the most potent fraction was tested on Vero cells. The most potent fraction was analyzed by TLC to identify the group of compound content using detector reagent. The mechanism of cell death was analyzed using flow cytometry and double stainning methods. The chloroform extract of *G. versteegii* leaves had the highest cytotoxicity value 166.73 µg . mL^{-1} and 224.5 µg . mL^{-1} on T47D cell and WiDr cell, respectively. The best potent fraction that eluted by nhexane:chloroform (50:50) had the lowest IC_{50} value 57.68 µg . mL^{-1} and 12.87 µg . mL^{-1} on T47D cell and WiDr cell, respectively. The selectivity assay on Vero and T47D cell showed that the potential fraction (nhexane:chloroform = 50:50) was not selective on Vero cell with index value 2.56. Besides that the selectivity assay on Vero and WiDr cell showed that the potential fraction (n-hexane:chloroform = 50:50) as the highest selectivity with index value 11.2. The best potent fraction contained the group of compounds such as terpenoid, flavonoid, phenolic and tannin. The tocixity of potential fraction induced necrosis and apoptosis on T47D and WiDr cell. This research reveals that the potential fraction (n-hexane:chloroform = 50:50) of *G. verstegii* leaves is potentially developed as breast cancer and colon cancer therapy candidates.

Keywords: agarwood, double stainning, extraction, flow cytometry, MTT assay, T47D, WiDr

In vitro study of the combination of doxorubicin, *Curcuma xanthorrhiza*, *Brucea javanica*, and *Ficus septica* as a potential novel therapy for metastatic breast cancer

Ika Rahmawati Sutejo[1,3], Herwandhani Putri[3], Sri Handayani[3,4], Riris Istighfari Jenie[2,3], and Edy Meiyanto[2,3,*]

[1]Department of Biochemistry, Faculty of Medicine, University of Jember, Indonesia
[2]Departement of Pharmaceutical Chemistry, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[3]Cancer Chemoprevention Research Center, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[4]Research Center for Chemistry, Indonesian Institute of Sciences (LIPI), Indonesia
e-mail: meiyan_e@ugm.ac.id

The use of doxorubicin as the main agent of chemotherapy for metastatic breast cancer is constrained by less optimized therapeutic effects, resistance and side effects. Therefore we need a combination of more than one chemopreventive agent which has different molecular targets to solve that problem. The aims of this study is to prove the inhibitory effect of ethanolic extract of rhizome of *Curcuma xanthorrhiza* (ECx), fruit of *Brucea javanica* (EBj), leave of *Ficus septica* (EFs) and doxorubicin (Dox) alone and its combination on migration and invasion of a highly metastatic 4T1 breast cancer cell line. Cytotoxic activity of single and combination treatment was evaluated by MTT assay, followed by an experiment of apoptosis induction by using flow cytometry. The inhibitory effect on migration was observed by scratch woundhealing assay. Furthermore, the observation of the activity of matrix metalloproteinase-9 (MMP-9) was analyzed by gelatin zymography. The results showed that ECx, EBj, EFs, and Dox has cytotoxic activity on 4T1 cells with the value of IC_{50} respectively (49.7 ± 1.53) μg . mL^{-1}, (59.9 ± 1.79) μg . mL^{-1}, (15.2 ± 2.12) μg . mL^{-1} and (1.2 ± 0.23) μM. Furthermore, combination of ECx-EBj-Dox and ECx-EBj-EFs revealed sinergistic effect on 4T1 cells and decrease cell viability through the induction of apoptosis and necrosis. Based on wound healing assay, 24 hours incubation of this combination inhibited 4T1 cells migration compared to single treatment. Gelatin zymography analysis showed that this combination also inhibited activity of MMP-9 greater than single used. *Curcuma xanthorrhiza, Brucea javanica,* and *Ficus septica* may have potential to be developed as a combination with or without doxorubicin for metastasis breast cancer treatment.

Keywords*: Brucea javanica, Curcuma xanthorrhiza, Ficus septica*, 4T1 cells, antimetastasis

T3-843

Screening of antibacterial and anticancer activity of soft corals from Togean Islands, Indonesia

Muhammad Sulaiman Zubair[1,*], Subehan Lallo[2], Rusmianti[1], Arsa Wahyu Nugrahani[1], and Ibrahim Jantan[3]

[1]Department of Pharmacy, Faculty of Sciences, Tadulako University, Indonesia
[2]Faculty of Pharmacy, Hasanuddin University, Indonesia
[3]School of Pharmacy, Taylor's University, Lakeside Campus, Malaysia
e-mail: sulaiman_zubair80 @yahoo.co.id

Soft corals (Octocorallia, Alcyonaceae) have been reported to possess diverse biological activities and unique structural chemistry. This study aims to screen the potential antibacterial and anticancer activity of some soft corals collected off Togean Islands, Central Sulawesi, Indonesia. They are *Lobophytum* sp, *Sarcophyton* sp, *Sinularia* sp 1, and *Sinularia* sp 2. All dried coral materials were extracted for 3 x 24 h by maceration method using methanol and then evaporated by the rotary evaporator to obtain the viscous extract. The determination of antibacterial activity had been performed by well agar diffusion method against *Staphylococcus aureus* and *Escherichia coli*. Meanwhile, the cytotoxic activity was performed by MTT method, followed by apoptosis annexin V-FTIC assay. Identification for the presence of terpenoids was performed by p-anisaldehyde-sulphuric acid spraying reagent on thin layer chromatography (TLC). *Sinularia* sp2 extract have strongly inhibited *S. aureus* and *E. coli* with the diameter of inhibition range from 12.76 mm and 17.86 mm, respectively. Moreover, *Sinularia* sp2 extract possessed also cytotoxic activity against human breast adenocarcinoma (MCF-7) and human colon colorectal carcinoma (HCT-116) with the IC50 of 46.807 and 47.186 µg/mL, respectively. Extract *Sinularia* sp 1 was found to have strongest cytotoxicity on human colon colorectal carcinoma (HCT-116) with the IC50 of < 1.505 µg/mL. Annexin V-FTIC assay clearly exhibited that the apoptosis mechanism is proposed by the extracts of *Sinularia* sp1 and *Sinularia* sp 2. Terpenoids were identified on both extracts suggesting for further purification and isolation for the bioactive terpenoid compounds.

Keywords: antibacterial, cytotoxicity, MTT, soft corals, Togean Islands

α-amilase inhibitory activity of fraction of Lebui (*Cajanus cajan* (L.) Millsp.) seed extract

Rumiyati[1]*, Dian Resti Setyaningrum[1], Agung Endro Nugroho[1], Yekti Asih Purwestri[2], Yudi Pranoto[3], Sri Widyastuti[4], Satrijo Saloko[4], and Muktasam[5]

[1]Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[2]Faculty of Biology, Universitas Gadjah Mada, Indonesia
[3]Faculty of Food and Agricultural Product Technology, Universitas Gadjah Mada, Indonesia
[4]Faculty of Food Technology and Agroindustry, University of Mataram, Indonesia
[5]Department of Sosio Economic, Faculty of Agriculture, University of Mataram, Indonesia
e-mail: rumiyaris@ugm.ac.id

Diabetes is a metabolic syndrome characterized by high blood sugar levels or hyperglycemia. Alpha-amylase inhibitors can be used as an antidiabetic that controls postprandial hyperglicemia. Alpha-amylase inhibitors are found in plants as protein and non-protein bioactive content such as in lebui seed. The purpose of this study was to determine the activity of alphaamylase inhibition of the fraction of ethanol extract of lebui seed. Preparation of the extracts was carried out by extraction of lebui seed and then fractionated to obtain n-hexane fraction (HF), ethyl acetate fraction (EAF), and water fraction (WF). The fractions then tested to alpha-amylase inhibition activity in vitro by measuring the reducing sugar using 3.5-dinitrosalicylic (DNS) reagent. Furthermore, identification of bioactive content of each fractions was carried out using thin layer chromatography. The results of alpha-amylase inhibition activity test showed that all fractions had the ability to inhibit alpha-amylase. The IC_{50} value of the n-hexane fraction, ethyl acetate fraction, and water fraction were 173.05 mg . mL^{-1}, 9.98 mg . mL^{-1}, and 137.19 mg . mL^{-1}, respectively. Ethyl acetate fraction has the smallest IC_{50} value compared to other fractions. Based on the identification of the bioactive content, bioactive content that are only found in the ethyl acetate fraction but not in other fractions are tannins. So that, the content in lebui seed which acts as an alpha-amylase inhibitor might be tannins.

Keywords: *Cajanus cajan* (L.) Millsp, α-amylase, fraction of ethanol extract, inhibitory activity, seed extract

D2-496

^{1}H-NMR fingerprinting of medicinal herbs contain chemical drug material allopurinol

Adita Yuniati Puspitasari[1], Harno Dwi Pranowo[1], Respati Tri Swasono[1]*, and Tri Rini Nuringtyas[2]

[1]Department of Chemistry, Faculty of Mathematics and Natural Science, Universitas Gadjah Mada, Indonesia

[2]Biochemistry Laboratory, Faculty of Biology Universitas Gadjah Mada, Indonesia

e-mail: respati@ugm.ac.id

Research to differentiate the pure medicinal herbs from the mix medicinal herbs with chemical drug material has been done. For this purpose, we conducted fingerprinting of commercial medicinal herbs and chemical drug material allopurinol using ^{1}H-NMR followed with chemometrics analysis. Nine commercial traditional herbal medicines claimed for rheumatic were used as samples as well as allopurinol as the chemical drug standard. Extraction of samples was done by ultrasonicator for 15 min in methanol-d4 containing 0.01% TMSP as an internal standard. Each type of herbal medicine was prepared in three replicates. The phytochemical analysis was done by 500 MHz JEOL NMR. The chemometrics analysis was done using SIMCA software following the ^{1}H NMR spectra processing with MNOVA software. All spectra showed no contamination with allopurinol. The specific signals of allopurinol at aromatic regions were confirmed not present when the spectra were stacked together. Hence, the result of OPLS-DA analysis convinced that the herbs were clearly separated the medicinal herbs into 3 classes. *Jamu* 1 is separated from others showed very high intensity of several signals which may indicate an addition of chemical medicines but not allopurinol. The clear separation of other two groups may corresponds to the similarity of ingredients. These results also showed that most of traditional medicines which produced by small industries, the traditional medicines contain no active pharmaceutical ingredients (allopurinol) indicating a high safety of Indonesia traditional medicines.

Keywords: ^{1}H-NMR, allopurinol, chemometrics, OPLS-DA, traditional medicine

Cytotoxicity of tetrahydropentagamavunon-0 (THPGV)-0 and tetrahydropentagamavunon-1 (THPGV-1) in several cancer cell lines

Muthi Ikawati[1,2], Heri Purwanto[3], Niar Nurul Imaniyyati[3], Anis Afifah[3], Marrita Langgeng Sagiyo[3], Jasson Yohanes[3], Sismindari[1], and Ritmaleni[1,4,*]

[1]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[2]Cancer Chemoprevention Research Center, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[3]Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[4]Curcumin Research Center Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
e-mail: ritmaleni@ugm.ac.id

Tetrahydropentagamavunon-0 (TPGV-0) and Tetrahydropentagamavunon-1 (THPGV-1), are analogs of a curcumin metabolite, tetrahydrocurcumin, and a derivate of Pentagamavunon-0 (PGV-0) and Pentagamavunon-0 (PGV-1), respectively. THPGV-0 and THPGV-1 have been successfully synthesized and are investigated for their anticancer potency. Cytotoxic assays were performed toward several cancer cell lines to determine values of IC_{50}, while the selectivity was also examined by assessing cytotoxicity in Vero normal cell line. THPGV-1 showed highest cytotoxic activity in lymphoma Raji cells, a suspension cell line, with an IC_{50} of 180 μM. Both THPGV-0 and THPGV-1 showed similar potencies in T47D breast cancer cell line with IC_{50} values of 250-270 μM. Regardless their high selectivity, however, cytotoxic activities of THPGV-0 and THPGV-1 were lower compared to PGV-0 and PGV-1 in HeLa cervical, T47D breast, and WiDr colon cancer cell lines. Further study using different types of cancer cell lines and confirmation of cell viability by another assays and apoptosis detection may give more benefit.

Keywords: anticancer, curcumin analog, cytotoxic, tetrahydropentagamavunon-0 (THPGV-0), tetrahydropentagamavunon-1 (THGPV-1)

D2-124

Synthesis of ^{99m}Tc-rutin as potential radiotracer for the development of cancer drugs from flavonoid

Eva Maria Widyasari[1]*, Esty Kusumawardhany[2], Rizky Juwita Sugiharti[1], Maula Eka Sriyani[1], and Muharam Marzuki[2]

[1]Center for Applied Nuclear Science and Technology, Indonesia
[2]Faculty of Pharmacy, Jenderal Ahmad Yani University, Indonesia
e-mail: evamaria@batan.go.id

Rutin is one of the attractive phytochemicals flavonoids because of its antioxidant activities. However, as traditional herbal medicine, its effectiveness is not yet been fully established due to the lack of scientific information. A radiotracer can be defined as a specific radiolabeled molecule that monitors the in vivo behaviour of a functional molecule, and can be used to provide biological information in a living system. Hence, to provide pharmacological information of rutin for cancer treatment, we synthesized radiolabeled flavonoid 99mTc-rutin as radiotracer. The aim of the present study is to develop 99mTc-rutin under varying conditions of rutin quantity, reducing agent concentration and incubation time. Labeling studies were performed by changing the selected parameters one by one and optimum labeling conditions were determined. After observing the conditions for maximum labeling efficiency, 99mTc-rutin was obtained with preparation of 700 µg of rutin with addition of 20 µg of SnCl2.2H2O as reductor and 1-3 mCi 99mTcO4- without any incubation. Radiochemical yield of 99mTc-rutin was determined with radio thin layer chromatography which was found 99,28 ± 0.15% and stable up to 4 hour. From the result of this study, the successfully labeled 99mTc-rutin can be used as a reference for following preclinical study. Furthermore radiolabeled 99mTc-rutin is expected as tools in research and development of rutin as cancer drugs from natural product to obtain detailed information its efficacy.

Keywords: ^{99m}Tc-rutin, cancer, flavonoid, labeled compound, radiotracer

Conjugation of anti-EpCAM antibody on alginate–RIP MJ-30 nanoparticle through carbodiimide reaction as a model of targeted protein therapy

Hilda Ismail*, Ummi Ciptasari, Arief Ikhsan, Fidya Suryani, Sismindari, Ronny Martien, and Agustinus Yuswanto
Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
e-mail: hilda_fa@ugm.ac.id

Ribosome inactivating proteins from *Mirabilis jalapa L.* (RIP MJ) has shown higher cytotoxic activity when being formulated as a nanoparticle. However, the selectivity of the delivery system is also an important aspect when it comes to cytotoxic cell therapy. Epithelial cell adhesion molecule (EpCAM) is a monomeric glycoprotein which is overexpressed in epithelial cancer cells. This study aim was to develop a model of targeted protein delivery system by formulating the base fraction of RIP MJ (RIP MJ30) into alginate nanoparticles and conjugating it with anti-EpCAM antibody. RIP MJ-30 was formulated in to nanoparticle using alginate and $CaCl_2$ as cross-linker. Optimization of volume ratio and pH condition was done into the pH variation of 4.5, 5.5, and 6.5. The success of conjugation was analyzed qualitatively using native polyacrylamide gel electrophoresis (native-PAGE) method and BCA assay. The optimum formula of RIP MJ-30 nanoparticles was produced using 0,3 % alginate and 0,2 % $CaCl_2$. Results indicated that optimum conjugation reaction was carried out at pH level of 5.5. The optimum native-PAGE condition was by using 8 % polyacrylamide gel in duration of 6 h. Characterization of nanoparticle resulted in particle size of 205.0 nm, zeta potential of -6.9mV, entrapment efficiency of (71.11 ± 4.84) %, and conjugation efficiency of (89.55 ± 6.18) %. It was concluded that RIP MJ-30 was successfully formulated into alginate nanoparticle and conjugated to anti-EpCAM antibody through carbodiimide reaction using 1-ethyl-(dimethylprophilamine) carbodiimide (EDAC).

Keywords: *Mirabilis jalapa*, alginate, anti-EpCAM, bio-conjugation, EDAC, nanoparticle

D2-081

Genome mining of anticancer-producing *Streptomyces* sp. GMY01 isolated from marine sample of Indonesia for new bioactive compounds

Camelia Herdini[1], Sofia Mubarika[1], Bambang Hariwiyanto[1], Nastiti Wijayanti[1], Akira Hosoyama[2], Atsushi Yamazoe[2], Hideaki Nojiri[3], and Jaka Widada[4,5,*]

[1]Graduate School of Biotechnology, Universitas Gadjah Mada, Indonesia
[2]Biological Resource Center, National Institute of Technology and Evaluation, Japan
[3]Biotechnology Research Center, The University of Tokyo, Japan
[4]Department of Agricultural Microbiology, Universitas Gadjah Mada, Indonesia
[5]Center of Frontier for Microbial Technology, Universitas Gadjah Mada, Indonesia
e-mail: jwidada@ugm.ac.id

Although many pharmaceutical companies now conduct drug discovery using computer modeling, traditionally, antibiotics were discovered by screening. In this approach, a large number of isolates of antibiotic-producing microorganisms likely derived from nature in pure culture, and these isolates than testes for the production of antibiotics. Genus of *Streptomycetes* is the most important bacterial producers of bioactive secondary metabolites such as antibiotics or cytostatics. In general, the selection of antibiotic-producing *Streptomyces* were performed using antagonists to test a number of microbial pathogens so that only strains that have the ability to inhibit forwarded for further investigation, while strains who do not have the ability discarded. For us, also it was interesting to explore further *Streptomyces* strains that do not produce an antifungal compound, in producing new bioactive compounds such as anticancer and anti-inflammatory. Our hypothesis the bioactive compounds produced from these strains may be safe when the compounds are developed as a drug, because the low cytotoxic activity against non-target cells. *Streptomyces* sp. GMY01 is a strain that produce anticancer and does not produce antifungal compound. Whole genome sequence analysis of GMY01 showed that 28 biosynthetic gene clusters for secondary metabolites were identified by antiSMASH 3.0 namely: 2 siderophores, 4 terpenes, 1 bacteriocins, 1 bacteriocins-NRPS, 1 bacteriocins-lantipeptide, 2 lantipeptide, 1 lantipeptide-NRPS, 1type-1 polyketide synthases [T1-PKS], 1 T2-PKS, 1 T3-PKS, 6 nonribosomal peptide synthetase [NRPS], 2 butyrolactones, 1 ectoine, 1 T1-PKS-butyrolacton-NRPS hybrid, 1 NRPS-T1-PKS hybrid, 1 otherKS-T1-PKS hybrid, and 1 other cluster.

Keywords: K *Streptomyces*, anticancer, genome sequence, secondary metabolites antiSMASH 3.0

iCOX2: An open source and offline graphical-user-interface application to identify cyclooxygenase-2 inhibitors

Enade Perdana Istyastono[1]*, Nunung Yuniarti[2], and Puspaningtyas Sanjoyo Adi[3]
[1]Faculty of Pharmacy, Sanata Dharma University, Indonesia
[2]Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[3]Department of Informatics Engineering, Faculty of Science and Technology, Sanata Dharma University, Indonesia
e-mail: enade@usd.ac.id

Very recently, in silico test protocols to identify marginal and potent inhibitors for cyclooxygenase-2 (COX-2) enzyme have been validated and published. In this article, the development of a graphical-user-interface (GUI) application to identify COX-2 inhibitors based on those protocols is presented. Together with the validated protocols, this open source and offline application is mainly powered by BKChem 0.13.0 to synthesize the test compound in silico and Zenity 3.18.1.1 to display GUI dialogs of the process and the output. The development and alpha-test of the GUI application were performed under LinuxMint 18.3, a GNU/Linux desktop distribution. The alpha tests were performed by subsequently employing the GUI application to test resveratrol, an active compound mainly found in red wine. The results showed that the GUI application worked perfectly and predicted the activity of resveratrol as a marginal inhibitor for COX-2.

Keywords: application, cyclooxygenase-2, graphical-user-interface, in silico test, open source

D3-795

Effect of red onion (*Allium cepa var ascalonicum*) skin extract on the motility and the adhesion index of *Pseudomonas aeruginosa* and macrophage phagocytosis index

Irma Prasety Ayu Nugraheni[1], Derana Widyastika[1], Sofia Maulida[1], Heni Susilowati[1], and Alma Linggar Jonarta[2]*

[1]Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
[2]Department of Oral Biology, Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
e-mail: almajonarta@ugm.ac.id

Red onion (*Allium cepa var ascalonicum*) skin contains various ingredients as antibacterial, antiinflammatory and immunomodulatory agents. The oral mucosa epithelium is the first barrier to the bacterial invasion, which is then taken over by macrophages in the deeper tissues. *Pseudomonas aeruginosa* found in the oral cavity is commensal bacteria which may be turned into an opportunistic pathogen and cause nosocomial infections. The purpose of this study was to determine the effect of red-onionskin extract towards *P. aeruginosa* ATCC 9027 on swarming motility and adhesion ability onto buccal epithelial cells, furthermore, to know the effect on the macrophage phagocytosis. The research was conducted into three parts of experiment using red-onion skin extract. Swarming motility test for the extract induced-bacteria was carried out on semi-solid media, stained using 0.1 % crystal violet, then measured the radial length of bacterial movement. The bacterial adhesion index, i.e. the number of the extract induced bacteria attached to buccal cells per 20 buccal cells, was calculated after incubated for two hours and stained with Gram stain. The ability of phagocytosis was shown by the extract induced-mouse peritoneal macrophages, then the phagocytosed bacteria were counted after Giemsa staining. Statistical test results from the three experiments showed significant differences between the test groups compared to the control groups (p<0.05). In conclusion, this study indicates that red-onion-skin extract has the potential to reduce swarming motility, as well as prevents bacterial adhesion to bucal epithelial cells, and moreover, increases the ability of macrophages phagocytosis to these bacteria.

Keywords: *Pseudomonas aeruginosa* ATCC 9027, adhesion index, macrophage phagocytosis index, red onion skin extract, swarming motility

Efficacy of thymol and eugenol against polymicrobial biofilm

Hasyrul Hamzah[1], Sylvia Utami Tunjung Pratiwi[2,3], and Triana Hertiani[2,3,*]

[1]Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[2]Department of Pharmaceutical Biology, Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
[3]Center for Natural Antiinfective Research (CNAIR), Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia
e-mail: hertiani@ugm.ac.id

Biofilms associated with human infection have high levels of pathogenicity due to their resistance to antibiotics. The discovery of an active antibiofilm agent against polymicrobial biofilms is a necessary consequence for coping with biofilm-related infections. Thymol and eugenol are essential oils that have potential as antibacterial and antifungal. This study aimed to determine the effectiveness of thymol and eugenol inhibits *C. albicans-P. aeruginosa-E. coli-S. aureus* and polymicrobial biofilm. Biofilm formation inhibition assay and biofilm degradation assay of thymol and eugenol were determined using microtiter broth method. The antibiofilm efficacy of thymol and eugenol towards polymicrobial biofilms were analyzed by calculating minimum biofilm inhibitor concentration ($MBIC_{50}$) and minimum biofilm eradication concentration ($MBEC_{50}$) values. The data were analyzed using Statistical Package for the Social Sciences (SPSS) with 95 % confidence level. Thymol and eugenol showed inhibitory activity against the formation of mono and polymicrobial biofilms of the microbial tested. The result also demonstrated an evidence of activity of thymol and eugenol in breaking down mono and polymicrobial biofilm. Therefore, thymol and eugenol serves as a potential source for new antibiofilm drugs towards polymicrobial biofilm.

Keywords: eugenol, $MBEC_{50}$, $MBIC_{50}$, polymicrobial biofilm, thymol

D3-023

Inhibitory activity of *Sargassum hystrix* extract and its methanolic fractions on inhibiting α-glucosidase activity

Wirdatul Auliya Azizi, Nurfitri Ekantari, and Amir Husni*
Department of Fisheries Faculty of Agriculture Universitas Gadjah Mada, Indonesia
e-mail: a-husni@ugm.ac.id

Seaweed has a great potential in the pharmaceutical field, one of them as antidiabetic. The research aimed to isolate and test of antidiabetic activity in methanol fraction of seaweed extract *Sargassum hystrix* and its methanol fraction on inhibiting the α-glucosidase. *S. hystrix* was extracted using methanol, then partition edusing chloroform, ethyl acetate, and methanol. Methanol fraction then separated by column chromatography to obtain the morepure compound. The crude extract, the partitioned methanol fraction, and the column chromatography fraction were tested for its activity on inhibiting the α-glucosidase. The compounds of active fraction were analyzed using gas chromatography-mass spectrometry (GC-MS). The inhibitory activity (IC_{50}) of the crude extracts and the partitioned methanol fraction were (0.347 ± 0.052) mg . mL^{-1} and (0.019 ± 0.001) mg . mL^{-1}. The column chromatography fractions that had an inhibitory activity to α-glucosidase were M2 (23.46 ± 1.63) %, M3 (30.88 ± 4.53) %, M4 (73.64 ± 3.47) %, and M7 (53.48 ± 1.56) %. The analysis of GC-MS showed that the suspected compound which had inhibiting α-glucosidase in methanol fraction were 9-octadecenoic acid, 1-heptadecane carboxylic acid, 9,12-octadecadienoic acid (Z, Z), and octadecanoic acid methyl ester.

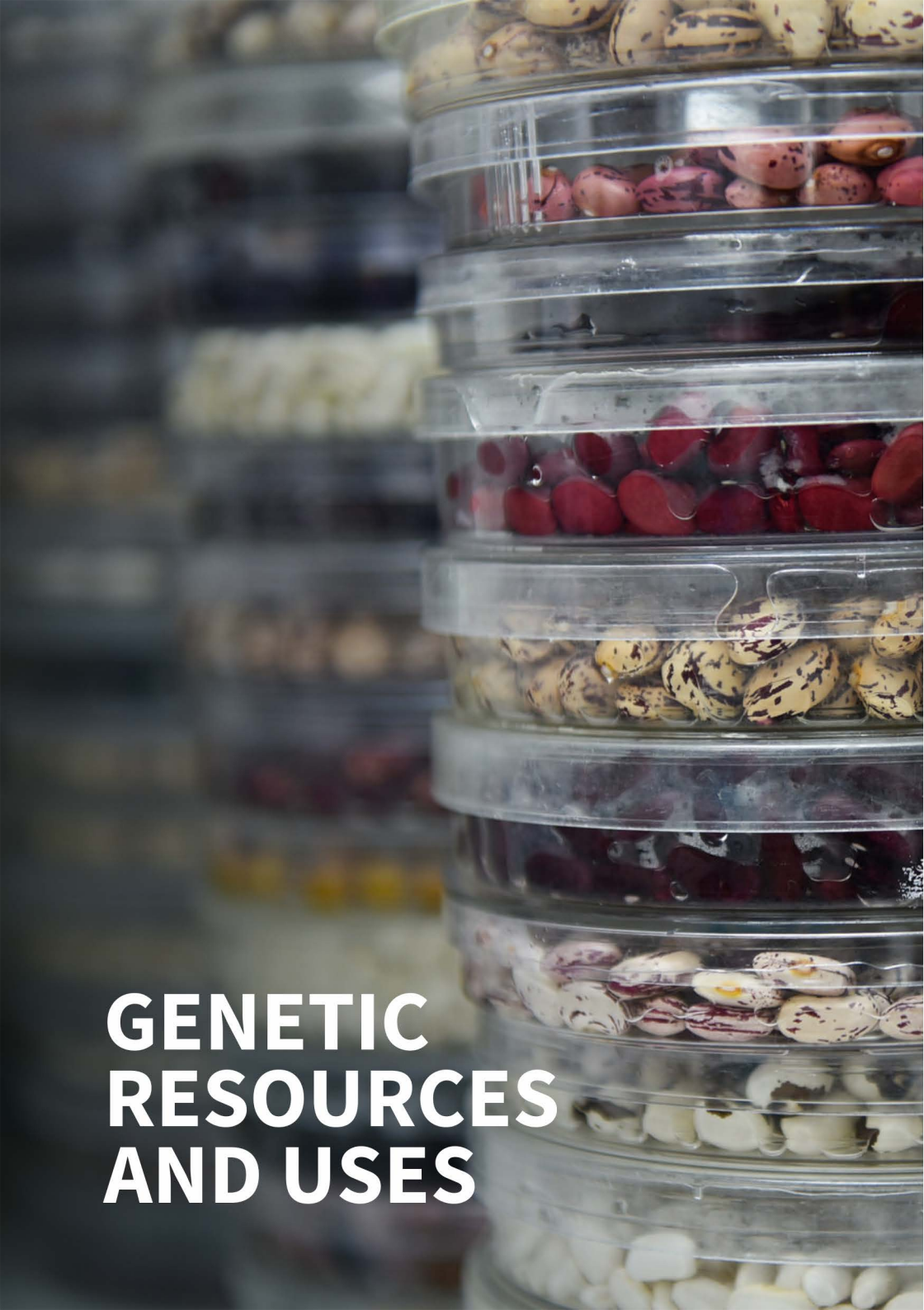
Keywords: *Sargassum hystrix,* α-glucosidase, fraction, inhibitory activity, methanol

Inhibitory effect of ethanol extract of Soursop (*Annona muricata*) leaf on acid production and adhesion of *Streptococcus mutans* ATCC 25175

Friska Ani Rahman
Dental Hygiene Program, Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
e-mail: friska_ani@ugm.ac.id

Dental caries and dental plaque are among the most common global oral health problems. The early stage of dental caries is characterized by a destruction of superficial dental structures caused by acids which are by-products of carbohydrate metabolism by a cariogenic bacterium. One of a cariogenic bacterium is *Streptococcus mutans*. *Annona muricata* is traditionally used as an herbal remedy for various diseases and has been identified in a previous study as an antimicrobial agent. Soursop leaf extracted by maceration using 70 % ethanol solvent. The extracts obtained were tested at various concentrations. To examine the effect of ethanol extract of Soursop on acid production by *S. mutans*, the pH of the culture was determined using a pH meter. Inhibition of adhesion of *S. mutans* to the saliva-coated hydroxyapatite (S-HA) discs was quantified using colony counting on TYS20B agar plates. The pH of *S. mutans* cultures in the presence of ethanol extract of Soursop leaf at various concentrations was higher than negative control, but there were no differences in pH value between the various concentration of ethanol extract of Soursop leaf. Adhesion of *S. mutans* to S-HA discs was inhibited by various concentrations of ethanol extract of Soursop leaf. Adhesion decreased with increasing concentrations of ethanol extract of Soursop leaf, but there were not significantly different in colony count between the various concentration of ethanol extract of Soursop leaf. Ethanol extract of Soursop leaf attenuates the acid production and adhesion of *S. mutans* to hydroxyapatite discs. These results suggest that ethanol extract of Soursop leaf is a promising naturally occurring agent for the treatment of dental caries.

Keywords: *Annona muricata*, *Streptococcus mutans*, acid production, adhesion, inhibitory effect



GENETIC RESOURCES AND USES

I1-653

Morphological and molecular characterization of 5 accessions of *Camellia sinensis* (L.) O. Kuntze exploited to develop high quality and quantity yield

Nafila Alifia Azka[1,*], Hani Widhianata[1], and Taryono[1,2]
[1]Faculty of Agriculture, Universitas Gadjah Mada, Indonesia
[2]Agrotechnology Innovation Centre, Universitas Gadjah Mada, Indonesia
e-mail: nafilaaa96@yahoo.co.id

Tea is a cross-pollinated and self-incompatible plant, consequently it has very high genetic diversity. This research was aimed to estimate the variability of morphological and molecular characteristics of five accessions which exploited to develop high quality and quantity yield at PT Pagilaran and compare the efficiency and accuracy of the use of morphological and molecular markers in tea characterization. The acessions consists of three Assamica tea clones (TRI 2025, Cinyiruan 143, and Kiara 8), and two Sinensis tea clones (Tambi and Tambi Jingga). Morphological observation includes leaf length, leaf width, stalk length, total pekoe, leaf fresh weight, stalk fresh weight, pekoe fresh weight, leaf dry weight, stalk dry weight, and pekoe dry weight, while the molecular observation was performed using SSR markers. Morphological data were analyzed using 5 % ANOVA with Tukey-Kramer test and PCA Biplot using SAS 9.4 and R software, whereas the molecular binary data were analyzed using the GenAlEx 6 software to estimate variance components, percentage of polymorphism, and total number of alleles and specific loci. Dendogram was created using Cluster program in SAS 9.4. The results showed that molecular characterization provide SSR markers are more effective for putative genetic markers characterization and every clones has its own morphological and SSR putative markers.

Keywords: *Camellia sinensis*, morphology, putative genetic marker, simple sequence repeats, tea

Characterization of Indonesian pigmented rice (*Oryza sativa* L.) based on morphology and SNPs (single nucleotide polymorphisms)

Nur Siti Kurniasih[1], Ratna Susandarini[1], Febri Adi Susanto[2], Tri Rini Nuringtyas[1,2], Glyn Jenkins[3], and Yekti Asih Purwestri[1,2,*]

[1]Department of Tropical Biology, Faculty of Biology, Universitas Gadjah Mada, Indonesia
[2]Research Center for Biotechnology, Universitas Gadjah Mada, Indonesia
[3]Institute of Biological, Environmental, and Rural Sciences (IBERS), Aberystwyth University, United Kingdom
e-mail: yekti@ugm.ac.id

Indonesia has many cultivars of pigmented rice, but many variants have not been characterized using morphological characters and molecular markers. SNPs (Single Nucleotide polymorphisms) have been used in previous studies to identify the Indica and Japonica subspecies. Characterization of Indica and Japonica subspecies is useful information for rice breeders, especially to generate the strong hybrid vigor. The aims of this study are to examine the morphological and molecular characteristics of Indonesian pigmented rice based on five SNPs markers. Morphological characters are used to determine the relationship between cultivars using cluster analysis. The SNP markers were amplified by PCR, sequenced and compared with sequences in the Gene Bank. Based on morphological characters, ten cultivars divide into two clusters. SNPs distinguish Indica and Japonica subspecies, and show that *Hitam Lampung, Aek Sibundong, Melik, Hitam Toraja, Merah Kalimantan*, and *Merah Sumbawa* belong to the Indica subspecies, and *Cempo Ireng* and *Pare Eja* belong to Japonica. *Abang Segreng* and *Hitam Toraja* could not be clearly assigned to either the Indica or Japonica subspecies.

Keywords: *Oryza sativa L.,* molecular characterization, morphological characterization, pigmented rice, SNP markers

I2-889

Vegetative characterization to identify oil palm (*Elaeis Guineensis* Jacq.) plantlet abnormalities

Ernayunita, Hernawan Rahmadi, Yurna Yenni, Retno Diah Setiowati, and Iman Yani Harahap
Indonesian Oil Palm Research Institute, Indonesia
e-mail: ernayunita_25@yahoo.com

Oil palm clone propagation is still hindered by flowering abnormality due to somaclonal variation. Characterization was done at each plantlet, ramet, and pre nursery phase. CRD was used in this study and different type of plantlet was used as treatment with 10 replicates. The result show that there were 11 different abnormality observed from plantlet until pre nursery. Viability rate of normal plantlet can reach up to 80 %, while viability rate of erect plantlet, rosette, curved plantlet, wide internodes plantlet were less than 50 %, but plantlet with less than 4 leaves was 66.67 %. Other abnormalities were fatal at acclimatization and ramet phase.

Keywords: *Elaeis guineensis,* abnormality identification, clone propagation, oil palm, plantlet, somaclonal

Morphological characters identification at early vegetative stage of 40 cassava (*Manihot esculenta* Crantz) accessions

R.A. Wulandari, T. Harjaka, R.H. Murti, A.D. Kurniasih, D. Kurniawati, and L. Ariansyah
Faculty of Agriculture, Universitas Gadjah Mada, Indonesia
e-mail: rani.akyun@gmail.com

Production of cassava in Indonesia descreased from 2011 to 2015. One reason is the limited variety of high yielding clones. The character that needs to be developed is high productivity levels of starch, and low levels of hydrogen cyanide (HCN). Efforts that need to be done is breeding program of with high genetic plant diversity. The aim of this research was to identify and know the diversity of morphological character among 40 cassava accessions. Research was carried out at Mei 2017 until August 2017 in Donokerto, Turi, Sleman, Yogyakarta with a Randomized Complete Block Design (RCBD) with 40 accessions as treatment and three blocks as the replication. The qualitative characters such as branching type, stem colour, leaf colour, shoot colour, and quantitative characters were number of lobe, lobe length, lobe width, petiole length, plant height, and stem diameter. The research results indicated that branching type have three different type, they were erect, dichotomous, and trichotomous. Stem colour was differ to three colour, were silver, dark-brown, and light-brown. Leaf colour four month after planting were light-green and dark-green. Shoot colour showed light-green, purplish-green, and purple. The result showed that Menthik putih have the longest petiole (38.83 cm), Madiun and Jari Hijau were the shortest one (27.43 cm). Smallest lobe width represented by Jari Ungu (2.4 cm), and Pandemen accession showed the widest one (6.92 cm). The shortest plant height represented by Jari Ungu (100.90 cm), and the tallest one was owned by Peking (212.67 cm) and Wilis (213.5). Jari Ungu was the smallest stem diameter (16.34 mm), and the widest were represented by Tangkai Merah Pekat (36.77 mm).

Keywords: *Manihot esculenta,* cassava, breeding program, morphological, vegetative stage

I3-210

Coconut (*Cocos nucifera* L.) diversity in Indonesia based on SSR molecular marker

Weda Makarti Mahayu[1,2,*] and Taryono[1,3]
[1]Faculty of Agriculture, Universitas Gadjah Mada, Indonesia
[2]Indonesian Palm Crops Research Institute, Indonesia
[3]Agrotechnology Innovation Centre, Universitas Gadjah Mada, Indonesia
e-mail: wedamakartimahayu@gmail.com, tariono60@gmail.com

Coconut plant known as “tree of life” because it has important rules in many aspects in people’s life and full of benefits. Indonesia has been known as coconut centre of origin, therefore there will be high diversity of coconut in this nation. The objectives of this study are to determine the diversity and similarity of Dwarf coconut germplasm that is part of coconut collection at IPCRI (Indonesian Plam Crops Reserach Institute). This research conducted at Mapanget Experimental Garden, IPCRI and Laboratory of Plant Breeding and Genetics, Faculty of Agriculture, Universitas Gadjah Mada (UGM) by survey method. Plant materials used in this research consists of eight Tall coconut varieties and two Dwarf coconut varieties. The results showed that the highest heterozygosity found in the Bali Tall (BAT) population, while the lowest was in the population of Bali Yellow Dwarf (BYD). Shannon diversity index analysis showed that individual heterogeneity values in each populations was low. The closest similarity relationship found between the Sweet Green Dwarf (SGD) and BAT population. The widest genetic distance was observed between the population of BYD and Nias Yellow Dwarf (NYD). The genetic similarity coefficients of 122 individual coconut plants from 10 populations observed on the pattern of DNA bands amplified using 10 SSR markers (109 loci, 1378 bands) ranged from 0.2 to 1. Individuals from 10 observed coconut populations were divided into six main groups (A, B, C, D, E and F) on the genetic similarity coefficient of 0.25. Each groups consists of 19, 10, 64, 15, 7 and 12 individuals. Individuals with high genetic diversity and located at different clusters may be useful as parent candidates in the future coconut breeding programs.

Keywords: *Cocos nucifera,* coconut, diversity, genetic distance, heterozygosity, SSR

Phylogenetic and variants analysis of LCR HPV-58 in cervical cancer patients from Dr. Hasan Sadikin General Hospital Bandung, Indonesia

Ika Agus Rini[1], Siska Telly Pratiwi[2,3], Gita Widya Pradini[1,4], Edhyana Sahiratmadja[1,5], and Herman Susanto[1,6]

[1]Center for the Study of Oncology, Faculty of Medicine Universitas Padjadjaran, Indonesia
[2]Graduate School of Biomedical Science Master Program, Faculty of Medicine, Universitas Padjadjaran, Indonesia
[3]Department of Microbiology, Faculty of Medicine Universitas Jenderal Achmad Yani, Indonesia
[4]Department of Microbiology and Parasitology, Faculty of Medicine Universitas Padjadjaran, Indonesia
[5]Department of Biochemistry and Molecular Biology, Faculty of Medicine Universitas Padjadjaran, Indonesia
[6]Department of Obstetrics and Gynecology, Dr. Hasan Sadikin General Hospital, Indonesia
e-mail: e.sahiratmadja@unpad.ac.id

Cervical cancer is the second most common cancer found in women worldwide. Long Control Region (LCR) human papillomavirus (HPV) is a genomic segment located between L1 and E6, which contains a large number of cis-responsive elements that regulate HPV virus replication and transcription. In this study, variation and phylogenetic analysis were performed on LCR sequences from cervical cancer patients recruited in Dr. Hasan Sadikin General Hospital, Bandung-Indonesia. Result showed that A7714G was the most frequent mutations found in LCR sequences, next to several other new mutations i.e.T7786C. The new mutations in LCR, region that control the virus replication, may play a role in severity of cervical cancer, and thus warrant further study.

Keywords: human papillomavirus (HPV), HPV-58, long control region (LCR), cervical cancer, phylogenetic analysis

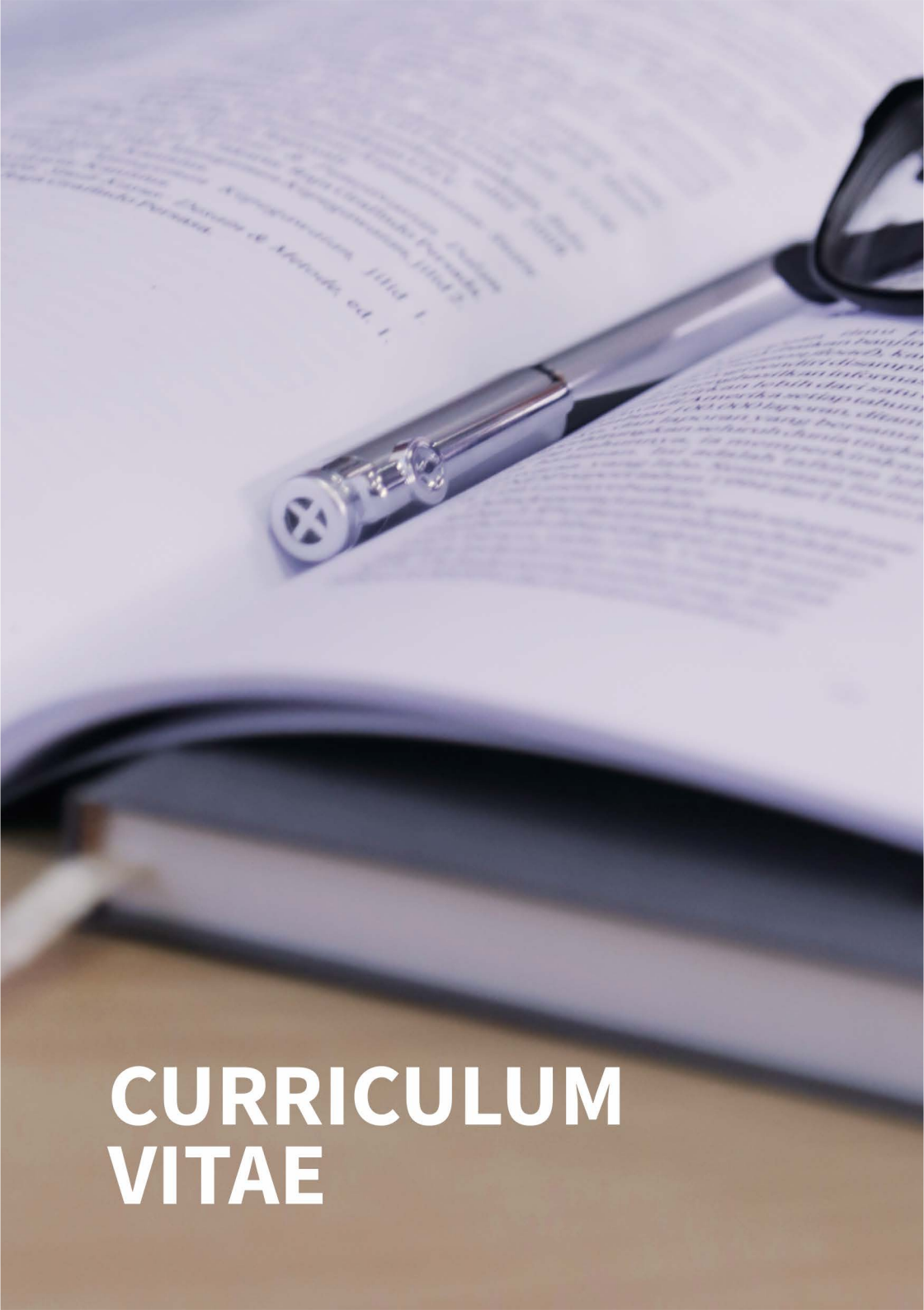
I3-136

Saccharomyces cerevisiae B18 as antifungal and aflatoxin binder *in vitro*

L. Istiqomah[1], E. Damayanti[1], D. Arisnandhy[2], F.M.C. Sigit Setyabudi[3], and M. Anwar[1]
[1]Research Unit for Natural Products Technology, Indonesian Institute of Sciences, Indonesia
[2]Faculty of Mathematics and Science, Universitas Jendral Soedirman, Indonesia
[3]Faculty of Agricultural Technology, Universitas Gadjah Mada, Indonesia
e-mail: lusty.istiqomah@gmail.com

Determining the ability of yeast as antifungal and aflatoxin binder *in vitro* was performed in this study. The antifungal assay was performed using overlay method and mycelial growth inhibition method, while binding aflatoxin activity was conducted by microtiter plate method. The results showed that the isolates of yeast with anti-fungal activity against *Aspergillus flavus* FNCC 6002, *A. paraciticus* FNCC 6033, and *Penicilium citrinum* FNCC 6111 was B18 isolate derived from Javanese duck (*Anas javanicus*) colon with the highest percentage of inhibition of 71.83 %. The aflatoxin binding assay showed that viable yeast B18 produced higher aflatoxin binding (71.86 %) than non-viable yeast (69.52 %) during 48 h of incubation. Molecular assay results based on genetically partial analysis on region D1/D2 Large Sub Unit (LSU) ribosomal DNA found that isolates of B18 yeast were identified as *Saccharomyces cerevisiae*. It can be concluded that *S. cerevisiae* B18 had antifungal and binding aflatoxin activity *in vitro*.

Keywords: *Saccharomyces cerevisiae, aspergillus flavus,* aflatoxin binder, antifungal, javanese duck



CURRICULUM VITAE

Dietmar Haltrich
Universität für Bodenkultur Wien
Austria

E-mail dietmar.haltrich@boku.ac.at

Field of interest

- Structure and function of flavin-containing oxidoreductases with focus on carbohydrate oxidases and dehydrogenases
- ß-galactosidases from lactobacilli
- Enzyme engineering
- Application of enzymes for bio catalysis and biosensors
- Gene expression in lactobacilli

Education

1988 Dipl. Ing. (equivalent to Master), University of Technology Graz, Institute of Biotechnology
1993 Dr. techn., University of Technology Graz, Institute of Biotechnology
2001 Habilitation in Biotechnology & Microbial Physiology, BOKU-University of Natural Resources and Life Sciences

Research projects

- Recreation of ancestral members of the GMC family of FAD-dependent oxidoreductases', project within the Doctoral Programme – plus Biomolecular Technology of Proteins (BioToP, http://biotop.boku.ac.at/) funded by the Austrian Science Fund FWF
- 'Tailoring of Pyranose Oxidase from Trametes multicolor for Its Application in Fuel Cells', Austrian Science Fund FWF Translational Project L213–B11
- 'Biocatalytic Synthesis of Prebiotics for Food and Feed', project within the Competence Centre on Applied Biocatalysis, funded by the Austrian Research Promotion Agency FFG
- 'Three-Dimensional Nanobio-Structure Based Self-contained Devices for Biomedical Applications', European Commission, FP7-NMP-2008-SMALL-2
- 'Enzyme Technology for the Sustainable Production of Health-Related Prebiotic Sugars', European Commission AUNP Project ASE/b7-301/1997/0178/13

Eni Harmayani
Universitas Gadjah Mada
Indonesia

E-mail eniharmayani@ugm.ac.id

Field of interest

- Food Security
- Food Microbiology
- Food Safety Functional
- Food Product Development
- Woman Empowerment

Education

- Agricultural Product Processing, Universitas Gadjah Mada
- Food Science and Human Nutrition, Colorado State University Fort Collins, USA
- Food Science and Human Nutrition, Colorado State University Fort Collins, USA

Awards

2005 Winner of Innovative Research Award (Gadjah Mada University)
2009 Winner of Indonesian Institute of Food Technologists (PATPI) Award on Best Paper for International Publication
2012 Winner of "Anugerah Pangan Nusantara" (National Food Security Award, Category: researcher), awarded by President of Republic Indonesia

Research projects

- Goat Milk Kefir Supplemented with Porang Glucomannan Improves Lipid Profile and Haematological Parameter in Rat Fed High Fat and High Fructose Diet. [2018]. Nurliyani; Prof. Dr. Ir. Eni Harmayani, M.Sc.; Dr. Dra. Sunarti, M.Kes.
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Ferry Sandra

Trisakti University
Indonesia

E-mail ferrysandra@gmail.com

Field of Interest

- Pathology
- Molecular Biology, Biochemistry
- Oral and Maxillofacial Surgery

Education

1991 Faculty of Dentistry, University of Indonesia, Indonesia
1998 Doctor of Phylosophy, Kyushu University, Japan
2010 Postdoctoral fellow, Harvard Medical School, USA

Work

2011–present Scientific Consultant, Prodia
2009–present Lecturer, Research Board of Dentistry Faculty, Ethics Comission of Dentistry Faculty, University of Trisakti
2006–2011 Senior Advisor and Director, Kalbe Farma
2005–2006 Head of Laboratory, Institute of Human Virology and Cancer Biology, University of Indonesia

Publications and scientific activities

- Author of 117 papers, (>1885 citations, h-index of 24 from Google Scholar, h-index 18 from Scopus), Speaker in 200 Seminars.
- Editor in 4 International Journal
- Advisor of 29 college students in master and doctoral program
- Chairman of the Council in Indonesian Society for Cancer Chemoprevention (ISSC)
- Vice President in Asian Cellular Theraphy Organization (ACTO)
- Vice President in the Indonesian Association for the Study of Medicinals (IASMED)

Glenn Pardede

PT East West Seed Indonesia (EWINDO)
Indonesia

E-mail glennpardede@panahmerah.id

Field of Interest

- Mechanical engineering and energy
- Thermal and Fluid Science
- Nuclear safety research

Education

1989 Undergraduate degree, Civil Engineering Universitas Indonesia
1998 Master degree, IPMI-Monash University

Work

2000	EWINDO Seed Operations Director
2011–present	EWINDO President Director
2011–-present	Chairman of Indonesian Flower Association (ASBINDO)
2011–present	Deputy of Horticulture Committee at Indonesia Chamber & Trade (KADIN)
2011–present	Deputy of Horticulture department at Indonesia Employers Association (APINDO)

Irfan Dwidya Prijambada

Universitas Gadjah Mada
Indonesia

E-mail irfan_prijambada@mail.ugm.ac.id

Field of interest

- Soil Biotechnology
- Ecology
- Microbiology

Education

1986 Bachelor degree of agriculture in Faculty of Agriculture, Universitas Gadjah Mada,Yogyakarta, Indonesia

1987 Postgraduate Course by UNESCO in the field of Microbiology carried out in the Department of Fermentation Technology, Fac. Engineering, Osaka University, Osaka, Japan

1992 Master of Engineering, Dept. of Fermentation Technology, Fac. of Engineering, Osaka University, Osaka, Japan

1996 Philosophical Doctor of Engineering, Dept of Fermentation Technology, Fac. of Engineering, Osaka University, Osaka, Japan

Research activities

- Main researcher on the Research Project on "Ecological Pollution of Oil-Polluted Mud Soils" funded by the Directorate of Higher Education, Ministry of National Education through Competitive Research Grants 1999–2001
- Guest researcher at the College of Agriculture, Ibaraki University, Ibaraki, Japan, October–December 2009 with the theme of the research "Identification of Biodiversity of Nitrogen-Staining Bacteria from Various Land Use in Southern Sumatra"
- Guest researcher at Fac. of Agriculture, Ibaraki University, Japan for research collaboration with Prof. Hiroyuki Ohta about the "Comparison of Pioneer Microbes in Mt Merapi, Yogyakarta, Indonesia and Mt Miyakojima, Issues, Japan" on August 20–26, 2013
- Research collaboration with Prof. Sachiko Takahi on "Use of Sweet Sorghum for Phytoremediation of Mercury Contaminated Soil" funded by JSPS-KAKENHI Grant fiscal year 2011–2013 no 22402004

Jun-Ya Kato

Nara Institute of Science and Technology
Japan

E-mail jkata@bs.naist.jp

Education

1983 Kyoto University, B.S. Biological Science
1985 Kyoto University, M.S. Biophysics
1988 Kyoto University, Ph.D. Biophysics

Publications

- Yoshida A, Yoneda-Kato N, Kato JY. CSN5 specifically interacts with CDK2 and controls senescence in a cytoplasmic cyclin E-mediated manner. Sci Rep. 2013;3:1054.
- Kato JY. and Yoneda-Kato N. New twist in the regulation of cyclin D1. BioMolecular Concepts. 1, 403–409, 2010
- Kato JY, and Yoneda-Kato N. Mammalian COP9 signalosome. (Review) Genes to Cells 14: 1209–25, 2009
- Yoneda-Kato, N., Kato, J.Y. Shuttling imbalance of MLF1 results in p53 instability and increases susceptibility to oncogenic transformation. Mol Cell Biol. 28: 422–434, 2008
- Mori M, Yoneda-Kato N, Yoshida A, Kato JY. Stable form of Jab1 enhances proliferation and maintenance of hematopoietic progenitors. J. Biol. Chem., 283: 29011–29021, 2008
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Maarten van Zonneveld
AVRDC-The World Vegetable Center
Taiwan

E-mail maarten.vanzonneveld@worldveg.org
mvzonneveld@gmail.com

Field of interest

- Conservation and sustainable use of plant genetic resources
- Geographic patterns of crop diversity and plant domestication
- Crop and diet diversification in food systems

Education

2005 MSc in Forest and Nature Conservation. Wageningen University, the Netherlands
2013 PhD in Applied Biological Sciences. Ghent University, Belgium

Research projects

- Coordinator of LAFORGEN, the Latin American Forest Genetic Resources Network
- Activity leader to strengthen two genebank collections of chili peppers in their primary center of diversity with five partners supported of GIZ 11
- Leader of project on agroecology for climate-resilient coffee in Central America with seven partners supported by Hivos and CCAFS

Masahiko Hatano
Chiba University
Japan

E-mail hatanom@faculty.chiba-u.jp

Field of interest

- Imunology
- Pharmacology
- Oncology

Education

1982 Undergraduate student, Chiba University School of Medicine, MD

1988 Research student, Department of Immunology, Chiba University School of Medicine

Professional activities

2007–present Professor, Department of Biomedical Science, Graduate School of Medicine, Chiba University

2015–present Director, Biomedical Research Center, Chiba University

Research projects

- Ogasawara T, Hatano M, Satake H, Ikari J, Taniguchi T, Tsuruoka N, Watanabe-Takano H, Fujimura L, Sakamoto A, Hirata H, Sugiyama K, Fukushima Y, Nakae S, Matsumoto K, Saito H, Fukuda T, Kurasawa K, Tatsumi K, Tokuhisa T, Arima M. Development of chronic allergic responses by dampening Bcl6-mediated suppressor activity in memory T helper 2 cells. Proc Natl Acad Sci U S A. 2017; 114:E741–E750.
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Mitsunori Kirihata
Osaka Prefecture University
Japan

E-mail kirihata@biochem.osakafu-u.ac.jp

Field of interest

- Medicinal Chemistry of Boron Drug for Boron Neutron Capture Therapy (BNCT)
- Organic Chemistry
- Bioorganic Chemistry
- Chemical Biology
- Peptide Chemistry

Education

1970 Tokyo University of Agriculture, Department of Agricultural Chemistry, BS
1972 Researcher of Institute of Chemistry, Kyoto University
1974 Master Course of Graduate School, Agricultural Chemistry, OPU.
1978 Doctor Course of Graduate School, Osaka Prefecture University (OPU) Ph.D.

Research Projects

- "Development and elucidation of a novel fluorescent boron-sensor for the analysis of boronic acid-containing compounds" Y. Hattori, T. Ogaki, M. Ishimura, Y. Ohta, M. Kirihata, Sensors (Switzerland), 2017; 17(10), 2436.
- "Practical calculation method to estimate the absolute boron concentration in tissues using 18F-FBPA PET" T. Watabe, K. Hanaoka, S. Naka, Y. Kanai, H. Ikeda, M. Aoki, E. Shimosegawa, M. Kirihata, J. Hatazawa, Annals of Nuclear Medicine, 2017; 31(6): 481–485.
- "Evaluation of a novel sodium borocaptate-containing unusual amino acid as a boron delivery agent for neutron therapy on the F98 rat glioma" G. Futamura, S. Kawabata,N. Nonoguchi, R. Hiramatsu, T. Toho, H. Tanaka, S. Masunaga, Y. Hattori, M. Kirihata, K. Ono, T. Kuroiwa, M. Miyatake, Radiat-Oncol. 2017; 12(1):26.

Awards

2nd Yutaka Mishima Chemical Award, 2016, awarded by the Japan Society Neutron Capture Therapy

Montarop Yamabhai

Suranaree University of Technology
Thailand

E-mail montarop@g.sut.ac.th

Field of interest

- Biotechnology
- Molecular recognition
- Recombinant proteins production & purification

Education

1989	B.Sc. (Hon), Mahidol University, Bangkok, Thailand
1987	Ph.D., University of North Carolina, Chapel Hill, NC, USA
2000–2002	Postdoctoral Fellows, University of Texas Southwestern Medical Center, Dallas, TX, USA
2003–2004	Humboldt Fellows, Max Planck Institute for Molecular Biology and Genetics, Dresden, Germany

Awards

2008 Best academic presentation (Asian Pacific Confederation of Chemical Engineering, APCChE)
2012 Best Conference Paper Finalist (IEEE, International Conference on Nano/Molecular Medicine and Engineering)
2013 Outstanding Staff of SUT for research
2014 Best Presentation Award (The 5th KKU International Engineering Conference 2014)

Publications

- Suebsoonthron, J., Jaroonwitchawan, T., Yamabhai, M., Noisa, P. (2017). Inhibition of WNT signaling reduces differentiation and induces sensitivity to doxorubicin in human malignant neuroblastoma SH-SY5Y cells. Anti-cancer drugs 28 (5), 469–479
- Pham, M. L., Leister, T., Nguyen, H.A., Do, B.C., Pham, A.T., Haltrich, D., Yamabhai, M., Nguyen, T.H., Nguyen, T.T. (2017). Immobilization of β-Galactosidases from Lactobacillus on Chitin Using a Chitin-Binding Domain. Journal of agricultural and food chemistry 65 (14), 2965–2976
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Pascal Montoro

Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD)
France

E-mail pascal.montoro@cirad.fr

Education

1987 Maîtrise in Biochemistry and Molecular Biology, University of Montpellier II, France
1989 DEA (equivalent Master) on Agronomy and Plant Science, University of Montpellier II, France
1993 Ph.D. in Plant Physiology, University of Montpellier II, France
1998 Advisor-Professor. Department of Agronomy, Faculty of Agriculture, Kasetsart University (KU Graduate School, registered code XA 462, 4 December 1998)
2009 HDR (Accreditation to Supervise PhD students as Main Advisor), University of Montpellier, France (12 June 2009)

Professional experiences

2002–present	Group Leader, BURST, CIRAD, UMR AGAP, Montpellier, France
2015–2017	Liaison Officer of the Molecular Biology and Physiology Specialist Group, International Rubber Research and Development Board, Kuala Lumpur, Malaysia
2002–present	Member of the Editorial Committee of Journal of Rubber Research
2002–2014	Liaison Officer of the Biotechnology Specialist Group, International Rubber Research and Development Board, Kuala Lumpur, Malaysia
1998–2001	Group Leader, Genetic engineering of rubber. CIRAD/KAPI. University of Kasetsart. Bangkok. Thailand
1998–1999	Co-coordinator Rubber Project, CIRAD - Centre DORAS, University of Kasetsart, Bangkok, Thailand
1995–1998	Researcher on molecular physiology, ORSTOM, Department of Biotechnology. Faculty of Sciences. University of Mahidol, Bangkok, Thailand
1993–1995	Post-doctorate position. INRA, Versailles - France

Publications

Author of 57 publications in peer-reviewed journals and book chapters h-index = 24

Piergiorgio Gentile
Newcastle University
United Kingdom

E-mail piergiorgio.gentile@ncl.ac.uk

Field of interest

- Polymer processing
- Biomimetic manufacturing
- Surface functionalisation at the nanoscale

Education

2004 B.Sc. in Biomedical Engineering (graduated with 110/110). Dept. of Mechanics, Politecnico di Torino, Italy.
2006 M.Sc. in Biomedical Engineering (graduated with 110/110). Dept. of Mechanics, Politecnico di Torino, Italy.
2010 Ph.D. in Biomedical Engineering. Dept. of Mechanics, Politecnico di Torino, Italy. Grade: Excellent

Awards

2017 Santander Mobility Award
2016 “Larry Hench” Young Investigator award by UK Society of Biomaterials
2015 Award for "Best oral presentation" at SIB congress
2011 PhD Award “Alberto Mazzoldi” by Italian National Bioengineering Group

Recent invited talks

2016 Layer-by-layer: a bioengineered tool to enhance specific biological activities at nanoscale. In: British Council/Newton Researcher Workshop: Healthcare Technologies for Aging Populations, Chengdu, China
2016 Layer-by-layer: a bioengineered tool to enhance specific biological activities at nanoscale. In: MeDe Annual Conference, Newcastle-Upon-Tyne, UK
2015 Electrospinning: a biomimetic method for mimicking native extracellular matrix. In: MeDe Innovation Guest Lecture Series #1 Seminar, Leeds, UK

Recent external roles

2018 Guest Editor for Materials journal. Special Issue: “Chitosan: Potential Applications in Pharmaceutical Industries and Medicine”
2017 Guest Editor for Frontiers in Bioengineering and Biotechnology. Issue: “Functionalisation at Nanoscale to Enhance Specific Biological Activities”

Publications

Author of 47 peer reviewed international papers, including 17 as first author (>1700 citations, h-index of 22 from Google Scholar), 3 book chapters and 2 patents

Shri Mohan Jain
University of Helsinki
Finland

E-mail mohan.jain@helsinki.fi

Field of interest

- Agricultural
- Biochemistry
- Genetics and Molecular
- Microbiology medicine

Education

1966–1970	Bachelor degree at the Chaudhary Charan Singh Haryana Agricultural University in Hisar, Haryana, India
1970–1972	Master of Science from the Genetics department at the G.B. Pant University of Agriculture and Technology in Pantnagar, Nainital, India
1972	Master of Philosophy in Jawaharlal Nehru University in New Delhi, India
1978	Ph.D., in Jawaharlal Nehru University in New Delhi, India

Publications

- Jain, S.M. 2011. Date palm genetic diversity conservation of for sustainable production, Acta Hort. 882:785–791
- Jain, S.M. 2011. Prospects of in vitro conservation of date palm genetic diversity for sustainable production. Emirates J Food and Agric 23 (2): 110–119
- Jain, S.M. and P. Suprasnna. 2011. Induced mutations for enhancing nutrition and food production. Gene Conservation, 10 (41):201–215
- Jain, S.M. 2012. Date palm biotechnology: current status and prospective-an overview. Emirates J Food and Agric. 24 (5). 400–407
- Jain, S.M. 2012. In vitro mutagenesis for improving date palm (Phoenix dactylifera L.) Emirates J Food and Agric. 24 (5). 386–399
- Jameel M. Al-Khayri, Dennis V. Johnson, Nasser S. Al-Khalifah and S. Mohan Jain.2012. Special issue on date palm papers presented at the “Arab Palm Conference 2011”. Emirates J Food and Agric. 24 (5): 1
- D. V. Johnson, J. M. Al-Khayri and S. M Jain. 2013. Seedling date palms (Phoenix dactylifera) as genetic resources. Emirates J Food and Agric. 25:809–830
- J. M. Al-Khayri, S. M. Jain, D. V. Johnson 2013. Date palm current research. Emirates J Food and Agric. 25:1–2

Vinod Chandran

The Queensland University of Technology
Australia

E-mail v.chandran@qut.edu.au

Field of interest

- Signal processing, image processing, pattern recognotion and machine learning for biomedical and biometric system applications
- Spectral analysis, invariant feature extraxtion from the bispectrum and decision fusion with control over detection errors
- A diverse range of applications with modalities such as 2D and 3D facial images, voice, fingerprints, iris, EEG, ECG, thermal images of the breast, retinal images, underwater sonar images, etc.

Education

- Bachelor's degree in Electrical Engineering from Indian Institute of Technology, Madras
- MS in Electrical Engineering from Texas Tech University
- MS in Computer Science from Washington State University
- Ph.D. in Electrical and Computer Engineering from Washington State University

Awards

A chief investigator on research grants and contracts over $2 million from various agencies – the Australian Research Council, Defence Science and Technology Organization, Australia Post, National Security Science and Technology, and Washington State University and Woods Hole Oceanographic Institution as subcontracts on grants from the Office of Naval Research, USA

Professional activities

- An adjunct Professor at Queensland University of Technology, Brisbane, Australia
- A senior member of the IEEE and member of the Australian Computer Society

Presentation Guidelines

Each parallel symposium will have a moderator, with one or more committee members in attendance. Oral presentations for the BioMIC Symposia have been allocated 15 minutes of effective presentation time, plus 5 minutes given to Q/A and 30 seconds turnaround time between speakers. Based on allocated presentation time, the presentation file should ideally contain approximately 10–12 PowerPoint slides. You are responsible for the content of your presentation.

The following will be at your disposal, for use during your presentation:

- Laptop
- Projector and screen
- Microphone
- Laser pointer

Submitting your presentation file

All presenters are required to submit their presentation file during registration on the first or second day of the conference, at the submissions desk in front of the Ballroom. It is not possible to use your own computer for your presentation.

- Your presentation file should be in a format compatible with Microsoft PowerPoint 2007 (or earlier).
- Bring your presentation on a USB memory stick. Facilities will not be provided for other submission methods.
- We highly recommend that you keep a backup of your presentation file on a second USB stick.
- Please do not embed videos in your presentation.

Emergency number

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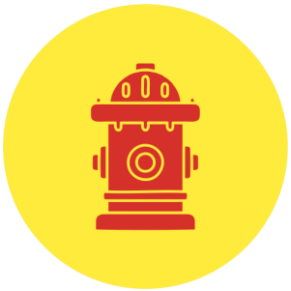
AMBULANCE
118 OR **119**



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SECRETARIAT
+62-811-2576-950

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INDONESIA SECTION

Badan Penerbit dan Publikasi Universitas Gadjah Mada
UGM Main Office Building, 3rd Floor, Room B3-02
Bulaksumur, Yogyakarta, Indonesia

(+62) 274 6491963
biomic@ugm.ac.id
http://biomic.ugm.ac.id
@biomicugm
biomic
flic.kr/biomic