AUGUST 2022 | VOL. 2

Malaysian Society for Microbiology

THE MALAYSIAN SOCIETY FOR MICROBIOLOGY

E-BULLETIN

What's inside this issue:

- Join MSM as a member!
- Find us on Facebook!

@malaysiamicro

- Visit our website mymicro.org

or contact us at microbsociety@gmail.com

From the President's desk..

Welcome to the 2nd MSM Newsletter!

The recently launched National Biotechnology Policy 2.0 by MOSTI has delineated various initiatives that are expected to transform Malaysia into a high-tech bio-innovative nation by 2030. Pivotal to this objective is the leveraging of good talent and resources in research and development across the three core biotechnology areas.

The fields of microbiology and its related areas are expected to play a significant role in the succession of this policy, especially in sub-sector areas of healthcare, agriculture, and industrial processes. Technologies adopted in vaccine production and biogenerics, biofertilizers, and bioplastics are already underpinned through fundamental and applied microbial research, demonstrating key relevance to future national research interests.

The Malaysian Society for Microbiology (MSM) recognises that a conducive scientific ecosystem is also fueled by activities that nurture its talent. Through initiatives such as the MSM Outreach Grants, the society aims to support a procession of activities that positively impact the many stakeholders across the scientific ecosystem. We are also currently working hard to establish a national-level microbial resource network that aims to corroborate and consolidate information that will benefit Malaysian researchers conducting microbiological research.

By championing these initiatives, MSM is able to contribute positively toward a culture of excellence in scientific research in the country. We hope that this MSM Newsletter can be leveraged as a platform for our members to share, disseminate, and obtain relevant information that benefits not just yourself but others as well. For this, we once again thank you for your support and look forward to many more endeavors together in the future.

We hope you find this newsletter helpful, and wish you good tidings ahead.

MAS JAFFRI MASARUDIN
MSM President, 2021/2023

MSM SPOTLIGHT

Microbiology and Community: The Way Forward

An interview with Assoc. Prof. Dr. Wan Zuhainis Saad
Universiti Putra Malaysa

PROFILE

- Assoc. Prof. Dr Wan Zuhainis Saad is an Associate Professor at the Department of Microbiology, Universiti Putra Malaysia. She is the Winner of the National Academic Award (Teaching Award – Pure Science Cluster) 2018. She received her MSc and PhD in Microbiology from Universiti Putra Malaysia.
- Her interest is in Agrobiotechnology, Mycology (fungal bioactive compounds), Educational Technology, Innovation in Teaching and Learning and Talent Development.
- Previously, she served as the Director of Academic Excellence, Department of Higher Education, Ministry of Higher Education, Malaysia. In her role, she was responsible in overseeing strategic academic planning and policy development, innovations in teaching and learning, and talent excellence.
- At the ministry, she and her team introduced innovative academic excellence initiatives including Experiential Learning and Competency-Based Education Landscape (EXCEL), Service Learning Malaysia University for Society (SULAM) and Future Workforce Engagement Series (ForcES), among others.

> *We need to conduct research and innovations in microbiology that can provide findings and output to the policymakers to build evidence-based policies and practices that can support and mitigate social inequalities. This is to ensure that every level of the community, regardless of social status, can have access to high-quality food/education and a hygienic environment to live in, which will eventually pave the way toward a developed nation.*

ASSOC. PROF. DR WAN ZUHAINIS SAAD

What lessons have we learnt about remote connectivity during pandemics in terms of teaching and learning, as well as knowledge dissemination from academia to the public?

The educators and students were not ready when we were faced with the rapid transition from face-to-face to online learning at the early time of the pandemic. But after 2 years, online learning has now become a new norm and we are more adapted to it. In fact, more people tend to prefer hybrid than physical learning. We want to leverage this opportunity so that teaching and learning can be more flexible and organic. Moving forward, the MOHE now emphasises 'hyflex' learning'. 'Hyflex' combines the terms 'hybrid' and 'flexible'. Hyflex learning integrates the common face-to-face (synchronous) and online (asynchronous) modes. Training and guidance will be given to Malaysian universities on how and what infrastructure will be required for a hyflex learning environment. The hyflex learning is one of the teaching and learning options encouraged by MOHE for universities to keep updated with the current scenarios and demands. Program owners can design their hyflex learning modules according to their creativity and needs.

As we have been adapting ourselves to online meetings, I could see more educational webinars being conducted. The webinars could reach more people out there, not only the locals but also people from all over the globe as long as they have an internet connection. Learning is now seamless and borderless.

How do you think Malaysian universities can help increase awareness of the impact of microbiology on the public? What roles can the students and the scientific communities play?

Malaysian educators and students can engage with the public through the Service Learning Malaysia University for Society (SULAM) platform. Let me give an example of how SULAM can be conducted by university medical students. Through Community Focus Case Study (CFCS), the students will have to identify a community to engage with from the early stage of their undergraduate studies and plan activities according to the needs of the community. Since the onset of the COVID-19 pandemic and the recent emergence of the monkeypox virus, the public has become more aware of the ugly side of microbes. In facing uncertainties of future health threats, the module can be designed to cover the aspects of education, social, healthcare and the economy. Activities can be conducted from time to time throughout their study for more immersive and experiential learning, and simultaneously benefit the target community. Students can be exposed earlier to real problems and stimulate their thinking to solve actual problems.

How do you think the higher learning institutions can help in advancing tertiary education to tackle many emerging national issues involving the community such as health threats, food security and economic viability?

We need flexible academic programs. Different study tracks can be provided to our undergraduate and postgraduate students, so they can acquire multiple skill sets to prepare them to be more agile and adaptable to change. We need to prepare them for life and not just solely as a scientist. On October 2nd 2021, MOHE launched Experiential Learning and Competency-Based Education Landscape (EXCEL), an Academic Program Transformation Initiative to produce lifelong learners, innovative entrepreneurs, creative practitioners, and change-makers. With four thrusts, IDEAL (industry-driven), CARE, REAL and POISE, this academic transformation can allow undergraduate students to have more experiential learning through industry and research.

In addition, we must do more transdisciplinary research as well. I think Malaysian microbiologists can start to explore how microbiology can address social equity. This is because due to differences in social status, not everyone in the society can have the same access to quality education, healthcare, food and nutrition, clean water, and a built environment. It has been reported that poor diet (eg. high-fat, high-sugar, low-fibre, highly processed), poor and unhygienic environment, and unequal and unbalanced work policy that is commonly associated with the socioeconomically disadvantaged community could lead to many health disparities such as obesity and comorbidities, psychiatric disorders, bowel diseases, poor neurological and mental processes, among others. Apparently, microbes are ubiquitous, from the food we eat, the workplace or house that we live in and in fact on our body parts too. We have been interacting with microbes and their ecosystems since early life, and these interactions occur in all stages of human life. Therefore, we need to understand the interplay of microorganisms, individuals, societies, and ecosystems to create a better life. This is where the importance of academia and microbiology research comes in. We need to conduct research and innovations in microbiology that can provide findings and output to the policymakers to build evidence-based policies and practices that can support and mitigate these social inequalities. This is to ensure that every level of the community, regardless of social status, can have access to high-quality food/education and a hygienic environment to live in, which will eventually pave the way toward a developed nation.

In essence, we first need to create public awareness of the relationship of microbes with social equity by organising nationwide webinars and programs featuring microbiology experts locally or internationally. This can be done by partnering with strategic partners such as industries, agencies, and NGOs. Then, we can integrate this into the curriculum, for example in science communication subjects. And lastly, by conducting transdisciplinary research with people from various social and science background, such as anthropology, nutrition, psychology, just to name a few.

What do you think can be done to synergise the institutions of higher learning with industry and community towards achieving the 17 Sustainable Development Goals?

Firstly, the roles of the quadruple helix, i.e ministry, academia, industry and community, are very important in achieving this. It needs a concerted effort from diverse partners. We need a strong professional body or organisation as a one-stop-centre, pooling experts from the academia and industries as strategic partners. They should be the point of reference for many organisations and they should work closely with local and international partners for plausible funding opportunities for our researchers. They can work together with other professional societies such as MSM to develop industry-recognised certification for students and lecturers to re-skill and up-skill.

Secondly, professional societies must evolve from their traditional practices in organising conferences and seminars to something more impactful that can drive new policies. They can plan their activities and research in line with the National Policy on Science, Technology and Innovation. Thirdly, the ministry can be the bridge to reduce the gap between the academia, community and industry. The ministry has the capacity to restructure existing academic programs so that we can train our students with the skill sets required by the industries.

Fourthly, academia and industries should also work closely together. The redesigning of curriculum, delivery, and assessment to embed industrial experiences under the new academic transformation program (IDEAL) will further encourage this connection and strengthen the quadruple helix. As a member of a professional society, we need to identify our expertise and network to create new eco-friendly products with industries that can solve problems faced by the community such as environmental issues. More importantly, the ministry, professional bodies, and industries should ensure that the public community from all levels receives adequate information and understand the agendas driven to achieve mutual goals. In short, I would like to emphasise again, that it needs collective efforts from the government, academia, industries, and communities to achieve the 17 sustainable development goals for a better place to live. Perhaps, we can establish a social equity-driven microbiology interest group to support this.

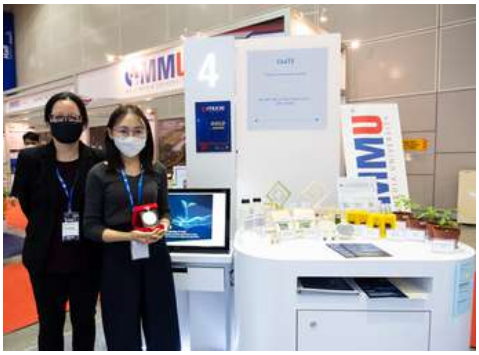
To wrap up this interview, do you have any advice for MSM members?

MSM members need to be more visible to highlight the importance of microbes in daily life. The emergence of COVID-19 has triggered the community to realise its broad and long-term impact. Therefore, the microbiology discipline must be more visible and be at the epicentre of the community. In achieving this, MSM members need to increase collaborations with stakeholders as it needs a concerted effort that will bring about a societal change. The visibility is expected to attract more industries and government agencies to work together with MSM members to address current and upcoming national issues related to microbiology.

NEWS AND REPORTS MAY-AUG 2022

Microbial-based Seed Coating Wins Gold Medal at ITEX2022

Prof. Dr. Adeline Ting and her co-inventor Dr. Chin Jia May from Monash University Malaysia, has been awarded the Gold Medal at the recent 33rd ITEX2022 (International Invention, Innovation and Technology Exhibition) held at the Kuala Lumpur Convention Centre (26-27 May 2022). Their invention, CoaTS: Coating Technology for Seeds, adopts an innovative microbial-based seed coating approach to improve tolerance to disease and soil salinity. Their project highlights the innovative application of beneficial microbes with tolerance to salinity and with disease suppressive effect, as bioagents for coating onto seeds. This project was co-funded by TORAY.



Workshop on Microbial Preservation Technique 2/2022

The Microbial Culture Collection Unit (UNiCC), Institute of Bioscience, Universiti Putra Malaysia, organised a 2-day hands-on Workshop on Microbial Preservation Technique Series 2/2022 from 26 to 27 July 2022. Thirteen participants from UPM and various agencies participated in this workshop. Participants had the opportunity to experience hands-on activities on how to preserve bacteria using freeze-drying and cryopreservation technique.

Bioliquifert™ Project appreciation ceremony

A liquid microbial-based biofertilizer products for all crops, Bioliquifert™ was recently developed by Malaysian Nuclear Agency (NUKLEAR MALAYSIA) and successfully commercialised by Peat Organic Sdn. Bhd. (POSB), a company in a cooperative agreement with the Government of Malaysia (represented by NUKLEAR MALAYSIA through a Memorandum of Agreement). On July 8, 2022, a ceremony to honour and recognise the innovators and inventors of Bioliquifert™ was held at NUKLEAR MALAYSIA. The Director General of NUKLEAR MALAYSIA, Dr. Abdul Rahim Harun presented a mock cheque and Certificates of Achievement to members of the Bioliquifert™ Project Team. The team members were acknowledged for their success in generating royalties from the commercialisation of Bioliquifert™ product. In an inspirational address to the staff of NUKLEAR MALAYSIA, the Director General praised the agency's accomplishment in producing excellent R&D products and services. Among the key factors behind the success were continuous hard work, perseverance, right commercial partners, and marketability of the products. He also hoped that this achievement can inspire and motivate all others.

Young Scientists Exploring the World of Microbes Program

Assoc. Prof. Dr. Suriana Sabri* &
Callista Chan Ying Yi
Department of Microbiology,
Universiti Putra Malaysia

The "Young Scientists Exploring the World of Microbes" program was organised by a group of third-year Bachelor of Science in Microbiology with Honours program students from the Department of Microbiology, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia. This Service-Learning Malaysia - University for Society (SULAM) program is part of the BMY4904 Service Learning in Microbiology course.

This program was aimed to create interest in STEM; specifically, to provide an awareness and understanding of microbiology-related topics amongst primary school students. The program was held on the 19th, 25th, and 26th of January 2022 at SJK(C) Serdang Baru 2 which involved 200 students of standard 5 and 6.

The knowledge on microbiology was transferred through 6 modules developed by the UPM students; Module 1: Microbes Around Us, Module 2: Underground Microbes, Module 3: Tiny Underwater Creatures, Module 4: A Sneak Peek into the Microworld, Module: 5 Let's Kill This Germs, and Module 6: Microbes Model Builders. Using these modules, various types of microorganisms in different environments were introduced, the characteristics and shapes of microbes were explained, and methods to control the growth of microbes were emphasised. The activities were conducted through video and slide presentations as well as quizzes to assess their knowledge. UPM students also created a Microbes' Corner exhibiting information and various activities which included a poster presentation, Worm and Wave games session, Foldscope, washy-washy song and dance session, and model building activity. The Microbes Corner provided an opportunity for school students to explore and play with microbiology-themed materials on their own, throughout the program duration.

Based on our pre- and post-survey, this program brought a huge impact on the UPM students as well as the school students. This program gave the opportunities for UPM students to design relevant activities for younger audiences and created awareness of the importance of contributing to the community through knowledge sharing. It has also successfully improved UPM students' skills in various aspects such as creativity, group work, communication, leadership and social skills.

Among the impacts on the community were 1) increasing the school students' knowledge on microbiology; 2) fostering schools students' interest in STEM in general and microbiology in particular; 3) creating awareness of the importance of good hygiene practices among school students; 4) achieving one of the objectives of the School Transformation Program 2025 (TS25) which is to provide a conducive and differentiated learning environment for school students; and 5) exposing the school students to an "English-rich" environment with the aim of improving language proficiency.

*For further information, Dr. Suriana Sabri can be contacted via suriana@upm.edu.my.

Webinar Series 1/2022: Microbial Culture Collection Focus

The Microbial Culture Collection Unit (UNiCC), Institute of Bioscience, Universiti Putra Malaysia, organised their Webinar Series 1/2022: Microbial Culture Collection Focus on May 24, 2022. The Webinar was conducted via Zoom and the Facebook Live platform (hosted by the Institute of Bioscience, UPM). Two speakers were invited to share their knowledge and experience; Dr. Philippe Desmeth and Ms. Suwanee Chunhametha. Dr. Philippe Desmeth is from the Belgian Coordinated Collections of Microorganisms (BCCM), and he spoke on the "Implementation of Patent Deposit (Budapest Treaty) and IDAs and NDAs'. Ms. Suwanee Chunhametha from Thailand Bioresource Centre (TBRC) delivered a talk on "Nagoya Protocol: Access and Benefit Sharing - TBRC Experience and Challenges". This Webinar was joined by more than 130 participants from Malaysia and other countries.

JAMS Kuala Lumpur June 2022

Dr. Nur Hazlin Hazrin-Chong
JAMSKL Coordinator

In collaboration with the Malaysian Society for Microbiology, The Joint Academic Microbiology Seminars Kuala Lumpur (JAMSKL) held its first post-pandemic, in-person session on June 23, 2022 at WORQ KL Gateway. Approximately 60 participants attended the seminar, ranging from students and academics to industrial representatives. Invited speakers included Dr. Hii Kieng Soon (Universiti Malaya), Dr. Norefrina Shafinaz Md Nor (Universiti Kebangsaan Malaysia) and Mr. Muhammad Zarul Hanifah (Monash University Malaysia).

All speakers shared interesting insights and useful knowledge based on their research. The first talk was given by Dr. Hii, who walked the audience through his work on transcriptomics of *Alexandrium minutum*, a dinoflagellate that produces saxitoxin. Saxitoxin is a potent neurotoxin, which can contaminate shellfish in the event of harmful algal blooms and cause Paralytic Shellfish Poisoning (PSP) disease in humans.

Next, Muhammad Zarul shared his valuable experience and perspectives as a PhD student in genomics and bioinformatics. Although he recently commenced his PhD study, Zarul had previously been involved in other projects that allowed him to hone his bioinformatic skills further and apply them to his PhD study.

Last but not least, we had Dr. Norefrina summarising her journey into airborne SARS-CoV-2 detection, particularly in hospitals at the peak of COVID-19 in Malaysia. Her research led to a publication in Scientific Reports (Springer Nature) to be among the top 100 most downloaded papers in 2021.

Established in 2019, JAMSKL serves as an outreach platform to the microbiology community in Kuala Lumpur and Malaysia. It aims to hold bi-monthly short talks from local and international researchers across various institutions that benefit academia, industry and the public. Thanks to sponsorships, particularly from QIAGEN and Pathomics Health, JAMSKL strives to minimise financial and logistical barriers to access the latest knowledge in microbiology research in Malaysia. Those interested in giving a talk or who would like to suggest any speakers could reach out directly to the JAMSKL committee at jamsklsecretariat@gmail.com.

Microbe Care Day with Darul Falah Orphanage, Kuala Terengganu

Assoc. Prof. Dr. Siti Nor Khadijah Addis &
Ts. Dr. Fazilah Ariffin
Faculty of Science and Marine Environment,
Universiti Malaysia Terengganu

A community outreach program organised by students of the Advanced Microbiology course, Biological Sciences Program from the Faculty of Science and Marine Environment (UMT) was held on Saturday, June 18, 2022 at Darul Falah Orphanage, Bukit Payung, Kuala Terengganu, Terengganu.

The program led by Ts. Dr. Fazilah Ariffin aimed to disseminate awareness of microbiology in daily activities through multiple activities on-site. Participants from primary schools were introduced to basic microbiology knowledge through laboratory simulation activities such as microbe observation under a light microscope and basic hygiene practices such as proper hand washing. The participants were also exposed to microbes and their relationship to infectious diseases via activities such as quizzes and group work.

Participants from Darul Falah Orphanage, Kuala Terengganu with lecturers and staff from Universiti Malaysia Terengganu

This program provided an opportunity for primary students to learn more about the field of microbiology, particularly the role of microorganisms in the environment and health. The participants found the program exciting and useful as an introduction to formal knowledge and practice of the microbiology field.

Student facilitators with participants attempting Microbiology Lab Simulation activities

MSM Community Outreach Grant 2022

The inaugural MSM Community Outreach Grant saw a submission of proposals from institutions all around Malaysia including UTM, UPM, UKM, UiTM, UTHM, Monash University Malaysia, INTI, UPSI, UNISZA, AIMST and Sunway University. The proposals were reviewed by an external expert panel, and we are pleased to announce the winners of the first MSM Community Outreach Grant as below. Congratulations to all winners and we look forward to seeing the impact of the grant in providing awareness of Microbiology to the community which will be showcased in next year's International Congress of the Malaysian Society for Microbiology 2023 (ICMSM2023).

Malaysian Society for Microbiology Postgraduate Symposium 2022

Assoc. Prof. Ts. Dr. Suhaila Mohd. Omar
Dept. of Biotechnology, Kulliyyah of Science,
International Islamic University Malaysia

The Malaysian Society for Microbiology Postgraduate Symposium 2022 (MSMPS 2022) was held virtually on August 10-11, 2022, co-organised by the International Islamic University Malaysia (IIUM) Kuantan. The theme for the meeting this year was 'Microbes & Planetary Health: A sustainable Affair". The symposium was officiated by Prof. Dr. Azmi Md. Noor, Campus Director, IIUM Kuantan. Participants from 15 universities, government and private sectors gathered through the Zoom platform to listen to Prof. Emerita Dato Dr. Asma Ismail's outstanding keynote talk entitled "Impact of Microbes in Transforming Research Landscape Post COVID Era". For first plenary session, Associate Prof. Dr. Lee Choon Weng from University Malaya enlightened the participants on microbes and environmental changes, triggering a discussion on climate change. Prof. Dr Evelyn Doyle, the second plenary speaker from the University College of Dublin shared her research group's findings on the use of omics technologies. These talks clearly showed that the advancement of technology accelerated findings in microbial research.

MSMPS was designed as an avenue for aspiring research students to exchange knowledge in the field of microbiology. Altogether 30 participants shared their research findings through oral and E-poster presentations. The best oral presentation winner received RM300 cash and was won by Miss Izzati Sabri from UPM. Meanwhile, Miss Vakgesri, also from UPM, won the best E-poster presentation award and received RM200 cash. Both winners also won the opportunity to publish in the Journal of Progress in Microbes and Molecular Biology, sponsored by H & H Publishers.

Postgraduate studies offered many opportunities and challenges. This topic was discussed in a forum featuring postgraduate students from different microbiology disciplines. While the short forum can never describe everything about postgraduate life, the best take-home messages were to make the most of your postgraduate life, learn from the best and last but not least, keep your perseverance. The success will find you later. See you again in the next MSMPS!

A snapshot during the postgraduate forum "Postgraduate Challenge and Motivation: A Sharing of Experience"

National Science Challenge (NSC)

Assoc. Prof. Dr. Mas Jaffri Masarudin
MSM representative for NSC

The National Science Challenge (NSC) is a highly coveted premier science competition in Malaysia for secondary school students, circa its inception in 1999. The NSC aims to nurture, promote, and enhance the interest in Science, Technology, Engineering and Mathematics (STEM), as well as to instill an interest among the younger generation to pursue STEM-related careers.

After a successful debut partnership last year, the Malaysian Society for Microbiology (MSM) was once again identified as the Strategic Partner for NSC 2022. In this capacity, our MSM members contributed as members of the Organising Committee and were instrumental in developing questions (with emphasis on Microbiology) for the Preliminary and Semi-Final rounds of the competition. This year, the NSC-MSM Best Microbiology Award will also be announced during the Grand Final of the NSC 2022.

The award will be accorded to the NSC 2022 participant who scored the highest marks in Biology throughout the competition.

MSM's participation in the NSC 2022 is a reflection of the society's role in promoting microbiological sciences throughout the whole gamut of society. MSM realises the importance of inculcating such interest at an early age. The NSC competition is open to all Malaysian secondary school students aged 13 - 16 years old, including homeschooling students. NSC has received strong support from the Ministry of Science, Technology and Innovation (MOSTI), Ministry of Education (MOE), Ministry of Science, Technology and Innovation (KSTI) Sabah, Majlis Amanah Rakyat (MARA), the Young Scientists Network (YSN)-ASM, Collaborative Research in Engineering, Science and Technology Centre (CREST), Sasbadi Online Sdn Bhd, American Chemical Society (ACS) Malaysia Chapter, and the Malaysian Society for Microbiology (MSM).

In anticipation of the Grand Final commencing later in the year, we would like to wish all the participants all the best in their endeavor.

7th Asian Plant Growth-Promoting Rhizobacteria (PGPR) International Conference for Sustainable Agriculture 2022

The 7th Asian Plant Growth-Promoting Rhizobacteria (PGPR) International Conference for Sustainable Agriculture 2022 with the theme "Regenerating Agriculture Through Beneficial Microbes for Improving Crop Productivity and Safety" was successfully conducted on August 23-26, 2022 at Auditorium Rashdan Baba, Universiti Putra Malaysia (UPM). The conference was officiated by the Minister of Agriculture and Food Industries, YB Datuk Seri Dr. Ronald Kiandee on August 24, 2022. It was organised by the Asian PGPR Society for Sustainable Agriculture, the Malaysian PGPR Society, Faculty of Agriculture and Institute of Plantation Studies, UPM and supported by the Ministry of Agriculture and Food Industries (MAFI) as well as Malaysia Convention and Exhibition Bureau (MyCEB), Ministry of Tourism, Arts and Culture Malaysia together with eight local collaborators, namely, Department of Agriculture Malaysia (DOA), Malaysian Agricultural Research and Development Institute (MARDI), Agriculture Institute Malaysia (AIM), Malaysian Plant Protection Society (MAPPS), Malaysian Society for Microbiology (MSM), Malaysian Society of Soil Science (MSSS), Universiti Teknologi Malaysia (UTM) and MAHSA University and four international collaborators, namely, Auburn University, The Indian Council of Agricultural Research, Indian Phytopathological Society and GlobalBioAg Linkages.

The conference was kindly sponsored by Auburn Ventures (USA), Dhana Crop Sciences Limited (India), Gujerat Eco Microbial Technologies Pvt. Ltd (India), AgBiosystems (India), Pragati Resorts (India), PRATHISTA Industries Limited (India), Sri BioAesthetic (India), AgriLife (India), Sujay Biotech/BIO WE (India), Geo Life (India), Valagro (International), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Varsha Bioscience & Technology (India), Diversatech Fertilizer (Malaysia) and Malaysian Convention and Exhibition Bureau (Malaysia) as well as five exhibitors, namely, Behn Meyer Agricare (M) Sdn. Bhd., Peat Organic (M) Sdn. Bhd., Hj. Mat Hj. Jantan Sdn. Bhd., Faculty of Agriculture, UPM and Malaysian Agricultural Research and Development Institute (MARDI). There were also seven advertisers included in the program and abstract book, namely Department of Agriculture Malaysia (DOA), Behn Meyer AgriCare (M) Sdn. Bhd., MyEdu Group Sdn. Bhd., Peat Organic (M) Sdn. Bhd., All Cosmos Industries Sdn. Bhd., Agricultural Institute of Malaysia (AIM) and Malaysian Plant Protection Society (MAPPS).

The conference was attended by 130 participants including 6 lead speakers, 46 oral speakers and 42 poster presenters coming from 16 countries. The conference Welcome Dinner was attended by the Honourable Vice Chancellor of UPM; Deputy Director General of MARDI; Director, Crop Quality Control Division, DOA; Dean, Faculty of Agriculture, UPM; Director, Institute of Plantation Studies, UPM; Prof. M.S. Reddy, Founder & Chairman, Asian PGPR Society for Sustainable Agriculture, and Chairperson & President of Malaysian PGPR Society, Prof. Dr. Mui-Yun Wong. The Gala Dinner witnessed the presentation of 61 awards given by the Asian PGPR Society for Sustainable Agriculture as a recognition to individuals with outstanding achievements including the prestigious Fellow Awards.

MSM WORKING GROUPS

Scan me to join!

MMRIN

Coordinates a sharing platform that acts as a national reference database to promote Malaysian microbial culture collections

COMMUNICATION

Coordinates information and news sharing related to MSM, MSM members and Microbiology

OUTREACH

Coordinates community events that promote transfer of knowledge to the public on Microbiology

ARTICLES FROM MSM MEMBERS

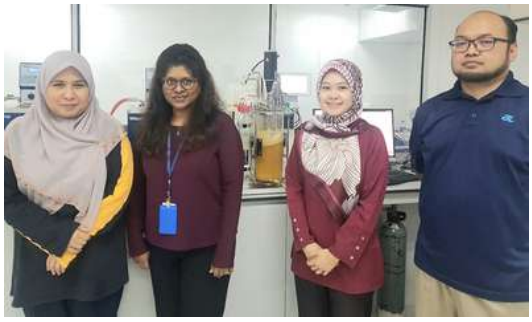
Potential Mycopharmaceuticals to Tackle Life-Threatening Infections: from Forest to Formulation

Dr. Getha Krishnasamy
Natural Products Division, Forest Research Institute Malaysia (FRIM)

The study elaborated in this article has been inspired by the overwhelming number of health benefits documented over the years for a group of organisms found widely in forest ecosystems – the basidiomycetes. Generally known as mushrooms, most of these fungi produce fruiting bodies while their mycelia can be cultivated in the laboratory. Basidiomycetes are capable of adjusting to different growth conditions, resulting in the production of a variety of secondary metabolites with bioactivities. They include metabolites with antimicrobial, antioxidant, anticancer, antiallergic, immune-modulating, anti-inflammatory and anticholesterolemic properties. Well-known medicinal mushrooms that have been reported as potential sources of bioactive metabolites to treat a wide range of ailments are typically species of *Ganoderma*, *Pleurotus*, *Schizophyllum* and *Lentinula*, among others. Nevertheless, many wild species in our forests are yet to be investigated for their bioactivities, and the chemical groups responsible for the therapeutic effects are yet to be isolated and identified. These beneficial mycopharmaceuticals represent important chemical compound structures critical for the synthesis of new molecules in drug design and discovery.

Researchers at the Natural Products Division of FRIM undertook a study in 2009 to explore mycopharmaceuticals active against pathogens causing life-threatening infections. The focus pathogen is *Staphylococcus aureus*, along with the methicillin-resistant *S. aureus* (MRSA). *Staphylococcus aureus* is the leading cause of skin infections, bacteremia, and respiratory infections such as pneumonia and other disorders. Additionally, the multidrug-resistant (MDR) staphylococci, especially methicillin-resistant *S. aureus* (MRSA), is of great concern due to the significant increase in the incidence of infectious disease caused by the pathogen in both community and hospital settings. Occurrence of the vancomycin intermediate VISA and vancomycin-resistant VRSA strains of *S. aureus* has also created an urgent need for new antibacterial agents, which can provide a broader armamentarium for clinicians to manage MRSA infections.

Lab-grown culture of strain DSM 24013 on potato dextrose agar (PDA).



Dr. Getha Krishnasamy (second from left) and her team of researchers from FRIM (from left to right): Ms. Saidatul Husni bt. Saidin (formulation), Ms. Shariffah Nurhidayah bt. Syed Abdul Rahman (bioprocess) and Mr. Muhammad Syamil b. Azahar (downstream-isolation).

FRIM researchers discovered that some wild basidiomycetes strains isolated from diseased trees of timber species showed bioactivities against MRSA, VISA and other MDR *S. aureus*. An innovative assay targeting inhibitors of essential bacterial enzymes with no structural homology with mammalian enzymes, led to the intriguing discovery of a potent bactericidal compound. The producer is a basidiomycetes fungus (family Marasmiaceae) isolated from an *Acacia mangium* tree infected with root rot disease. A dimeric sesquiterpene compound was purified from shake-flask fermentation culture extracts and the basidiomycetes strain was deposited at DSMZ – Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH under the accession number DSM 24013. Over the years, FRIM researchers successfully established the activities of the compound against MRSA, VISA and other MDR *S. aureus*. Molecular docking studies predicted a novel killing mechanism for the dimer sesquiterpene and a Malaysian patent was granted in 2020. Together with collaborators from the Faculty of Health Sciences, Universiti Kebangsaan Malaysia, the *in vivo* therapeutic efficacy of the compound was demonstrated in an animal model where control of MRSA and rapid healing of skin wounds was observed.

Intensive research efforts were undertaken to develop the patented compound into an active ingredient formulation for controlling topical infections caused by life threatening MDR *S. aureus*. The breakthrough comes after the team successfully established a proprietary production technology based on submerged fermentation of strain DSM 24013 in a bioreactor, and downstream isolation methods. Use of submerged fermentation allows complete control of the production process and ensures standardised chemical profiles in the active ingredient. The team is actively carrying out further investigations on efficacy, quality, stability, and safety of the developed active ingredient. The encouraging findings from this research led to the development of an efficacious prototype formulation of bioactive secondary metabolites from an indigenous wild basidiomycete species. Comprehensive approaches taken in the study are beneficial to sustainably harness the potentials of our bioresources and propel the fungus to the forefront in efforts to battle against infections from dangerous MDR superbugs.

The Development of the First Intranasal Vaccine for the Prevention of Pneumonic Mannheimiosis in Sheep and Goats

Prof. Ts. Dr. Mohd Effendy Abd Wahid, FASc.
Universiti Malaysia Terengganu (UMT)

When the world was still in its dark ages, no one believed that some of the diseases were caused by certain microorganisms that were so tiny, that could not be seen even by the naked eyes. At that time, the witch doctor was always referred to whenever people contracted unexplainable diseases with unique clinical signs or symptoms. It was not until the 1600s, when the microscope was invented, that Dutch scientist Antoine van Leeuwenhoek spotted tiny swimming "animalcules" while fiddling with the newly invented microscope. Leeuwenhoek isolated the bacteria from his teeth, soil, and water and used his single-lens microscope to observe and notice that they have sizes, shapes, and organisations. At that time, no one knew that the "animalcules" were actually bacteria.

Pneumonic mannheimiosis is one of the most common respiratory diseases of small ruminants worldwide. The disease is caused either by *Mannheimia haemolytica* (*M. haemolytica*) type A or *Pasteurella multocida* types A and D. In our country, 70% of the disease in sheep and goats has been associated with *M. haemolytica* type A and 30% of the bacteria isolated from pneumonic lungs were identified as *M. haemolytica* serotype A. Vaccination is the best control measure for the disease. Still, the protection provided by several commercial mannheimiosis vaccines is uncertain. Several factors have been recognised as the cause of vaccination failures, for instance, the route of administration, the antigen, and the adjuvant used in the vaccine.

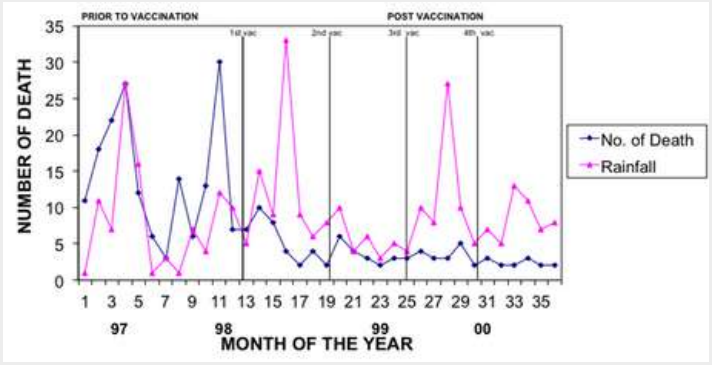
The pathogen can be found in the upper respiratory tract of healthy animals and is considered normal flora or commensal bacteria. The bacteria has also been recovered from nasopharynges, tonsils, and lungs of sheep and goats.The bacteria isolated from the nasal cavity of healthy sheep and goats is said to be less pathogenic. It becomes virulent before it invades the lungs during the immune-compromised condition. It will eventually colonise the upper respiratory tract before lung lesions develop. The virulence factors include leukotoxin (LKT), lipopolysaccharide (LPS), adhesins, capsule, outer membrane proteins, and various proteases. The toxin is enhanced by lipopolysaccharide, which is associated with the release of pro-inflammatory cytokines from the leukocytes. The toxin will eventually produce effects such as neutrophil membrane rupture, production of numerous vesicles within the cytoplasm, pyknotic nuclei, and cell cytolysis. LPS is also known as endotoxin and is part of the outermost layer of the outer membrane in gram-negative bacteria. LPS will induce an inflammatory reaction in the lungs and affect the surfactant in the alveolus which will lead to a reduction of surface tension at the air-alveolar interface in the alveolus. This reaction might lead to the collapse of the alveolus structure, which is irreversible in nature. The capsule of *M. haemolytica* also plays an important role in the inhibition of phagocytosis and intracellular killing which enables it to establish itself in the lungs.

As mentioned earlier, imported vaccines, which employ the parenteral delivery route, had been used to control the disease in local sheep and goat with a limited success rate. The Veterinary Research Institute in Ipoh had formulated an oil adjuvant vaccine with formalin-killed whole organism using local strains of *M. haemolytica* and *P. multocida* for intramuscular injection. Still, the vaccine did not show any success in controlling the disease. However, another experiment using the improved oil-adjuvant vaccine incorporated with formalin-killed *M. haemolytica* A7 and *P. multocida* types A and D showed better protection when challenged against either *M. haemolytica* A2 or A7. Unfortunately, due to the thick viscosity of the oil adjuvant, it was very difficult to deliver the vaccine by intramuscular injection to the big herds of animals. Furthermore, the adjuvant caused swelling and pain at the injection site and lameness with uneventful recovery in approximately 10% of vaccinated animals. The locally produced oil-adjuvant vaccine was not popular among farmers thus resulting in a high incidence of the disease on many farms in Malaysia.

A study conducted by Jasni at el. (1990) involving six farms over a 5-year period in Malaysia showed that deaths due to pneumonic mannheimiosis were between 31.5% and 32.4% annually. It was also discovered that the highest and lowest incidence of the disease correlated well with the highest and lowest rainfall. The changes in temperatures during the seasonal changes have caused stressful conditions for the animals. Improper vaccination regime had also contributed to low serological antibody titers in 30% to 80% of animals in five farms, due to the unpopularity of the vaccines among farmers. *M. haemolytica* is part of the normal flora in the upper respiratory tract of animals and inhalation of large numbers of the bacterium into the lungs will affect or initiate the infectious process at the mucosal surfaces. The mucosal immune system is an important component of the effective immune response of the animal. Consequently, there is increasing interest in developing vaccines, which generate robust mucosal immune responses. *M. haemolytica* uses the respiratory route to cause the infection which is armed with lymphoid tissues of mucosal immunity. The first line of contact between the bacterium and host is along the mucosal membrane lining the epithelial of the respiratory tract, and the best way to prevent the colonisation is by stimulating the pulmonary lymphoid tissue that will provide substantial local cell-mediated and humoral immune responses.

Therefore, a study on stimulating the mucosal immune system at the pulmonary level and their associated lymphoid tissues were conducted. We used formalin-killed whole organism of *M. haemolytica* A2 as a seed vaccine. We developed them into a spray mist during the delivery onto the mucosal membrane in the nostril of sheep and goats. Then we measured the size of bronchus-associated tissues (BALT), as well as the numbers of lymphocytes in the bronchus areas. We also measured the level of serum IgA and IgG before, and after the intranasal spray, vaccine was delivered. We found that the size of the BALT had increased significantly ($p<0.05$), together with the numbers of lymphocytes and the levels of serum IgA and IgG. Then we proceeded with a challenge assay and found that all vaccinated animals survived the infection.

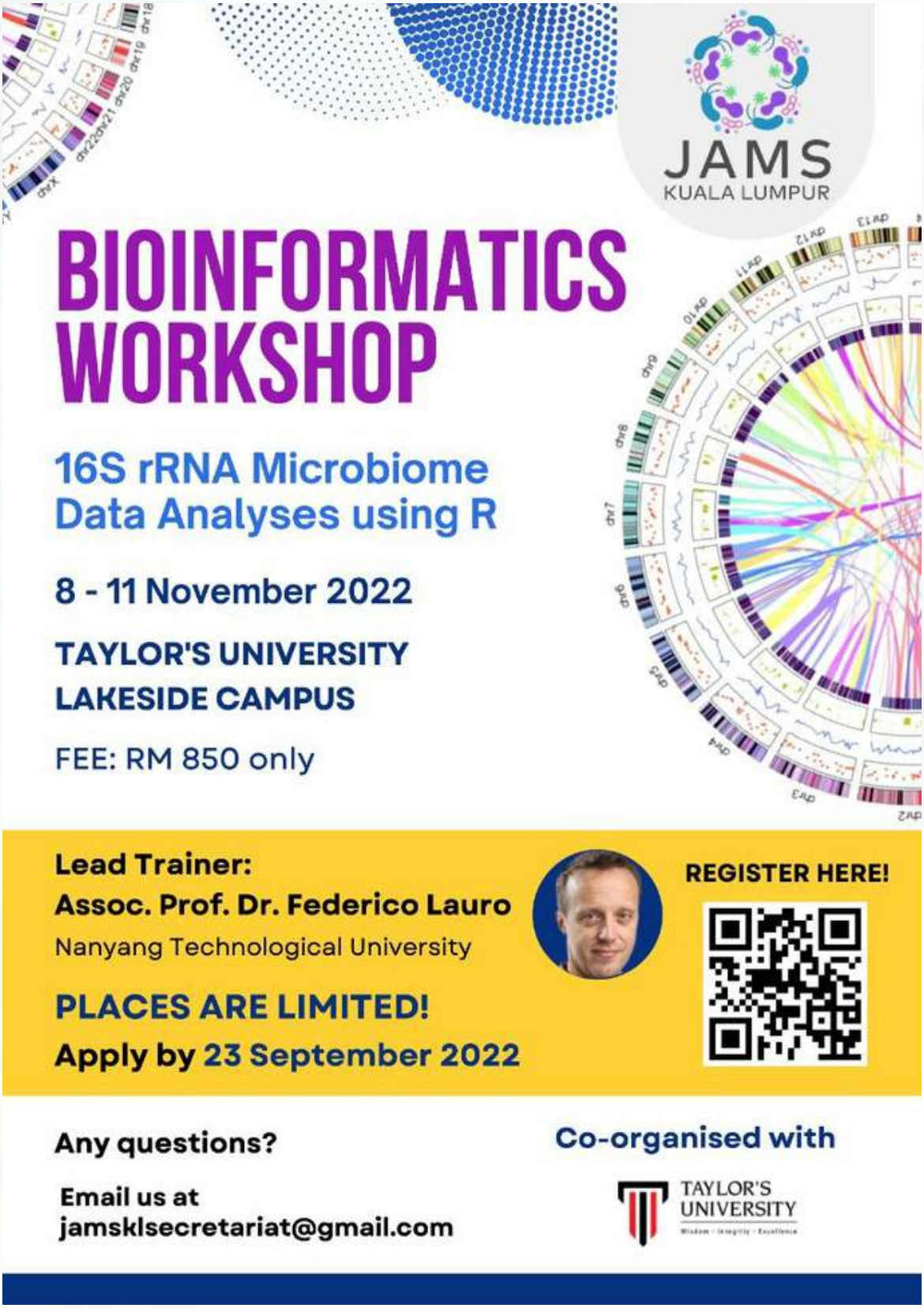
The final experiment was to conduct a clinical trial on a farm to determine whether the intranasal spray vaccine could protect the sheep against pneumonic mannheimiosis. Two farms located at the East Coast and West Coast of Peninsular Malaysia were selected for the study. Before the start of the experiments, high mortality rates of about 60% due to pneumonic pasteurellosis during the rainy seasons from October to December on the East Coast and March to May on the West Coast were observed in both farms respectively. At the end of the experiment, the mortality rates showed a 52% reduction to only 1% to 3% annually. The 52% reduction of the annual death rate indicated good efficacy of the vaccine. Under experimental conditions, the efficacy of the intranasal mannheimia spray vaccine was between 95% to 98%, which was obtained within 2 weeks post-vaccination and lasted for a period of 12 weeks. The vaccine also induced high levels of IgAs in the lungs and nasal mucosa, which prevented the colonisation of the respiratory tracts. The rainy season normally will cause stress to the animals and affects the host immune defence against the disease. The field trials showed that the rainy season did not affect the protection provided by the mucosal route of vaccine delivery. This is evidenced by the reduced mortality rates during the rainy seasons.



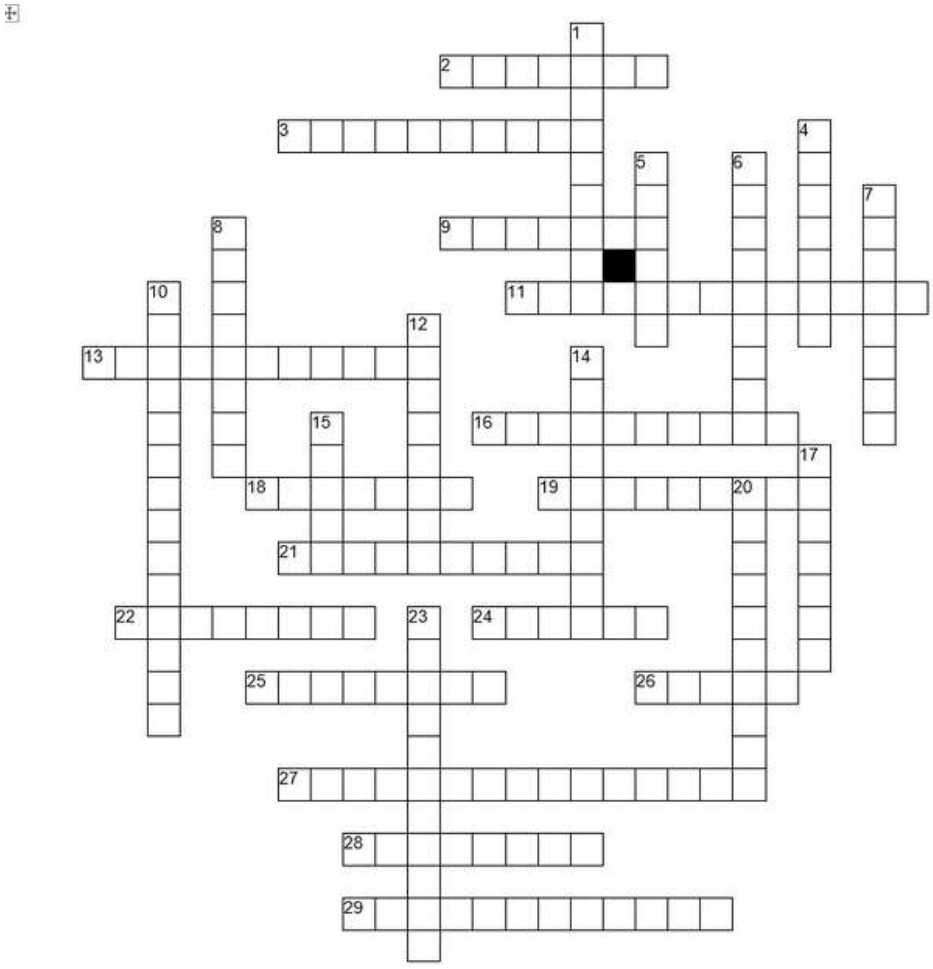
Mortality rates before and after vaccination programs in two farms.

UPCOMING EVENTS

UPCOMING EVENTS



TAKE ON THIS CHALLENGE!



Across

2. Smaller than bacteria and are completely reliant on the host cell for survival
3. These are hospital acquired infections that occur in about 35% of all surgical patients
9. Apparently healthy person who harbours and can transmit a pathogenic organism
11. Harmless microorganisms with their normal environment
13. Bacteria that grows with or without oxygen
16. Coexists with Hepatitis B
18. Particle of moisture which carries microorganisms
19. Reside on the surface of the skin and are easily removed by washing
21. This is transmitted through percutaneous or permucous in blood, serum, and other body fluids
22. Study of viruses
24. Severe toxic febrile state resulting from infection with pyogenic microorganism
25. An aerobic gram-positive bacilli
26. Shape of coccus
27. This can normally be found in the oral cavity, digestive tract and vagina
28. *Pseudomonas aeruginosa* is an example of an aerobic gram-_____ bacilli
29. Soiled by a microorganism

Down

1. Special precautions taken to prevent transmission of microorganisms from specific body substance
4. Requires oxygen to grow
5. *E. coli* is an example of what type of flora?
6. Microorganisms capable of producing disease
7. Rod shape bacteria
8. Study of fungi
10. Living organisms invisible to the naked eye
12. Live in the cracks and crevices of the skin
14. Grows in an oxygen-free environment
15. Formed under conditions of nutritional depletion, capable of surviving adverse conditions
17. Free of microorganisms and spores
20. Most post-operative infections result from seeding by this type of microorganism
23. Clostridium _____ is an example of an anaerobic gram-positive bacteria

Source: www. wordmint.com

Malaysian Society for Microbiology

e-Bulletin

Malaysian Society for Microbiology

December 2022 *Edition*

Next edition's theme: Trending Microbes

Calling for newsletter articles!

- MSM Spotlight
- Article from MSM members
- Student's column
- News & reports
- Upcoming events
- Games

Interested in contributing an article or advertising a non-profit microbiology event in the next issue? Please reach out to us at:

- Email: msmcomm22@gmail.com