

## WDCM Training Course for Microbiome Data Sharing WFCC-MIRCEN World Data Center for Microorganisms (WDCM) Oct 15-30, 2017, Beijing China

### Personal Identification

I am Dr. Dalia Sukmawati, researcher and Lecturer in Microbiology Division at Biology Department, Universitas Negeri Jakarta, Indonesia. I teach mycology, microbiology, biodiversity of fungi, and bioinformatics at my university. My PhD is in Yeast Taxonomy which was conducted at Faculty of Mathematics and Natural Sciences, Universitas Indonesia, Depok Indonesia. At present, I am working on the exploitation of yeast for the potential bioactive compound such as immunomodulator, anti-cancer, cellulose, chitinase enzyme, amylase and I am also checking the antagonism mechanisms for inhibited growth of pathogenic fungi. My other primary objective of the research is molecular identification of yeast, molds and bacteria. My other research that has been completed is: (1) Exploration of the Basidiomycetes mushroom diversity from conservation area of Halimun mountain, and explore their potential as bioactive immunomodulator compound; (2) Screening bioactive compound as  $\beta$ -1-3 Glucan from Basidiomycota mushroom, which isolated from the conservation area Pangrango mountain in Indonesia; (3) The anticancer effect of polysaccharides isolated from higher basidiomycetes mushrooms; (4) Activity test on *C.albicans* and *E.coli* from *Lentinus edodes* miselium; (5) Isolation and screening potential yeast for antagonism potential from many substrate in plant, animal, and soil; at the present I do in (6) Exploration yeast from phylloplane plant *Broussonetia papyrifera*, *Canberra manghans*, indigenous fruit from Indonesia, (7) Application yeast from many substrate for probiotic, (8). setting up new research with topic soil microbiome, plant microbiome to selected potential microbe able to inhibit pathogenic microbe.

#### **Name of your culture collection:**

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## **ABSTRACT**

Microbes constitute the largest biomass on the earth (Bacteria, Archaea and Eukaryotes). The microbial biodiversity is regarded as a special feature for beneficial with specific characteristic product. Discovery of new microbial taxa or strains need to preserve to make them accessible to other researchers for research, teaching and for biotechnological exploitation. Training Course for Developing Countries on WDCM Training Course for Microbiome Data Sharing. October 15-30, 2017 at the center for microbial resource and bid data, Institute of Microbiology, Chinese Academy of Sciences (IMCAS) supported by Bureau of International Co-operation Chinese Academy of Science, is a good initiative to bring the culture collections on single platform from the developing countries and help them sharing database with WFCC/WDCM. This training course to acquire knowledge on microbial culture collection around the world, microbiome data and data standards in this area and update our information regarding the main databases including WFCC and CCINFO, GCM on-line catalogue, taxonomic rules and regulation and required ISO certificate and Bioinformatics in general. The relatively long period of this training course provides participants with the opportunity of communication between scientific groups in different countries. Training course organized by WDCM, Institute of Microbiology, Chinese Academy of Science is a good initiative to bring the culture collections on single platform from the developing countries and help them sharing database with WFCC/WDCM.

Key words: Microbial, Metagenome, WFCC.

## **1. Brief Introduction of Your Culture Collection.**

The collection was founded on 2014 and be a member of WFCC (World Federation of Culture Collections (WDCM) in 2017. Collection has currently containing strains of yeast, filamentous fungi and bacteria that can be handled in Biosafety level 1 or 2 facilities (Risk Group 1 or 2).

The collection performs of Universitas Negeri Jakarta Culture Collection (UNJCC) is culture collection with aims to maintain, manage, and explore potential of Indonesian indigenous yeasts, fungi, and bacteria for teaching material, industry and environment (Fig 1). UNJCC also aspires to provide strains for researcher and teaching laboratories. The laboratory is equipped with freezer, refrigerated centrifuge, laminar air flow, phase-contrast microscope, PCR, autoclaves and incubators. For long term preservation, two techniques we are applied i.e. mineral oil, glass beds methods, and freezing. Objective is to establish and maintain a microbial culture collection center using a good system; to provide safe deposition of microbial cultures for Indonesian, lecturer, researchers and industries; to stimulate and support the study and research work related to microbial diversity and taxonomy in UNJ.

Our Research Area in CC are: (1) Microbial Diversity and Ecology (Exploration of Biodiversity; Microbial systematics; Ecological study: microbial community structure, host-microbe interaction) and Bioprospecting; (2) Bioprospecting (enzyme, biocontrol, and bioremediation) (Fig 2.)

Research projects developed by UNJCC staff or in collaboration with research groups of the host laboratory are largely focused on a polyphasic approach (using complementary molecular characterization) aiming at the phylogenetic study, identification and typing, and functional characterization of various microorganism

groups, in the frame of:

- Exploration of yeast, fungi and bacteria biodiversity from marine water and sediment.
- Exploration of yeast, fungi and bacteria biodiversity from soil.
- Exploration of yeast biodiversity from Botanical Garden.
- Exploration of bacteria biodiversity for surfactant.
- Exploration of yeast biodiversity from phylloplane plant *Broussonetia papyrifera*, *Canberra manghans*, flowers and indigenous fruit from Indonesia source.
- Exploration of the Basidiomycetes mushroom diversity from conservation area of Halimun mountain, and explore their potential as bioactive immunomodulator compound.
- Studies on the potential of yeasts from mangrove ecosystem in antagonism agent for inhibit pathogenic fungi produce aflatoxin AFB1 (*Aspergillus flavus*).
- The Potential of *Rhodotorula mucilaginosa*, *Rhodotorula glutinis* as carotenoid biomass.
- The potential of mycocin-potential yeasts as: Killer of *Candida albicans*.
- Bio preservatives for food products.
- Biocontrol against pathogenic fungi on agricultural plants and crops.
- Screening bioactive compound as  $\beta$ -1-3 Glucan from Basidiomycota mushroom, which isolated from the conservation area Panggrango mountain in Indonesia.
- The anticancer effect of polysaccharides isolated from higher Basidiomycetes mushrooms.

- Activity test on *C.albicans* and *E.coli* from *Lentinus edodes* miselium.
- Isolation and screening potential yeast for antagonism potential from many substrates in plant, animal, and soil.
- Application yeast from many substrates for probiotic in chicken gut.
- Screening and evaluation of probiotic microorganisms from fermented food and dairy product.
- Screening and production of microbial enzyme including cellulose, amylase, Chitinase, and protease, etc.

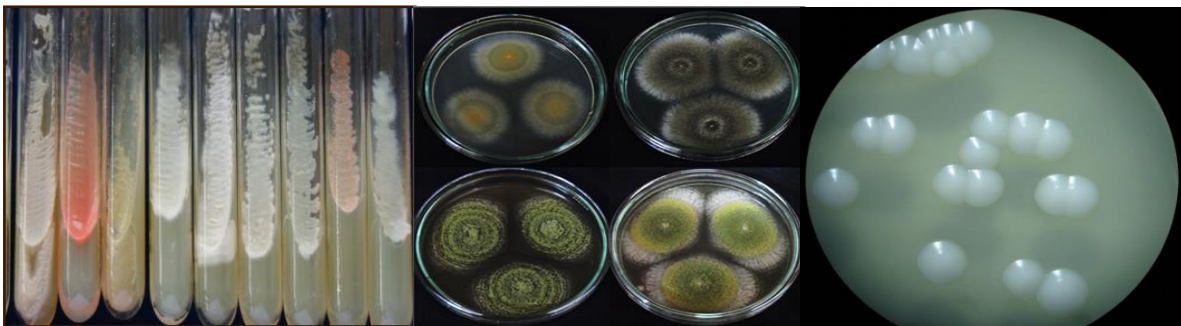


Fig 1. The collection of yeast and fungi isolates at UNJCC

Collection of Microorganisms Universitas Negeri Jakarta  
 Culture Collection (UNJCC)

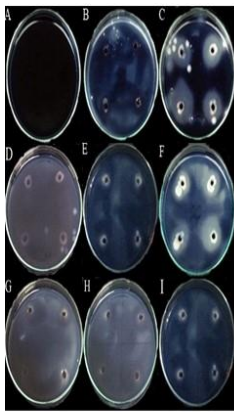
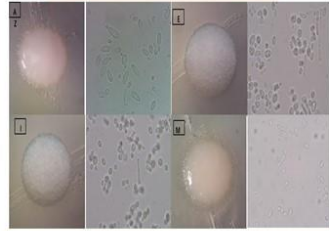


Fig 8. The ability produce amylase of yeast isolates based on clear zone formed by well method. (A) Negative control; (B) K33; (C) K34; (D) K36; (E) K37; (F) K39; (G) K48; (H) K107; (I) K128 YPSA medium, incubation 30°C at 72 h

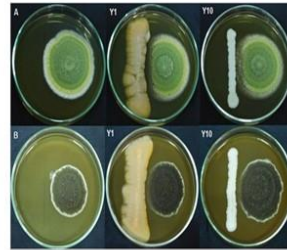
Yeast as Potential Produce Amylase



Code of isolates	Index IAA (mm) (Mean±SE)
control	0.00 <sup>a</sup>
K33	3.81 <sup>a</sup> ± 0.17
K34	21.05 <sup>a</sup> ± 1.65
K36	5.35 <sup>a</sup> ± 0.21
K37	4.56 <sup>a</sup> ± 0.83
K39	17.36 <sup>a</sup> ± 1.20
K48	6.83 <sup>a</sup> ± 0.20
K107	6.68 <sup>a</sup> ± 0.74
K128	4.76 <sup>a</sup> ± 0.25

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A = mold control (K6)  
 B = mold control (K9)  
 Y1 = Yeast  
 Y10 = Yeast

Yeast as Potential for Antagonism and Biocontrol Agents

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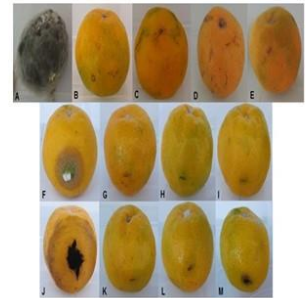


Fig 8. Biocontrol test of yeast from teak leaf against citrus fruit destroyer. A= Control fruit without sterilization; B= control fruit washed with water; C= control of surface sterilization fruits; D= fruit in soak yeast Y1; E= fruit in soak yeast Y10; F= mold control K6; G= Yeast and mold Y1+K6; H= Yeast and mold Y10+K6; I= fruits with dithane 0.3% + K6; J= mold control K9; K= yeast and mold Y1+K9; L= Yeast and mold Y10+K9; M= fruit with dithane 0.3%+K9. 7 days incubation.

Fig 2. The potential of yeast isolates produces amylase and as biocontrol from UNJCC

## 2. Benefit from The Training Courses.

The workshop give me provide me an in-depth knowledge on recent advances in the field of mycology. Training will also enrich my expertise in the field of recent technologies like metagenome and genome sequencing which will be helpful for me to share this knowledge with my colleagues and students at the university, attending this training will give me an insight into the details and idea of how to maintain collection in the laboratory conditions (Fig 3).



Fig 3. Presentation UNJCC in WDCM Training Course for Microbiome Data Sharing. October 15-30, 2017

Also, The WDCM training courses give us knowlagent about Global catalogue of microorganisms, the information about collaboration in change international student, overview of global mycological databases, data standards microbial resources, BSL3 laboratory, microbiome data analysis, 16S rDNA sequences based taxonomy identification, and the important thing to get information to collaboration and visiting CGMCC and this course will be a good media for exchange information and make a new collaboration with other CC in around the others country. That attending this training will be very useful to boost up my career and our CC can become good in management and preservation method. This course will be a way for us to develop expertise.

### **3. Suggestion on WDCM Work.**

WDCM should continue the effort of up grading data and built up research in microbiome at the culture collection around the world. It also should search for the strategies to support the small culture collection through financial sponsorship, collaboration and joint project and outsourcing services. I give some advice for the next course it will be better if some data practice will do with hand on, and give lecturer to analysis some metadata for metagenome data analysis. Also it would be very useful if you can introduce a short description for each of the following terms: ORDERS, DEPOSITS and MTA, how to software in metagenomic analysis works , so as all of database users (the beginner ones and those from very small collections, especially) to know what should be uploaded, it will very helpful for us.

### **4. Comments or Suggestion on The Training Courses.**

First, I am very thankful for the opportunity which WDCM offered me; participating at this training course was a real chance to get familiarized with data management, metagenome, so mandatory for curators. I would like to express my gratitude to WDCM and Bureau of international cooperation Chinese Academy of Science and Dr. Juncai Ma, Dr. Lihuan Wu and Miss Jianyuan Zhang for providing the opportunity of my participation in the Training Course, and also for sponsorship of the accommodation during the training course in Beijing. In my opinion, Bioinformatics, metagenomics and whole genome sequence analysis are very popular topic in modern microbiology. Hand on training to analyses data related to the recent molecular technologies would be very useful for participants.



## **5. Suggestion on Further Cooperation Between WDCM And Your Collections.**

UNJCC is looking forward to participating actively in sharing the data related to the collection generated from the project microbial mission. We would be happy to conduct similar training course in collaboration with WDCM in future. We will be very welcome if we can collaboration in microbiome data base from Indonesia land. And other for next corporation UNJCC and WDCM we hope can collaboration to build our CC with some kind project such as to improve the management and good preservation method of the UNJCC using method from WDCM protocol and with new informatic and bioinformatic tools; exchange of know-how with other culture collection via WDCM; organize workshop and courses for Indonesia benefit to collaboration with WDCM; setting up new research with topic soil microbiome, plant microbiome to selected potential microbe able to inhibited pathogenic microbe.