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17	ANGGUN CAHYANING PERTIWI	Sepuluh Nopember Institute of Techn	Adsorption of Cu(II) on Silica Gel Synthesize From Chemical Bottle Glass Waste: Optimization by Response Surface Methodology-Box Behnken Design	102	
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Moderator : Fenny Mentang

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2	Janed Lauren Soplantila	Universitas Kristen Indonesia	STUDY ETNOGRASTOMY OF TRADITIONAL FOOD OF AMBON LOCAL COMMUNITIES (REVIEW)	149	Video
3	Muhammad Ridla	Institut Pertanian Bogor	Evaluation of Soybean By-products as Ruminant Feeds: An In Vitro Rumen Fermentation Study	160	LIVE
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5	Agustin Zarkani	University of Bengkulu	A First record in Southeast Asia of the legless mealybug <i>Chaetococcus turanicus</i> Borchsenius (Hemiptera: Psudococcidae) from bamboo fields in Indonesia	183	LIVE
6	Dr. ENDANG NURCAHYANI, M.Si.	UNIVERSITY OF LAMPUNG	ASSEMBLY OF SUPERIOR VARIETY OF VANILLA ( <i>Vanilla planifolia</i> Andrews.) RESISTANT TO FUSARIUM WILT DISEASE BASED ON MOLECULAR TECHNIQUES AND INDUCED RESISTANCE WITH FUSARIC ACID	187	Video
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17	Yusnita Mirna Anggraeni	National Research and Innovation Agency (BRIN)	Behavioural Study of Anopheles vagus as a Potential Lymphatic Filariasis Vector in Several Provinces in Indonesia	248	
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No	Name	University	Title	Num of Abs	
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2	Binaria Lumban Gaol	Sepuluh Nopember Institute of Techno	The Influence of Hexamethylenetetramine on Iron Phosphate Solid	125	Video

# ASSEMBLY OF SUPERIOR VARIETY OF VANILLA (*Vanilla planifolia* Andrews.) RESISTANT TO FUSARIUM WILT DISEASE BASED ON MOLECULAR TECHNIQUES AND INDUCED RESISTANCE WITH FUSARIC ACID

Endang Nurcahyani<sup>1a)</sup>, Hardoko Insan Qudus<sup>2b)</sup>, Sumardi<sup>3c)</sup>, Azahra Putri  
Najla<sup>1d)</sup>, Meilyana Santa Maria<sup>4e)</sup>, Ratna Oktaviani<sup>1f)</sup>

## Author Affiliations

<sup>1</sup>Department of Applied Biology, Faculty of Mathematics and Natural Sciences, University of Lampung,  
Lampung, Indonesia.

<sup>2</sup>Department of Chemistry, Faculty of Mathematics and Natural Sciences, University of Lampung, Lampung,  
Indonesia.

<sup>3</sup>Department of Magister Biology, Faculty of Mathematics and Natural Sciences, University of Lampung,  
Lampung, Indonesia.

<sup>4</sup>Department of Biology, Faculty of Mathematics and Natural Sciences, University of Lampung, Lampung,  
Indonesia.

## Author Emails

<sup>a)</sup> Corresponding author: [endang.nurcahyani@fmipa.unila.ac.id](mailto:endang.nurcahyani@fmipa.unila.ac.id)

<sup>b)</sup> [hardoko.insan@fmipa.unila.ac.id](mailto:hardoko.insan@fmipa.unila.ac.id)

<sup>c)</sup> [sumardi.1965@fmipa.unila.ac.id](mailto:sumardi.1965@fmipa.unila.ac.id)

<sup>d)</sup> [azahra2856@gmail.com](mailto:azahra2856@gmail.com)

<sup>e)</sup> [meilyanasanta@gmail.com](mailto:meilyanasanta@gmail.com)

<sup>f)</sup> [ratnaoktaviani869@gmail.com](mailto:ratnaoktaviani869@gmail.com)

**Abstract.** Vanilla (*Vanilla planifolia* Andrews) is one of the plantation commodities with a fairly high economic value and has a fairly good name in the international market. In the international market, Indonesian vanilla is known as *Java Vanilla Beans* because it has the best quality with a vanillin content of 2.75%. The United Nations Development Program (UNDP), recommends that Indonesian vanilla be no different from "Bourbon vanilla" which has a very good image of the commodity in the international community. One of the production constraints in vanilla cultivation is stem rot disease which can cause very large losses with the result that the plant will die 50-100%, or even cannot produce and the quality of fruit from diseased plants is very low. This disease is caused by the fungus *Fusarium oxysporum* f. sp. *vanillae* (*Fov*) which until now still cannot be overcome effectively even though several studies have been done. The use of high-yielding varieties of vanilla that are resistant to stem rot is expected to be an important alternative for disease control. Resistance to disease can be obtained by means of Induced Resistance, namely treatment before pathogen infection with chemical compounds or by inoculation of non-pathogenic microorganisms. Induced resistance is resistance that is expressed after a plant is attacked by pathogens and can be used as an important tool for controlling plant diseases. The use of fusaric acid as a selection agent can produce variants that are insensitive to fusaric acid, so that after being regenerated into plants, the plants are resistant to *Fusarium oxysporum* infection. Vanilla plantlets resistant to *Fov* infection were initiated and selected in vitro in *Murashige and Skoog* medium with the addition of fusaric acid at different concentrations, and an indication of the concentration of fusaric acid tolerant for the selection of resistant vanilla plantlets was found. Inoculation of *Fov* fungus isolates on resistant vanilla has also been carried out, followed by analysis of DNA patterns, protein profiles, sequencing analysis, and specific expression characters on *Fov* resistant vanilla plantlets. This study aims to determine and determine: 1) the right combination of 2,4-D and NAA concentrations for callus initiation and shoot development from stem shoot explants and the appropriate BAP concentration for shoot initiation from stem node explants; 2) the concentration range of tolerant fusaric acid for selection of vanilla plantlets with optimum growth; 3) effective concentration of fusaric acid to suppress *Fov* fungus in vitro; 4) protein profile and DNA pattern of *Fov* resistant vanilla plantlets; and 5) sequencing analysis of ITS r-DNA regions; 6) The specific expression characters in *Fov*-resistant vanilla plantlets included total phenol content, peroxidase enzyme activity, lignin thickness, total chlorophyll, chlorophyll a, and chlorophyll b levels, as well as root and stem anatomical structures. The results

showed that: 1) 2,4-D 2.0 mg/L + NAA 10 mg/L was the best concentration combination for callus and shoot initiation from shoot and shoot explants and BA 1.0 mg/L was the best concentration for shoot initiation from stem node explants; 2) the concentration range of tolerant fusaric acid for the selection of vanilla plantlets with optimum growth is between 90 ppm-110 ppm; 3) in vitro suppression of *Fov* fungi using fusaric acid concentration of 110 ppm was more effective than concentrations of 90 and 100 ppm; 4) the appearance of protein bands ( $\pm 18$  kD) indicated the formation of PR-protein (peroxidase) in vanilla plantlets that were resistant to *Fov*. The presence of new (specific) DNA bands in *Fov*-resistant vanilla plantlets with sizes of 930 bp (OPB\_14), 430 bp (OPB\_20), and 230 bp and 270 bp (OPD\_19), can be predicted as candidate RAPD markers for resistance of vanilla plantlets to *Fov*; 5) the results of the sequencing analysis showed that the amplification of the ITS r-DNA region was detected in the 600-700 bp size band. Based on the comparison of the nucleotide base arrangement, vanilla treated with fusaric acid concentrations of 90 ppm, 100 ppm, and 110 ppm experienced mutations in the 18S; ITS 1; 5,8S; ITS2; and 26S rDNA regions; 6) the higher the concentration of fusaric acid, the higher the total phenol content, peroxidase enzyme activity, lignin thickness, and total chlorophyll, chlorophyll a, and chlorophyll b content in *Fov*-resistant vanilla plantlets. There were differences between the anatomical structure of the roots and stems of control, resistant and *Fov*-infected vanilla plantlets, namely the formation of tilosis in the trachea of roots and stems infected with *Fov*.

**Keywords:** *Fusarium oxysporum* f.sp. *vanillae*, fusaric acid, induced resistance, *Vanilla planifolia*, vanilla stem rot



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## SCHEDULE

### 3 June

Opening Ceremony			Venue
08:00	Registration	All participants	Pre-Function Hall
08:30	Commencing the Event	MC: drh. Kersty Putri Nathania Pinontoan	Kharisma Ballroom Hybrid Host: Alwin M. Sambul, S.T., M.Eng., Ph.D. Agus Muliantara, S.S.Kom., M.Kom.
08:33	ICON SMART Profile	Video	
08:35	Welcoming Remark	Prof. Dr. Benny Pinontoan, M.Sc. Dean, Faculty of Mathematics and Natural Science, Universitas Sam Ratulangi	
08:45	Indonesian National Anthem: Indonesia Raya	All Participants	
08:47	Prayer	I Gusti Ngurah Anom Cahyadi Putra, S.T., M.Cs.	
08:52	MIPAnet Introductory Remark	Prof. Dr. Hadi Suwono. Secretary-General of MIPAnet	
08:57	MDSM Introductory Remark	Prof. Dr. Rosalina. Chair of Majlis Dekan Sains dan Matematik, Malaysia	
09:02	Dance Performance: <i>Belibis Dance</i>	UKM Arts Universitas Udayana	
09:06	Collaborative Speech	Prof. Dr. Ir. I Nyoman Gde Antara, M.Eng., IPU. Rector, Universitas Udayana	
09:13	Opening Speech and Official Opening ICON SMART 2022	Prof. Dr. Ir. Ellen J. Kumaat, M.Sc., DEA. Rector, Universitas Sam Ratulangi	
09:20	Symbolic Opening	- Rector of Universitas Sam Ratulangi - Rector of Universitas Udayana - Secretary-general of MIPAnet - Head of MDSM - Deans of Co-host Faculties	
09:27	Photo Session 1	- VIPs - Deans of MIPAnet and MDSM	
09:30	Photo Session 2	- VIPs - Deans of MIPAnet and MDSM	
09:35	Dance Performance: <i>Baris Tunggal</i>	UKM Arts Universitas Udayana	
09:40	Thankyou Note	Susan Marlein Mambu, SP., M.Si., Ph.D The Conference Chair	
09:45	- Host and Co-host Profiles - Bali	Videos	
	Coffee Break	All Participants	



	Plenary Session	Moderator	Venue / Media
10:00	<b>Assoc. Prof. Dr. Anchana Prathep</b> (Prince of Songkla University, Thailand) <i>"Networking: A Better Way to Learn and Share Our Knowledges and Lead to A Greater Impact."</i>	Ir. Feky R. Mantiri, M.Sc., Ph.D. (UNSRAT)	Kharisma Ballroom Hybrid  Host: Alwin M. Sambul, S.T., M.Eng., Ph.D. Agus Muliantara, S.S.Kom., M.Kom.
10:25	<b>Prof. Dr. Junji Shikata</b> (Yokohama National University, Japan) <i>"Group Testing and its Application to Cryptography"</i>	Prof. Komang Dharmawan, Ph.D. (UNUD)	
10:50	<b>Prof. Dr. M. Basyaruiddin A. Rahman</b> (Universiti Putra Malaysia) <i>"Encapsulation and Nanodelivery of Active Molecules via Sustainable Reticular Materials"</i>	Dr. Bambang Fajar Suryadi (UNRAM)	
11:15	<b>Prof. Dr. Hadi Suwono</b> (Universitas Negeri Malang) <i>"Interdisciplinary Curriculum on Undergraduate Science Education"</i>	Dr.rer.nat. Henderite L. Ohee, M.Si. (UNCEN)	
11:40	<b>Prof. Dr. Zulqarnain Mohamed</b> (Universiti Malaya) <i>"Marine mammal conservation: DNA based approaches to studying biodiversity of selected dolphin species in Malaysia"</i>		
12:05	Lunch Break		



	Parallel Sessions	Moderator	Venue / Media
13:00	MIPAnet - MDSM Annual Meeting	MC: drh, Kersty Putri Nathania Pinontoan, S.KH.	Discovery Room Hybrid.
14.45	Coffee Break		
15:00	MIPAnet - MDSM Annual Meeting	MC: drh, Kersty Putri Nathania Pinontoan, S.KH.	

	Parallel Sessions	Moderator	Venue / Media
13:00	<p><b>Workshop: <i>Arduino-based Experiments in Research.</i></b> by Prince of Songkla University, Thailand:</p> <ol style="list-style-type: none"> <li>1. Assoc. Prof. Dr. Suttida Rakkapao</li> <li>2. Dr. Panu Thainiramit</li> <li>3. Asst. Prof. Dr. Singha Prasitpong</li> <li>4. Mr. Wissarut Phayphung</li> <li>5. Miss. Nutchanat Suchatpong</li> </ol>	Dr. Marisa Christina Tapilouw, S.Si., M.T. (UKSW) Handy Mossey, S.Si., M.Si. (UNSRAT)	Shinta Room
14:45	Coffee Break		
15:00	On-site Parallel Session <b>Class A</b>	Dr. Henny Rampe	



	Parallel Sessions	Moderator	Venue / Media
13:00	On-site Parallel Session <b>Class B</b>	Dr. Farha N.J Dapas, S.Si., M.Env. Stud (UNSRAT)	<b>Rama Room</b>
14:20	<b>Invited Speaker:</b> <b>Dr. Prasad Kaparaju</b> (Griffith University, Australia) <i>"Biological hydrogen and methane production from lignocellulosic feedstocks for natural gas grid injection"</i>	Dr. Farha N.J Dapas, S.Si., M.Env. Stud (UNSRAT)	
14:45	Coffee Break		
15:00	<b>Workshop: Optimization Using Graphs</b> by Yokohama National University, Japan <b>1. Prof. Dr. Seiya Negami</b> <i>"What happens in a very huge network?"</i> <b>2. Prof. Atsuhiko Nakamoto</b> <i>"Flip distance of triangulations on surfaces"</i> <b>3. Assoc. Prof. Kenta Ozeki:</b> <i>"A list orientation of a graph"</i>	Christie E. J. C Montolalu, S.Si., M.Sc. (UNSRAT) Ni Luh Dewi Sintuari, Ph.D. (UNDIKSHA) drh. Kersty Putri Nathania Pinontoan, S.KH.	

	Parallel Sessions	Moderator	Venue / Media
13:00- 17:00	On-site Parallel Session <b>Class C</b>	Cokorda Rai Adi Pramatha Handy Mosey	<b>Kharisma Ballroom</b>
	On-site Parallel Session <b>Class D</b>	Ratna Siahaan John Kekenusa	
	On-site Parallel Session <b>Class E</b>	Glanny Mangindaan Hanny Sangian	
	On-site Parallel Session <b>Class F</b>	Parluhutan Siahaan Yohanis Langi	
	Online (Zoom) Parallel Session <b>Class G – Class Y</b>		<b>Online Zoom</b>