

## KELENGKAPAN ARTIKEL

Judul Artikel :

Elaeocarpus grandiflorus induced immunoglobulin G activity on B Cell Receptor (BCR) Pathway

Nama seminar (Web):

The 9<sup>th</sup> International Conference of Mathematics Sciences and Educations

Web: <https://icmseunnes.com/2022/>

Kelengkapan:

1. Sertifikat presenter
2. Program book of Conference
3. PPT (Presentasi)
4. Ethical approval penelitiab

### SERTIFIKAT PRESENTER





# PROGRAM BOOK ICMSE 2022

The 9<sup>th</sup> International Conference on Mathematics, Science, and Education

“Innovative Research on Mathematics, Sciences and Education  
in Post Covid-19 Pandemic Towards Society 5.0”



supported by:



## CONTENTS

1	Preface
3	Welcome Note (Rector of Universitas Negeri Semarang)
4	Welcome Note (Dean of Faculty of Mathematics and Natural Sciences)
6	Welcome Note (Chairman of ICMSE 2022)
8	Schedule
10	Organizing Committee
11	Keynote Speakers
12	Parallel Session Schedule
42	Technical Instruction and Rules

## Welcome Note



Rector of Universitas Negeri Semarang  
Prof. Dr. Fethur Rokhman, M.Hum

Assalamu'alaikum warahmatullahi wabarakatuh,

First, I would like to express my gratitude to Allah SWT for His blessing and mercy that we could hold the 9<sup>th</sup> International Conference on Mathematics, Science, and Education (ICMSE) 2022. This year, ICMSE invites top keynote speakers to share their ideas and breakthrough in their own field, making this conference goes in-line with the vision of UNNES, to be a university with conservation insight international reputation. With the spirit as A House of Knowledge, UNNES always leads us to build our campus to develop civilization in producing quality of human resources in various fields to make better life. Thus, it brings UNNES as an Excellent University according to the National Accreditation Agency for Higher Education or BAN-PP. In addition, I would also like to send my sincere appreciation to the Faculty of Mathematics and Natural Sciences for hosting and holding this great conference, awarded best partners and co-host in this conference: Baskolistan University of Information Technology, Engineering, and Management Sciences (BUTEMS) Pakistan, and Asosiasi MIPA-LPTK Indonesia (AMLI) for always supporting the conference.

Lastly, I would like to congratulate all the contributors whose papers are presented in this prestigious conference. It is expected that this conference will bring significant and valuable ideas to improve our research and innovation to the education system in Indonesia and the world.

Warm Greetings,  
Wassalamu'alaikum warahmatullahi wabarakatuh.

## Welcome Note



Dean of Faculty of Mathematics and Natural Sciences  
Dr. Supanto, M.S.

Assalamu'alaikum warahmatullahi wabarakatuh,

Honorable Rector, Vice Rectors, Head of Institutes, Deans and Head of Departments in Universitas Negeri Semarang,  
Distinguished Speakers:

1. Prof. Dr. Matthias Ludwig, Goethe University Frankfurt, Germany
2. Dr. Muhammad Faruq bin Omar, Universiti Teknologi Malaysia, Malaysia
3. Dr. Nilesh Nirmai, Mahedol University, Thailand
4. Assoc. Prof. Teo Tang Wei, Nanyang Technological University, Singapore
5. Prof. Jong Siju-yung Monte, Chinese University of Hong Kong, Hong Kong
6. Dr. dr. Nugrahaningrat, W.N., M.Kes., Universitas Negeri Semarang, Indonesia

and distinguished participants from overseas countries and provinces in Indonesia. I extend to you all our warmest welcome to International Conference on Mathematics, Science and Education hosted by Faculty of Mathematics and Natural Sciences Universitas Negeri Semarang, and co-hosted Baskolistan University of Information Technology, Engineering and Management Sciences (BUTEMS) Pakistan, and Asosiasi MIPA-LPTK Indonesia (AMLI).

This is the ninth conference of International Conference on Mathematics, Science and Education and this year we have BUTEMS Pakistan as the co-host of organizer. The conference theme is "Innovative Research on Mathematics, Science and Education in Post Covid-19 Pandemic Towards Society 3.0". Through this conference, it is expected that we can create a discussion forum to improve the innovative research on mathematics, science, and education in this post-pandemic era. In addition, the ICMSE 2022 is still conducted virtually for the safety of all participants and to give a bigger opportunity to overseas participants to take part in this conference. We hope that the conference will be conducted successfully and deliver a fruitful discussion.

## Schedule of ICMSE 2022

9<sup>th</sup> International Conference on Mathematics, Science, and Education (ICMSE)  
Semarang, 5 – 6 October 2022

TIME (Western Indonesian Time GMT+7)	ACTIVITIES
<b>DAY 1: WEDNESDAY, 5 OCTOBER 2022</b>	
07:00 – 08:00	<b>Join ZOOM</b> <b>Zoom Meeting ID : 923 2989 8955</b> <b>Passcode : ICMSE</b>
08:00 – 08:30	<ul style="list-style-type: none"> <li>- Opening by MC</li> <li>- National Anthem "Indonesia Raya"</li> <li>- Prayer</li> <li>- Welcoming Speech by Chairman</li> <li>- Speech by Co-Host</li> </ul>
08.30 – 08.45	Speech and Official Opening by Rector of Universitas Negeri Semarang <b>Prof. Dr. Fathur Rokhman, M.Hum</b>
<b>Plenary Session I (Moderator: Rifa'atunnisa, S.Hut., M.Si., Ph.D.)</b>	
08:50 – 09:15	<b>Dr. dr. Nugrahaningsih WH, M.Kes.</b> Universitas Negeri Semarang, Indonesia Title: <i>Elaeocarpus grandiflorus</i> Extract Induced Immunoglobulin G Activity on B Cell Receptor (BCR) Pathway
09:20 – 09:45	<b>Assoc. Prof. Teo Tang Wee</b> National Institute of Education (NIE), Nanyang Technological University, Singapore Title: Innovative Research and Education in Post Covid-19 Pandemic Towards Society 5.0
09:50 – 10:10	<b>Dr. Muhammad Firdaus Bin Oman</b> Universiti Teknologi Malaysia, Malaysia Title: Fiber Bragg Grating Temperature Sensor with Sic/C Mutilayer Thin Film Coating for Sensing Improvement
10:10 – 10:25	QnA session

## PROGRAM BOOK OF ICMSE 2022

The 9<sup>th</sup> International Conference on Mathematics, Science, and Education  
Faculty of Mathematics and Natural Sciences - Universitas Negeri Semarang, 5-6 October 2022



<b>Plenary Session II (Moderator: Dr. rer.nat. Adi Nur Cahyono, M.Pd.)</b>	
10:30 – 10:55	<b>Prof. Dr. Matthias Ludwig</b> Goethe-Universität, Frankfurt, Germany Title: Teaching beyond Covid 19 - The Asymptote Project
11:00 – 11:25	<b>Prof. Jong Siu-yung, Morris</b> The Chinese University of Hong Kong, Hong Kong Title: Concerns about STEM Education: A Lesson Learned from Frontline Teachers in Hong Kong
11.30 – 11.55	<b>Dr. Nilesh Prakash Nirmal</b> Mahidol University, Thailand Title: Phytochemical-based Nano-formulation Increases Stability and Efficiency of the Compound
11:55 – 12:10	QnA session
12:10 – 13.00	Lunch Break
13:00 – 15:50	Parallel Session I (Oral Presentation)
15:50 – 16.00	Closing day 1
<b>DAY 2: THURSDAY, 6 OCTOBER 2022</b>	
07:00 – 08:00	Join ZOOM
08:00 – 12:00	Parallel Session II (Oral Presentation)
12.00	Closing day 2

## Organizing Committee of ICMSE 2022

### Supervisors:

Dr. Sugianto, M.Si  
Dr. Masrukan, M.Si  
Dr. Dwi Yulianti, M.Si  
Dr. Parmin, M.Pd

### Chairman:

Arif Widiyatmoko, S. Pd., M. Pd., Ph.D.

### Co-chairman:

Dr. Iwan Junaedi, M.Pd.

### Members:

1. Stephani Diah Pamelasari, M.Hum
2. Dr. Noor Aini Habibah, M.Si
3. Titik Ismiyati, S.Hum
4. Prof. Dr. Woro Sumarni, M.Si
5. Antonius Supriyadi, M. M.
6. Ninik Purwaningsih, M.Si
7. Senda Kartika Rakainsa, S.Farm., M.Pharm.Sc.
8. Cepi Kurniawan, Ph.D
9. Dr. Masturi, M.Si
10. Prof. Dr. Isti Hidayah, M.Pd
11. Dr. Langlang Handayani, M.App.Sc
12. M. Alauhdin, S.Si., M.Si., Ph.D.
13. Endang Sugiharti, S.Si., M.Kom
14. Trisni Wulandari V., M.M
15. Budi Prasetyo, M.Kom
16. Aji Purwinarko, S.Si., M.Cs.

## Keynote Speakers of ICMSE 2022



Prof. Dr. Matthias Ludwig

Goethe University Frankfurt, Germany



Assoc. Prof. Teo Tang Wee

Nanyang Technological University, Singapore



Dr. Muhammad Firdaus Bin Omar

Universiti Teknologi Malaysia, Malaysia



Prof. Jong Siu-yung, Morris

The Chinese University of Hong Kong, Hong Kong



Dr. Nilesh Nirmal

Mahidol University, Thailand



Dr. dr. Nugrahaningsih WH, M. Kes.

Universitas Negeri Semarang, Indonesia

## Parallel Session Schedule

### Day 1 (5 October 2022)

#### PARALLEL SESSION

The 9<sup>th</sup> International Conference on Mathematics, Science, and Education (ICMSE)

Day 1: Wednesday, October 5<sup>th</sup>, 2022

Room : 1  
 Scope : Biology and Biology Education  
 Moderator : Prof. Dr. drh. R. Susanti, M. P.  
 Zoom Meeting ID : 978 4221 7367  
 Passcode : 618747

Link to upload presentation file : <https://bit.ly/ICMSE2022-PresentationFile>

No.	Time (Western Indonesia Time GMT+7)	Title and Author
	13.00 – 13.05	<b>Opening of The Parallel Session</b>
1	13.06 – 13.21	<b>Invited Speaker:</b> Valorization of Agro-Industrial Oily Wastes into Microbial Cell-Bound Lipases for Solvent-Free Biodiesel Synthesis and Wastewater Bioremediation <i>Apichat Upaichit</i>
2	13.22 – 13.37	<b>Invited Speaker:</b> Wound healing in db/db mice with type 2 diabetes using non-contact exposure with an argon non-thermal atmospheric pressure plasma jet device <i>Arya Iswara</i>
3	13.38 – 13.53	<b>Invited Speaker:</b> <i>Bella Firdha Asyifa Haryanto</i>
	13.54 – 14.09	<b>Questions and Answer</b>
<b>Panel 1</b>		
4	14.10 – 14.20	Antidiabetic Activity of Moringa Leaf Extract On Oxidative Stress Parameters



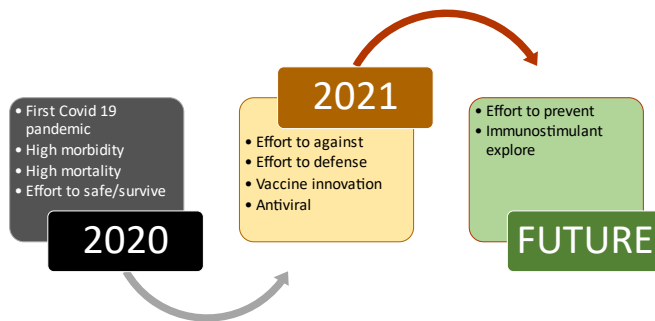
## PPT (PRESENTASI)

### *Elaeocarpus grandiflorus* Induced Immunoglobulin G Activity on B Cell Receptor Pathway



Dr. dr. Nugrahaningsih WH, M.Kes  
Associate Professor of Biology  
Department  
Universitas Negeri Semarang

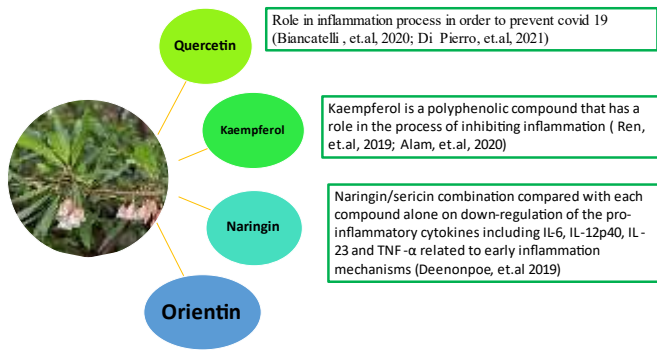
## BACKGROUND



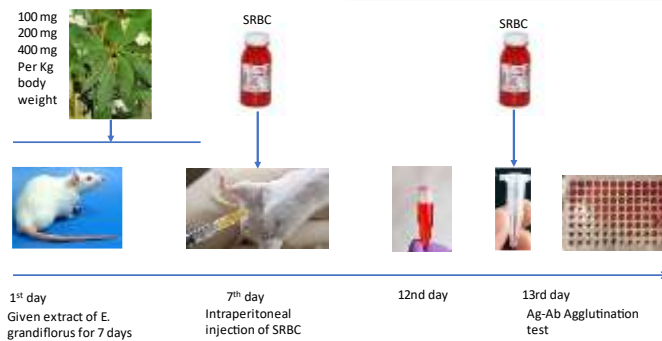
Previous Immunostimulant herb research:

Piper longum Linn  
Phyllanthus niruri  
Andrographis paniculata  
Panax ginseng  
Allium sativum  
Curcuma longa  
etc

# E. grandiflorus

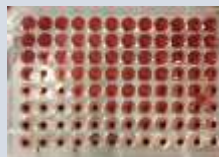


## RESEARCH METHODS



## Agglutination test

- The wells were marked according to the sample order.
- The serum was diluted by double dilution with PBS NaCl pH 7.4 in a ratio of 1/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256, and 1/512.
- First step: pipette 75  $\mu$ L of PBS NaCl pH 7.4 and 25  $\mu$ L of serum to the lowest dilution of 1/4. Then pipette 50  $\mu$ L of PBS NaCl pH 7.4 at each dilution from 1/8 to 1/512 dilution.
- Pipette 50  $\mu$ L from a 1/4 dilution to a 1/8 dilution, then homogenize. Pipette 50  $\mu$ L from 1/8 dilution to 1/16 dilution, then homogenize.
- The same procedure was carried out for each dilution until the highest dilution was 1/512, so that the volume of each dilution was 50  $\mu$ L.
- Pipette 50  $\mu$ L SRBC 2% v/v into each dilution so that the volume becomes 100  $\mu$ L, then homogenize.
- Then it was incubated at 37°C for 60 minutes and allowed to stand for 1x24 hours at room temperature,
- observed the agglutination



## RESULT

- The highest positive result of agglutination test was 1/128 dilution
- Only P3 (400 mg/KgBW) group showed the difference
- The positive control have no difference

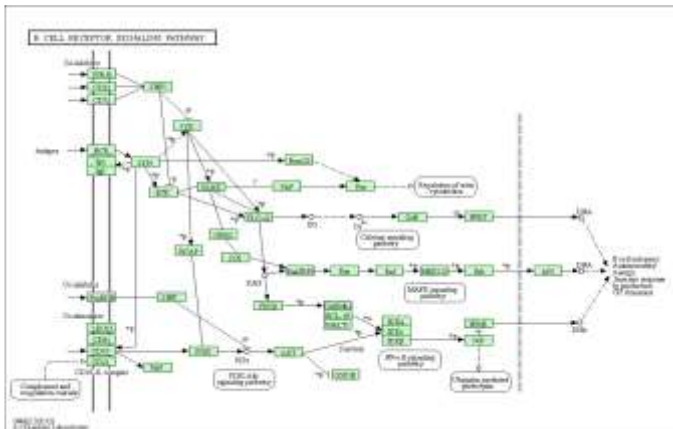
Table 1. The positive agglutination test

dilutio n	Neg control					Pos control					P1					P2					P3				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1/512																									
1/256																									
1/128																					++	++	++	++	++
1/64																					+++	+++	+++	+++	+++
1/32	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
1/16	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
1/8	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
1/4	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++



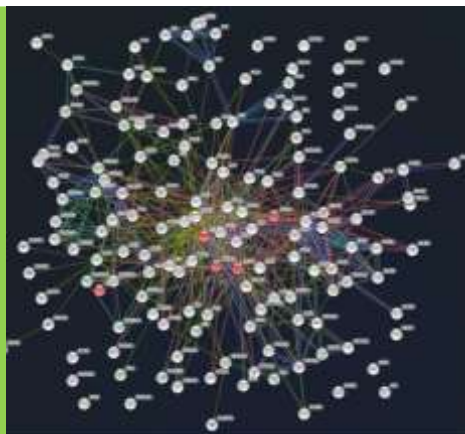
## DISCUSSION

- Antibody was produced by B cell as the response to antigen stimulus. B cell produce and secrete millions of different antibody molecules, each of which recognizes a different (foreign) antigen.
- Sheep red blood cell induced immune system by activated **B Cell Receptor (BCR) pathway**.
- The first stimulus of sheep red blood cell leads the formation of a specific antibody. The first specific antibody not release but is stored in the plasma membrane. This specific antibody **role as receptor for sheep red blood cell antigen**.
- The second meeting with the sheep red blood cell will activated membrane receptor signaling to produced specific antibody. This specific antibody will released to the blood or tissue



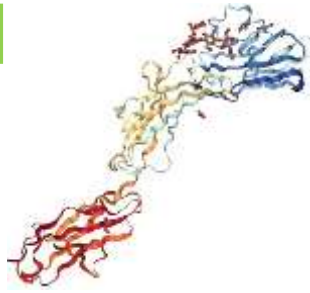
The target of *E. grandiflorus* on B Cell Receptor (BCR) Pathway :

- CD22
- HRAS
- PIK3R1
- AKT1
- GSK3B



## CD22(cluster of differentiation -22)

- The ligand-binding domain of CD22 is important for regulation of B-cell Ca signaling
- CD22 associated with other signaling molecules otherwise involved in positive BCR signaling: PLC $\gamma$ 2, Syk, and PI3K
- Naringin from *E. grandiflorus* recruited to CD22 and positively increased B Cell activation --> increased Ig production



## HRAS

- The HRAS protein is a GTPase and is an early player in many signal transduction pathways and is usually associated with cell membranes due to the presence of an isoprenyl group on its C-terminus.
- HRAS acts as a molecular on/off switch, once it is turned on it recruits and activates proteins necessary for the propagation of the receptor's signal, such as c-Raf and PI3K.
- PI3K and phospholipase C $\gamma$ 2 (PLC- $\gamma$ 2) are important downstream effectors of BCR signaling, and results in the expression of immediate early genes that further activate the expression of other genes involved in B cell proliferation, differentiation and Ig production
- Orientin binding to HRAS and resulted Ig G production



## PI3KR1 (phosphoinositide-3-kinase regulatory subunit 1)

- PI3KR1 is a member of the PI3K/AKT pathway, which is a key regulator of various cellular processes such as proliferation and apoptosis
- The PI3K pathway can be activated by a range of signals, including hormones, growth factors and components of the extracellular matrix (ECM)
- Quercetin role as extracellular ligand bind to a receptor tyrosine kinase (RTK) in the plasma membrane, causing receptor dimerization and cross-phosphorylation of tyrosine residues in the intracellular domains



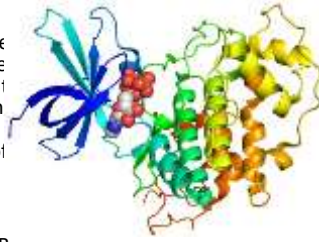
## AKT1

- AKT1 is one of 3 closely related serine/threonine protein kinases (AKT1, AKT2 and AKT3) called the AKT kinase, and which regulate many processes including metabolism, proliferation, cell survival, growth and angiogenesis
- AKT also regulates glycogen synthase kinase $\beta$ , a kinase whose substrates include the nuclear factor of activated T cells (NFAT) $\kappa$  and beta-catenin transcriptional activators. In addition to Akt, PI3K derived lipids also regulate the activity and localization of other targets of BCR signaling. Thus, a key event in BCR signaling is the recruitment of PI3K to the plasma membrane where its substrates are located. This is mediated by binding of the Src homology (SH) 2 domains in PI3K to phosphotyrosine-containing sequences on membrane-associated docking proteins



## GSK3B (Glycogen synthase kinase -3β)

- GSK3 have two isomer: GSK3  $\alpha$  and GSK3 $\beta$
- GSK3 enhanced immune responses to counteract real, or stress-induced perceive threats to survival. Thus, survival may have benefited from GSK3 promoting both innate and adaptive immune responses, increasing the production of multiple inflammatory cytokines and promoting the production of Th1 and Th17 inflammatory T cells, which should increase resistance to injury and infection
- Quercetin of *E. grandiflorus* bind to GSK3B and promoted Ig G production



## CONCLUSION

- *E. grandiflorus* potentially to develop as an immunostimulant. The extract influence Ig G production through the B Cell Receptor (BCR) pathway. Quercetin, naringin and orientin bind to CD22, HRAS, PIK3R1, GSK3B and AKT1 resulted increasing of IgG activity.

## ETHICAL APPROVAL PENELITIAN



KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET DAN TEKNOLOGI  
UNIVERSITAS NEGERI SEMARANG  
FAKULTAS ILMU KEOLAHRAHAAN  
**KOMITE ETIK PENELITIAN KESEHATAN (KEPK)**  
Gedung F5, Lantai 2 Kampus Sekaran, Gunungpati, Semarang, Telp (024) 8508107

### **ETHICAL CLEARANCE** Nomor: 303/KEPK/EC/2022

Komite Etik Penelitian Kesehatan Universitas Negeri Semarang, setelah membaca dan menelaah usulan penelitian dengan judul :

Kaempferol dan Quercetin dari Ekstrak Daun *Elaeocarpus grandiflorus* sebagai immunostimulan

Nama Peneliti Utama : Dr. dr. Nugrahaningsih WH, M.Kes  
Institusi Peneliti : Jurusan Biologi, Fakultas Matematika dan Ilmu Pengetahuan Alam, UNNES  
Lokasi Penelitian : Laboratorium Biologi, Fakultas Matematika dan Ilmu Pengetahuan Alam UNNES  
Tanggal Persetujuan : 11 Juli 2022  
(berlaku 1 tahun setelah tanggal persetujuan)

menyatakan bahwa penelitian di atas telah memenuhi prinsip-prinsip yang dinyatakan dalam Standards and Operational Guidance for Ethics Review of Health-Related Research with Human Participants dari WHO 2011 dan International Ethical Guidelines for Health-related Research Involving Humans dari CIOMS dan WHO 2016. Oleh karena itu, penelitian di atas dapat dilaksanakan dengan selalu memperhatikan prinsip-prinsip tersebut.

Komite Etik Penelitian Kesehatan berhak untuk memantau kegiatan penelitian tersebut.

Peneliti harus melampirkan *informed consent* yang telah disetujui dan ditandatangani oleh peserta penelitian dan saksi pada laporan penelitian.

Peneliti diwajibkan menyerahkan:

- Laporan kemajuan penelitian
- Laporan kejadian bahaya yang ditimbulkan
- Laporan akhir penelitian

Semarang, 11 Juli 2022  
Ketua,

Prof. Dr. dr. Oktia Woro K.H., M.Kes.  
NIP. 19591001 198703 2 001