



No. 1108/UN36.1/KP/2022

# Certificate of Appreciation

This Certificate is Presented to

**Hartono**

as **Presenter**  
of a paper entitled

**Development of Chitosan Based siRNA-PLK1 Nanoparticles I  
as Anticancer**

in the 2<sup>nd</sup> International Conference on Life Science and Biology Education (ICoLiBE),  
Organized by Biology Department, Faculty of Mathematics and Natural Sciences (FMIPA)  
Universitas Negeri Makassar (State University of Makassar)

Makassar, November 15<sup>th</sup>, 2022

**Dean of FMIPA  
Universitas Negeri Makassar**



**Drs. Suwardi Annas, M.Si., Ph.D.**

NIP. 196912311994031110

Supported by:







**BOOK OF ABSTRACT**

**ICoLiBE**

**2nd International Conference on Life  
Science and Biology Education (ICoLiBE)**

**Biology Department, FMIPA UNM,  
Makassar, South Sulawesi, Indonesia  
on November 15th, 2022**

**BIOLOGY AND  
LEARNING**

## PREFACE

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### Foreword by The Dean of Faculty of Mathematics and Natural Science, Universitas Negeri Makassar (UNM)



Assalamualaikum Wr. Wb.

I would like to take this opportunity to express my sincere appreciation to all keynote speakers and invited speakers for accepting our invitation to share their research findings and best practices here, at the 2nd International Conference on Life Science and Biology Education, organized by Biology Department FMIPA UNM. We do hope that best practices in the field of Biological science and Biology education can be well communicated among researchers, teachers educators, school teachers, and also students joining this conference.

I would also like to take this opportunity to thank the Chair of The 2nd ICoLiBe for organizing this special event as a platform for networking as well as for exchanging knowledge and best practices in the field of Biological science and Biology education.

The 2nd International Conference on Life Science and Biology Education is not only expected to be a forum to disseminate the latest research findings in the field of Biology and Biology Education, but it is also expected to be a networking forum for researchers, teacher educators, and school teachers. We hope that the meeting of researchers and academics from various institutions in this place can be a starting point for more collaborations in the future.

Behind the implementation of these activities, there are hard work, commitment and outstanding cooperation of the executive committee. Therefore, to the whole team of the executive committee, I really thank you for your hard work and enthusiasm for the success of the 2nd International Conference on Life Science and Biology Education.

Finally, as the Dean of The Faculty of Mathematics and Natural Sciences Universitas Negeri Makassar, I would like to congratulate all participants for joining the 2nd International Conference on Life Science and Biology Education. Hopefully, this conference can bring benefits for all of us.

Wassalamualaikum wr wb.

Makassar, November 2022  
Dean of FMIPA UNM,

Drs. Suwardi Annas, M.Si., Ph.D

# ICoLiBe 2022

2nd International Conference on Life  
Science and Biology Education (ICoLiBe)



## GREETINGS FROM THE COMMITTEE

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### Foreword by Chairman ICoLIBE 2022



Assalamualaikum Wr. Wb.

First of all, let's raise our praise and gratitude to the Almighty God who still gives us mercy and blessing so that the 2nd International Conference on Life Science and Biology Education organized by Biology Department, Faculty of Mathematics and Natural Sciences, Universitas Negeri Makassar can be successfully held today.

As the head of the committee, I would like to deliver my sincere appreciation to all keynote speakers and all invited speakers for their willingness to spend their time with us at the 2nd International Conference on Life Science and Biology Education to share knowledge and insights on the field of life science and Biology education.

There are a total of 317 participants joining this conference, both offline and online participants, including 105 parallel presenters. Presenters joining this conference are researchers, teacher educator, and students from various institutions, including from Hiroshima University Japan, Monash University Australia, and several universities across Indonesia, such as Universitas Gajah Mada, Universitas Padjadjaran, Universitas Hasanuddin, Universitas Negeri Malang, Universitas Negeri Makassar, Universitas Islam Makassar, Universitas Bosowa, Universitas Sulawesi Barat, Universitas Halu Oleo, UIN Walisongo Semarang, Universitas Riau, Universitas Negeri Medan, Universitas Tanjungpura, Universitas Sembilanbelas November Kolaka, Universitas Nusa Nipa, Universitas Borneo Tarakan, STMKG (College of Meteorology, Climatology and Geophysics), Senior High School from south sulawesi, and also from National Research Agency and Innovation (BRIN).

We do hope that the knowledge sharing through this conference can bring positive impacts to improve the quality of research and education, particularly to foster collaboration among researchers in the field of Biology and Biology education. On behalf of the committee, I would like to apologize if there are weaknesses during the 2nd International Conference on Life Science and Biology Education.

Wassalamualaikum Wr. Wb.

Makassar, November 2022  
Chairman of ICoLIBE 2022,

Dr. Ir. Muh. Wiharto, M.Si

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Science and Biology Education (ICoLIBE)

## COMMITTEE

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Chairman	: Dr. Ir. Muh. Wiharto, M.Si
Vice Chairman	: Dr. St. Fatmah Hiola, S.P, M. Si.
Secretary	: Faisal, S.Pd., M.Pd., Ph.D
Vice Secretary	: Dian Dwi Putri Ulan Sari Patongai, S.Pd., M.Pd
Treasurer	: Dr. Andi Munisa, M.Si
Vice Treasurer	: Andi Bida Purnamasari, S.Si., M.Kes
Secretariat Division	: Dr. Abd. Muis, M.Si
Event Division	: Prof. Dr. Ir. Yusminah Hala, M.S
Finance Division	: Dr. Adnan, M.Si
Publication Division	: Prof. Oslan Jumadi, S.Si., M.Phil., Ph.D
Equipment Division	: Dr. A. Mushawwir Taiyeb, M.Kes
Consumption Division	: Dr. Syamsiah, M.Si



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## CONFERENCE SCHEDULES

### Program at Glance (Tuesday, November 15<sup>th</sup>, 2022)

Link Zoom : <https://us06web.zoom.us/j/83065458374?pwd=OVhZTFYrUXY2dTcvVmFNbmRTZXAxM2dzO9>

Meeting ID : 830 6545 8374

Passcode : Conference

Time (GMT+8)	Speaker	Venue
08:00-08:30	<b>Registration</b>	
08:30-09:30	<b>Opening Remarks:</b> 1. Chairman of ICoLIBE 2022, <b>Dr. Ir. Muh. Wiharto, M.Si</b> 2. Dean of Faculty of Mathematics and Natural Sciences, UNM. <b>Drs. Suwardi Annas, M. Si., Ph.D.</b> 3. Rector of Universitas Negeri Makassar (UNM). <b>Prof. Dr. Ir. H. Husain Syam, M. TP., IPU., ASEAN Eng</b>	Menara FMIPA UNM, Floor 12
09:30-09:45	<i>Tea Break</i>	
09:45-10:30	<b>Professor Nathalie Bourgougnon</b> Université de Bretagne Sud, France	
10:30-11:15	<b>Professor Kazuyuki Inubushi.</b> Tokyo University of Agriculture, Japan	
11:15-12:00	<b>Dr. Hye Eun-Chu</b> Macquarie University, Australia	
12:00-13:30	<i>Lunch Break</i>	
13:30-14:15	<b>Prof. Dr. Fahrul Zaman Bin Huyop</b> Universiti Teknologi Malaysia, Malaysia	Menara FMIPA UNM, Floor 12
	<b>Professor Sonya N. Martin.</b> Seoul National University, Republic of Korea <a href="https://us06web.zoom.us/j/85359330646?pwd=UmlTaU9UeW9vZXRFWDN4dHh5VmpOUT09">https://us06web.zoom.us/j/85359330646?pwd=UmlTaU9UeW9vZXRFWDN4dHh5VmpOUT09</a> Meeting ID: 853 5933 0646, Passcode: BioUNM	Zoom Meeting
14:15-15:00	<b>Prof Oslan Jumadi, Ph.D.</b> Universitas Negeri Makassar, Indonesia	Menara FMIPA UNM, Floor 12
	<b>Asst. Professor Sirinapa K, Ph.D.</b> Naresuan University, Thailand <a href="https://us06web.zoom.us/j/85359330646?pwd=UmlTaU9UeW9vZXRFWDN4dHh5VmpOUT09">https://us06web.zoom.us/j/85359330646?pwd=UmlTaU9UeW9vZXRFWDN4dHh5VmpOUT09</a> Meeting ID: 853 5933 0646, Passcode: BioUNM	Zoom Meeting
15:00-15:30	<i>Tea Break</i>	
15:30-18:50	Oral Presentation Concurrent Session (Offline)	Menara FMIPA UNM, Floor 12
	Oral Presentation Concurrent Session (Online)	Zoom Meeting
18:50-18:55	<b>Closing Ceremony</b>	

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## PARALLEL SESSION

### OFFLINE (Biology Education)

ROOM 1 : Menara FMIPA UNM, Floor 12

Moderator : Dian Dwi Putri Ulan Sari Patongai, S.Pd., M.Pd

Operator : HMJ Biologi

No	Name	Affiliation	Title	Time (GMT+8)
1	Khairurrahimin	Universitas Negeri Makassar	Profile Of Student Learning Outcome Using Contextual Teaching And Learning Approach In Sma Negeri 11 Makassar	15.30-15.40
2	Prof. Dr. Nurhayati B., M.Pd	Universitas Negeri Makassar	The Effectiveness Of Authentic Assessment Instruments Based On Science Literacy On Learning Outcomes And Science Literacy Abilities In Biology Subjects Of MAN 2 Soppeng Students	15.40-15.50
3	Dr. Ismail, M.S	Universitas Negeri Makassar	Development And Validity Of Biology Learning Tool Using The Tpack Framework With Guided Inquiry Settings To Improve Student's Science Literacy Skills	15.50.16.00
<b>Question And Answer Session</b>				16.00-16.10
4	Qurniasty	Universitas Negeri Makassar	Development of E-Module Applications Based on Research Results on Macrozoobenthos Diversity Based on Project Based Learning (PjBL) Assisted by Hypertext Preprocessor (PHP) Applications to Improve Environmental Attitudes of Class X High School Students	16.10-16.20
5	Rani Ramadani	Universitas Negeri Makassar	Guided Inquiry Learning To Science Process Skills And scientific Attitudes: The Experimentals Evidence	16.20-16.30
6	Ahmad Fahrezi Diab	Universitas Negeri Makassar	Validity Testing Of E-Atlas Monocot Plants Anatomy Family Poaceae As A Learning Media	16.30-16.40
<b>Question And Answer Session</b>				16.40-16.50
7	St. Muriati	Universitas Bosowa	Analysis Of Character Value Of Natural Science Education Students At Bosowa University	16.50-17.00
8	Rughaya Salsabila SM	Universitas Negeri Makassar	Analysis Of School Field Introduction I Implentation Biology Education Faculty Of Mathematics And Natural Sciences Makassar State University At SMAN 14 Makassar	17.00-17.10
9	Sitti Saenab	Universitas Negeri Makassar	How literate prospective science teacher in this digital era? Profile of digital literacy skills of preservice science teacher in South Sulawesi, Indonesia	17.10-17.20
<b>Question And Answer Session</b>				17.20-17.30
10	Prof. Firdaus	Universitas Negeri Makassar	Relationship of Knowledge, Attitudes, and Community Participation on Clean Water Management in Camba District, Maros Regency	17.30-17.40
11	Muliana GH	Universitas Negeri Makassar	Practicality of Learning Media Video Tutorial Biology Digestive System Concept	17.40-17.50
12	Asham Bin Jamaluddin	Universitas Negeri Makassar	Critical Thinking and Learning Achievement in Higher Education: How They are Correlated	17.50-18.00
<b>Question And Answer Session</b>				18.00-18.10

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**OFFLINE (Biology Education)**

ROOM 2 : Menara FMIPA UNM, Floor 7

Moderator : Muliana GH, S.Pd., M.Pd

Operator : HMJ Biologi

No	Name	Affiliation	Title	Time (GMT+8)
1	Afifah Ichsanty AR	Universitas Negeri Makassar	The Implementation Of Blended Learning To Enhance The Student's Cognitive Learning Outcomes	15.30-15.40
2	Vesly Hardianti pabisa	Universitas Negeri Makassar	The Effect of Problem Based Learning Model on Critical Thinking Skills and Learning Outcomes of Class X High School Students in Biology Learning.	15.40-15.50
3	Fitriah Rahmayanti Ismail	Universitas Negeri Makassar	Profile of Students Problem Solving Ability Through the Application of Problem Based Learning Model on Environmental Change Material	15.50.16.00
<b>Question And Answer Session</b>				16.00-16.10
4	Ainun Fitriski Utami	Universitas Negeri Makassar	Analysis Of Teacher And Student Needs On The Use Of E-Module Based On Project Based Learning Materials Of Environmental Change In Class X SMA/MA	16.10-16.20
5	Rafida Roslan	Universitas Negeri Makassar	Analysis Of The Need For Development Of Google Sites Web-Based Learning Media On Motion System Materials For Class XI SMA	16.20-16.30
6	Rio Rezki Mustamin	Universitas Negeri Makassar	Profile of the Level of Scientific Reasoning of Students on Biology Material for Class XII SMA Negeri 7 Luwu	16.30-16.40
<b>Question And Answer Session</b>				16.40-16.50
7	Melfhira Ardalin Biantong	Universitas Negeri Makassar	Analysis Of Student's Higher Order Thinking Skill In Biology Learning Class Xi Sma Negeri 1 Kolaka	16.50-17.00
8	Restidar Soedarto	Universitas Negeri Makassar	The Relationship between Knowledge Levels about Viruses and Health Behavior of Class X MAN 2 Makassar City Students	17.00-17.10
9	Ayunda Widya Frasiska	Universitas Negeri Makassar	Profile of Students' Scientific Argumentation Skills Through Biology Learning Based on Scientific Social Issues	17.10-17.20
<b>Question And Answer Session</b>				17.20-17.30



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**OFFLINE (Biology Education)**

ROOM 3 : Menara FMIPA UNM, Floor 7

Moderator : Saparuddin, S.Pd., M.Pd

Operator : HMJ Biologi

No	Name	Affiliation	Title	Time (GMT+8)
1	Raihanah Musfirah	Universitas Negeri Makassar	Level Of Science Literature Capabilities Of Class Ix Students Of SMA Negeri 40 Makassar With Pisa Standard Questions	15.30-15.40
2	Fairuz Azizah Ismail	Universitas Negeri Makassar	Improving Student's Science Literature Ability Through Problem-Based Learning At SMPN 40 Makassar	15.40-15.50
3	Masyta Nurul Jihad	Universitas Negeri Makassar	Analysis Of Increased Activity And Scientific Attitudes Of Students On Human Excretory System Materials Through Cooperative Jigsaw Types In Class Xi Students Of Man Pinrang	15.50.16.00
<b>Question And Answer Session</b>				16.00-16.10
4	Sri Irmayani Sukur	Universitas Negeri Makassar	Effectiveness Of The Circulatory System Learning Unit With Guided Inquiry Based Flipped Classroom Learning Settings To Improve Self Regulated Learning And Student Learning Outcomes In Class Xi	16.10-16.20
5	Sriwahyuni	Universitas Negeri Makassar	Analysis Of The Need For Development of Mind Mapping-Based Biology E-Book On Animalia Materials For Class X Senior High School	16.20-16.30
6	Putri Regita Ananda	Universitas Negeri Makassar	Analysis of the Implementation of the School Field Introduction (PLP) 01 at SMA Negeri 12 Makassar	16.30-16.40
<b>Question And Answer Session</b>				16.40-16.50
7	Winnie Criswi Pratama	Universitas Negeri Makassar	The effect of the Problem Based Learning (PBL) model on students' critical thinking skills in the cell material of class XI at SMA Negeri 6 Luwu Timur	16.50-17.00
8	Alfina Putriyani Ahmad	Universitas Negeri Makassar	Correlation between Learning Motivation and Science Literacy Skills of Class XII High School Students on Coordination System Materials Using NOSLiT Questions.	17.00-17.10
<b>Question And Answer Session</b>				17.10-17.20



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**OFFLINE (Biology et al)**

ROOM 4 : Menara FMIPA UNM, Floor 7

Moderator : Sahribulan, S.Si., M.Si

Operator : HMJ Biology

No	Name	Affiliation	Title	Time (GMT+8)
1	M. Yasin HG.	Fakultas Pertanian UIM Makassar	Development Opportunities Of Waxy Corn In South Sulawesi	15.30-15.40
2	Prof.Dr. Aris Badara, S.Pd., M.Hum.	Universitas Hali Oleo	Survival Of The Marine Environment Lexicon Bajo Language	15.40-15.50
3	Panji Setiawan	Universitas Negeri Makassar	Application Of Black Soldier Fly (Hermetia Illucens) Frass Affacted Grenhouse Gas In Corn Field	15.50.16.00
Question And Answer Session				16.00-16.10
4	Erni Widiastuti	Universitas Negeri Makassar	Effect of Application Mealworm Frass (Tenebrio molitor) on Emission of CH <sub>4</sub> , N <sub>2</sub> O, CO <sub>2</sub> , Ammonium (NH <sub>4</sub> <sup>+</sup> ), Nitrate (NO <sub>3</sub> <sup>-</sup> ) in Paddy Field	16.10-16.20
5	Didik Imam Sakirin	Universitas Negeri Makassar	The Effects of Golden Sea Cucumber (Stichopus hermanii) Ethanol Extract on the Lung Histopathology of Mice (Mus musculus) Exposed to Hydrochloric Acid (HCl) 37%	16.20-16.30
6	Awal Nur Rahmat	Universitas Negeri Makassar	The Effect Of Sodium Bicarbonate (Nahco <sub>3</sub> ) Addition On The Growth Of Chlorella Sp Type Microalgae	16.30-16.40
Question And Answer Session				16.40-16.50
7	Fadel Muhammad Syachreza	Universitas Negeri Makassar	Important Value Index of Tree Vegetation In Buffer Zone of Samangki Village, Bantimurung Bulusaraung National Park	16.50-17.00
8	Hotna Pala'biran	Universitas Negeri Makassar	Important Value Index of Shrub Vegetation in Buffer Zone, Samangki Village, Bantimurung Bulusaraung National Park	17.00-17.10
9	Hartono	Universitas Negeri Makassar	Development of Chitosan Based siRNA-PLK1 Nanoparticles as Anticancer	17.10-17.20
Question And Answer Session				17.20-17.30
10	Novita K	Universitas Negeri Makassar	Emission of Greenhouse Gas (N <sub>2</sub> O, CH <sub>4</sub> , CO <sub>2</sub> ), Nitrification Rate and Metagenomics of Bacteria in Soil Treated with Organic Frass of Black Soldier Fly (BSF)	17.30-17.40
11	Sudding	Chemistry Department, Universitas Negeri Makassar	ISOLATION AND BIOACTIVITY TESTING AS ANTIDIABETIC OF SECONDARY METABOLITES EXTRACT OF CHLOROFORM PURSLANE (Portulaca oleraceae L)	17.40-17.50
12	Nani Kurnia	Universitas Negeri Makassar	ORGANOLEPTIC TESTING OF SWEET POTATO TAPAI (Ipomoea batatas L.) FERMENTED BY GLUTINOUS RICE TAPAI YEAST	17.50-18.00
Question And Answer Session				18.00-18.10



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**OFFLINE (Biology et al)**

ROOM 5 : Menara FMIPA UNM, Floor 7

Moderator : Dr. Evi Ristiana, M.Pd

Operator : HMJ Biology

No	Name	Affiliation	Title	Time (GMT+8)
1	Alfiqi Dwiva Annisi	Universitas Negeri Makassar	Isolation of Polysaccharide Degrading Enzyme Producing Bacteria from Digestive Organs of Abalone <i>Haliotis</i> sp.	15.30-15.40
2	Nur Asisa Bachok	Universitas Negeri Makassar	Effect of Frass Mealworm ( <i>Tenebrio molitor</i> ) on Growth and Soil Microalgae Growth	15.40-15.50
3	Husnul Khatima	Universitas Negeri Makassar	Inventory of Domesticated Orchids in the Buffer Area of Bantimurung Bulusaraung National Park (Case Study: In Realolo Village, Mallawa District, Maros Regency)	15.50.16.00
Question And Answer Session				16.00-16.10
4	Yustika Indah Sari Noviar	Universitas Negeri Makassar	The Effects of the Application of Mealworm ( <i>Tenebrio molitor</i> L.) Frass as Alternative Fertilizer on Greenhouse Gas Emissions (CH <sub>4</sub> , N <sub>2</sub> O, CO <sub>2</sub> ), Concentration of Ammonium (NH <sub>4</sub> <sup>+</sup> ) and Nitrate (NO <sub>3</sub> <sup>-</sup> ) in Corn Field	16.10-16.20
5	Aulia Dzalsabila	Universitas Negeri Makassar	Effect of Ultraviolet Radiation on Mycelium Growth of White Oyster Mushroom ( <i>Pleurotus ostreatus</i> )	16.20-16.30
6	Hastika	Universitas Negeri Makassar	The Effectiveness of Utilizing the Environment Around the School as a Learning Resource for Ecosystem Materials Through Group Investigation Learning with the Surrounding Nature Approach in Class X at SMAS Semen Tonasa	16.30-16.40
Question And Answer Session				16.40-16.50
7	M. Fiqriansyah W, S.Si	Universitas Negeri Makassar	Effect of Addition of Tapioca Waste and Molasses to Mushroom Media on The Weight of White Oyster Mushroom ( <i>Pleurotus ostreatus</i> )	16.50-17.00
8	Nur Aynun	Universitas Negeri Makassar	Utilization of Molasses and Tapioca Dregs on Media White Oyster Mushroom ( <i>Pleurotus ostreatus</i> )	17.00-17.10
9	Mega Octavia Biringallo	Universitas Negeri Makassar	ANALYSIS OF COLIFORM <i>Escherichia coli</i> CONTAMINATION ON SINGLE AND MIXED FRUIT OF APPLE ( <i>Malus domestica</i> ) AND GRAPES ( <i>Vitis vinifera</i> ) FROM THE TRADITIONAL MARKET AND FRUIT STORES IN MAKASSAR	17.10-17.20
Question And Answer Session				17.20-17.30
10	Satriani Umar	Universitas Negeri Makassar	Important Value Index of Herbaceous Vegetation In The buffer zone Area of Samangki Village, Bantimurung Bulusaraung National Park	17.30-17.40
11	Rachmawaty	Universitas Negeri Makassar	Cocoa pod husk extract as edible coating on shelf life and quality of Tomatoes	17.40-17.50
12	Sahribulan	Universitas Negeri Makassar	Decreasing the Population of Decomposer Bacteria, Phosphate Solvents, and Nitrification by Herbicides	17.50-18.00
13	Andi Asmawati Azis	Universitas Negeri Makassar	Preliminary Study On Field Application Of Human Urine Fertilizer On Cultivation of Green Amaranth In Bajeng Distric, Gowa, South Sulawesi.	18.00-18.10
Question And Answer Session				18.10-18.20

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**ONLINE (Biology Education)**ZOOM 1 : <https://us06web.zoom.us/j/85359330646?pwd=UmlTaU9UeW9vZXRFWDN4dHh5VmpOUT09>

(Meeting ID: 853 5933 0646, Passcode: BioUNM)

Moderator : Rezki Amalia, S.Pd., M.Pd

Operator : HMJ Biology

No	Name	Affiliation	Title	Time (GMT+8)
1	Aidil Adhani	Universitas Borneo Tarakan	Profile of Digital Competence of Biology Pre-Service Teacher	15.30-15.40
2	Maya Agustin	Universitas Negeri Malang	An Overview of Project-Based Learning in Genetics Courses at Universitas Negeri Malang	15.40-15.50
3	Dra. Elya Febrita, M.Si	FKIP Universitas Riau	The Effects of Application of Student Worksheets Based on PITA Questions (Productive, Imaginative, Open, and Analytical) and Local Wisdom on Student Independence	15.50-16.00
<b>Question And Answer Session</b>				16.00-16.10
4	Lisma P. Bastian	Universitas Negeri Makassar	Biology Learning Innovations Through The Development of E-Module on Coordination System Material for Class XI Senior High School	16.10-16.20
5	Irma Andriani	Dept.Biologi FMIPA Unhas	Improving the Skills of Science Teachers at the Junior High School Level in Kab. Maros Through Training on Utilizing Natural Resources Around Schools as a Science Learning Method	16.20-16.30
6	Mochammad Iqbal, S.Pd., M.Pd.	Universitas Negeri Malang	The Use of Media by Undergraduate Students in Presentations and Discussions on Genetics Courses; A Qualitative Study	16.30-16.40
<b>Question And Answer Session</b>				16.40-16.50
7	Mardiana Suyuti	MAN 3 Kota Makassar	The need analysis of multiliteracy learning model based on self regulated learning to improve students' science self-efficacy.	16.50-17.00
8	Henny Setiawati	Universitas Muhammadiyah Parepare	Profile Of Learning Critical Thinking Through Strategy Project Based Learning (Pjbl) At SMA Negeri Kota Parepare	17.00-17.10
9	Dian Tauhidah	UIN Walisongo Semarang	Information Literacy Profile of Undergraduate Students in Different Grades	17.10-17.20
<b>Question And Answer Session</b>				17.20-17.30
10	Maisarah Muaazarah Zuhri	Universitas Negeri Makassar	Analysis Of Science Literature Capabilities Of SMA Class X Ipa Students In Makassar City In Solving Pisa Questions	17.30-17.40
11	Rifka Annisa	Universitas Negeri Makassar	Analysis Of The Need For The Development Of An Enrichment Flipbook From The Study Results Of Orchid Diversity In Mallawa Resort, Bantimurung Bulusaraung National Park, Maros Regency	17.40-17.50
<b>Question And Answer Session</b>				18.00-18.10



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**ONLINE (Biology Education)**

ZOOM 2 : <https://us06web.zoom.us/j/85359330646?pwd=UmlTaU9UeW9vZXRFWDN4dHh5VmpOUT09>

(Meeting ID: 853 5933 0646, Passcode: BioUNM)

Moderator : Andi Bida Purnamasari, S.Si., M.Kes

Operator : HMJ Biology

No	Name	Affiliation	Title	Time (GMT+8)
1	Nurasih Nadira	Universitas Negeri Makassar	Development of Ecosystem Material E-modules as a Source of Learning Biology of Class X SMA	15.30-15.40
2	Aulia Oktasesaria Azis	Universitas Negeri Makassar	Development of E-Book Biology Material Classification of Living Things Class X SMA	15.40-15.50
3	Andi Mudhillah Mamar	Universitas Negeri Makassar	The Effect Of Problem Based Learning (PBL) Model On Interest Motivation and Learning Outcomes	15.50-16.00
Question And Answer Session				16.00-16.10
4	Alisha Amaliah	Universitas Negeri Makassar	Analysis of Needs Development of E-book Based on Case Study on Environmental Change Subject For for Grade 10	16.10-16.20
5	Nur Khairah Sukma	Universitas Negeri Makassar	Analysis of Science Process Skill-Based Learning Tasks in Biology Textbook Class X SMA/MA	16.20-16.30
6	Resky Amaliah Sapa	Universitas Negeri Makassar	The Effect of Self-Efficacy and Learning Independence on Biology Learning Outcomes in Online Learning of State Senior High School Students in Pangkajene District	16.30-16.40
Question And Answer Session				16.40-16.50
7	Nurul Jihani	Universitas Negeri Makassar	Analysis of Science Literacy Ability of Biology Learning Students at Senior High Schools in Bone Regency	16.50-17.00
8	Wulandari	Universitas Negeri Makassar	Profile of Science Process Skills of Class XII Students at SMAN 5 Luwu Timur on Excretory System Material	17.00-17.10
9	Yusril Haq Ismail	Universitas Negeri Makassar	Analysis of Science Literacy Ability of Biology Learning Students at SMA Negeri 3 Majene.	17.10-17.20
Question And Answer Session				17.20-17.30
10	Nur Putri Pratiwi Anwar	Universitas Negeri Makassar	Analysis Of The Need For Development Of E-Book Weed Plants As A Student Learning Source	17.30-17.40
11	Sriwidayani Syam	Monash University	The Effect of Implementing School Garden Activities on Learning Experience among Primary Students in Australia	17.40-17.50
Question And Answer Session				17.50-18.00

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**ONLINE (Biology et al)**

ZOOM 3 : <https://us06web.zoom.us/j/85359330646?pwd=UmlTaU9UeW9vZXRFWDN4dHh5VmpOUT09>  
(Meeting ID: 853 5933 0646, Passcode: BioUNM)

Moderator : Yusnaeni Yusuf, S.S., M.Si

Operator : HMJ Biology

No	Name	Affiliation	Title	Time (GMT+8)
1	Dwi Umi Siswanti	Universitas Gadjah Mada	Effect of Biofertilizer Application on Growth and Nitrate Reductase Activity of Brassica sp to Salinity Stress	15.30-15.40
2	Rukman Muslimin	Hiroshima Univ	Structural Redesign of Lankacidin to Improve the Biological Activity Inspired by Computational Analysis	15.40-15.50
3	Paesal	Badan Riset dan Inovasi Nasional (BRIN)	Utilization of Bacteria and Fungi as Biodegradation of Agricultural waste for Organic Fertilizer	15.50.16.00
Question And Answer Session				15.45-15.50
4	Andi Sukainah	Universitas Negeri Makassar	Proximate Analysis And Digestibility Of Modified Corn Flour	16.10-16.20
5	Yohanes Bare	Universitas Nusa Nipa	Role of Quinic acid from Coffee pulp as Inhibitor PLPro	16.20-16.30
6	Ahdiat Agriansyah	Gadjah Mada University	Assembly and mapping resistance gene against powdery mildew using characterized amplified sequence region marker on melon (cucumis melo L.) Cultivar tacapa	16.30-16.40
Question And Answer Session				16.05-16.10
7	Dr. Melva Silitonga, M.S	Universitas Negeri Medan	ANTI-CANCER ACTIVITY OF Plectranthus amboinicus L. Spreng EXTRACT IN WHITE RATS EXPOSED TO BENZO[a]PYRENE AND CHARACTERIZATION OF ACTIVE COMPONENTS USING MOLECULAR DOCKING TECHNIQUE	16.50-17.00
8	Indrayani, S.Pi, M.Biotech.Stu, Ph.D	Universitas Negeri Makassar	Isolation and Characterization of Extremophile Bacteria from Waepella Hot Spring for Hydrolytic Enzyme Production	17.00-17.10
9	Tsabita Fadhilaturrehman	Universitas Padjadjaran	Biodegradation of Polyethylene (PE) and Polypropylene (PP) by The Consortium of Bacteria from The Sarimukti Landfill Leachate, West Bandung Regency	17.10-17.20
Question And Answer Session				17.20-17.30
10	Bagus Primohadi Syahputra	STMKG	Statistical Approach in Studying The Distribution of Chlorophyll A and Its Relationship to Temperature and Salinity in The Seas of Northern and Southern Indonesia	17.30-17.40
11	Dinda Kartika Wijayanti	Universitas Tanjungpura	A-glukosidase enzyme inhibition by ethanol extract of various varian of kratom (mitragyna speciosa korth.) Leaf	17.40-17.50
12	Sartika G. P., S.Si., M.Sc.	Universitas Sembilanbelas November Kolaka	Antibacterial Activity Of Cocoa Leaf Extract Theobroma cacao L. AGAINST ACNE-CAUSED BACTERIA Cutibacterium acnes and Staphylococcus epidermidis	17.50-18.00
Question And Answer Session				18.00-18.10
13	Sri Ambardini	Universitas Halu Oleo	THE EFFECT OF LOCAL MICROORGANISM FROM THE LEAVES OF SERUNI JALAR (Wedelia trilobata (L.) Hitchc.) ON THE GROWTH OF CUT CELERY (Apium graveolens L. var. Sylvestre Alef)	18.10-18.20
14	Yusnaeni Yusuf	Universitas Negeri Makassar	Effect of Organic Nutrition in Morphological Character of Orchid Embryo	18.20-18.30
Question And Answer Session				18.30-18.40

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**ONLINE (Biology et al)**ZOOM 4 : <https://us06web.zoom.us/j/85359330646?pwd=UmlTaU9UeW9vZXRFWDN4dHh5VmpOUT09>

(Meeting ID: 853 5933 0646, Passcode: BioUNM)

Moderator : Djumarirmanto, S.Pd

Operator : HMJ

No	Name	Affiliation	Title	Time (GMT+8)
1	Nardy Noerman Najib	BRIN	Characteristics Of Maleo Senkawor (Macrocephalon Maleo) Egg Nests In Lake Towuti, East Luwu Regency	15.30-15.40
2	Candra Arumimaniyah	Padjadjaran University	Production of Antibacterial Substance by Immobilized Cell of Geobacillus subterraneus TM6Sp1 Against Gastrointestinal Pathogen Bacteria	15.40-15.50
3	Eka Nurdiani	Universitas Tanjungpura	Cytotoxicity and Selectivity of Water Simpura (Dillenia suffruticosa (Griff.) Martelli) Fraction against Breast Cancer Cells	15.50-16.00
Question And Answer Session				16.00-16.10
4	Erlintan Sinaga	Universitas Negeri Medan	Effect of ethanol Pirdot leaves in rat white induce B(a)P as anti-hepatocellular carcinoma through in vivo and in silico	16.10-16.20
5	Saparina Rahma	Universitas Tanjungpura	Cytotoxicity and Selectivity of Water Fraction of Simpura Trunk (Dillenia Suffruticosa (Griff.) Martelli) against Colon and Cervical Cancer Cells	16.20-16.30
6	Margareta Lita Widian Sari	Pendidikan Kimia FKIP UNTAN	Microorganism Contamination Test on Kratom Leaves	16.30-16.40
Question And Answer Session				16.40-16.50
7	Divya Indah Pratiwi	Universitas Tanjungpura	Tyrosinase Enzyme Inhibition by Ethanol Extract of Various varian of Kratom (Mitragyna speciosa Korth.) Leaf	16.50-17.00
8	Dewi Puspita Sari	Fakultas Biologi Universitas Gadjah Mada	Potential Plants in KGPA Mangkunagoro I Forest Park as Material for Botanical Printing Motifs	17.00-17.10
9	Purnama Melania	Universitas Tanjungpura	Antioxidant Activity And Total Phenolic Test Of Kratom Leaf (Mitragyna speciosa Korth.)	17.10-17.20
Question And Answer Session				17.20-17.30
10	Patma Elis	Universitas Negeri Makassar	The Effectiveness Of Adding Seaweed To Feed In Reducing Fat And Cholesterol Levels In Broiler Chickens	17.30-17.40
11	Masdiana Sinambela	Universitas Negeri Medan	Plankton Community in Mariah Bandar Spring Simalungun District	17.40-17.50
12	Nasiah Badwi	Universitas Negeri Makassar	Profile of deforestation in maros watershed South sulawesi province	17.50-18.00
Question And Answer Session				18.00-18.10
13	Ahmad Hasyim	Universitas Patempo	The Meiofauna Abundance as Descriptor of Environment Changes in The Coast of Losari Beach, Makassar	18.00-18.20
14	Halifah Pagarra	Universitas Negeri Makassar	Optimization the factors that influence Pectin Extraction of Pomelo Peels (Citrus maxima) using the Central Composite Design from Response Surface Methodology	18.20-18.30
15	Yenni Yusuf	Universitas Hasanuddin	Vitamin D Level and Anti-SARS-CoV-2 Antibody Titre in convalescent COVID-19 patients	18.30-18.40
Question And Answer Session				18.40-18.50



# ICoLIBE 2022

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## KEYNOTE SPEAKERS

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### Seaweeds around the world State of art and perspectives

Nathalie Bourgougnon

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#### Abstract

Macroalgae are extremely diverse groups of aquatic, eukaryotic, multicellular, photosynthetic organisms possessing chlorophyll a, ranging in size from a few millimeters to several meters. At the base of marine food chains, they constitute a direct food source for certain herbivorous species. Generally benthic, they are present in different ecosystems, from rocky substrates to coral reefs, from lagoons to salt marshes. Macroalgae are, in most cases, confined to the narrow tidal range in coastal areas that cover more than 7 million km<sup>2</sup>. But they are also present in the form of true underwater forests with a functioning comparable to that of terrestrial forests and, thus, have a determining role on the oceanic carbon cycle. The harvesting and use of seaweed are part of the heritage economy of the coastline. Long considered as marginal, they have nevertheless allowed many populations to live and survive for several centuries throughout the world.

This conference proposes to approach the world of macroalgae through different examples explored Marine Biotechnology and Chemistry Laboratory. Seaweeds play a major role in the major functions of the alga within its environment: development, growth, reproduction, defense ... Attached to their substrate, marine macroalgae are linked to their environment and confronted with various environmental factors abiotic and biotic not always stable in time and space. The combination of these factors plays a determining role on the physiology of macroalgae and conditions their distribution on the foreshore. Each species will live in an environment to which it has adapted according to its own physiological parameters, its ability to resist changes in the environment, especially during low tides, or its ability to defend itself against biotic aggressions such as predation, or competition for the substrate. Macroalgae have many applications worldwide: vegetables and food supplements, texturizers, cosmetic industry, natural fertilizers, new materials



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## Soil Microbial Biomass and Greenhouse Gas Flux in Agricultural Soil

Kazuyuki INUBUSHI<sup>\*1,2</sup>, Ayana KAWASHIMA<sup>1</sup>, Silvio USHIWATA<sup>3</sup>,  
Hiroyuki OHSHIMA<sup>1</sup>, Taku KATO<sup>1</sup> and Miwa YASHIMA<sup>2</sup>

<sup>1</sup>Faculty of Applied Biosciences, Tokyo University of Agriculture, JAPAN

<sup>2</sup>Graduate School of Horticulture, Chiba University, JAPAN

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### Abstract

#### Introduction

Soil microbial biomass is an active motor of nutrient and bioelements in soil ecosystem. The size of soil microbial biomass is proportional to soil fertility with high ecological diversity and human impact such as fertilization. Soil microbial biomass is also sensitive monitor for stress to soil ecosystem, such as heavy metal contamination. Our previous study (Padre et al., 2007) shows that organic amendments affect soil biological parameters in long-term field experiment. Also Brookes et al. (2019) indicated that the heavy metal contained in the sewage sludge compost suppress soil microbial activities. We examined effects of various soil managements on soil microbial biomass, activities and also greenhouse gas dynamics including CH<sub>4</sub> and CO<sub>2</sub> from temperate soils.

#### Materials and methods

Soil samples were collected from coastal paddy and upland field with and without organic amendments, followed by soil microbial analysis by chloroform-fumigation extraction method, enzyme assay and ATP determination, physical and chemical analysis as well as the FID and TCD gas chromatographic analysis of the gas samples after laboratory incubation. Another set of soil samples were taken from Matsudo campus upland field with and without the sewage sludge compost applied about 20 years ago, then measured their soil ATP and heavy metal contents by ICP.

#### Results and discussion

Paddy soils had more enzymatic activities than upland soil, while fertilizer application in upland increased soil organic matter contents and consequently microbial activities such as enzymatic parameters and soil ATP contents. Paddy soils produced more CH<sub>4</sub> while upland soil produced more CO<sub>2</sub>. Upland soil amended with sewage sludge compost contained slightly more heavy metals (Cu and Zn), and less soil organic C and N contents and even half ATP contents than control soil. These findings indicate soil managements and land-use changes have significant and long-term impacts on soil biological parameters.



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## **Arts Integrated STEM in Science Classrooms: STEAM Program Integration and Practice**

Dr Hye-Eun Chu

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### **Abstract**

The presentation includes the theoretical framework, pedagogical approach and some outcomes of a STEAM project conducted in seven primary and secondary schools in Sydney and Seoul. The project was grounded in a social constructivist theory of learning and applied an inquiry-based pedagogical method, which informed the integration of arts- and culture-related content into science teaching/learning activities. STEAM lessons were designed to build an awareness and appreciation of the relevance and role of science concepts in social-cultural events familiar to students, such as the Vivid Sydney (an annual festival of light) known to every Sydney student and the Light Festival familiar to South Korean students. Some strategies of arts/culture integration and the resulting outcomes are described and illustrated with students' work. The positive effects of the STEAM approach on teaching, learning, and students' perception of science are reported, with evidence provided from the projects. Notwithstanding the positive effects, there are challenges to be addressed in any plan to implement STEAM more widely than as a trial in selected schools. These challenges and concerns are discussed and possible solutions proposed at the end of presentation.



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## INVITED SPEAKERS

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### **Exploring potential of halophilic bacterium isolated From hypersaline environment for bioremediation**

Fahrul Huyop

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#### **Abstract**

Hypersaline environments can be coastal lagoons, salt and soda lakes, salterns (human-made hypersaline ponds for producing salt), deep-sea brine pools and fermented foods and pickling brines. Hypersaline environments have higher salinities than seawater ( $\approx 35\%$ ) and may even be salt saturated. The saltiest aquatic habitat on earth may be the hypersaline lakes of McMurdo Dry Valleys in Antarctica. Biodegradation of halogenated organic compounds by indigenous populations of microorganisms are highlighted because carbon-halogen bonds are the most recalcitrant. The identification of these microorganisms which have capabilities to convert the toxic hydrocarbons into less harmful products is crucial for bioremediation purposes. The initial study was to profile the microbial diversity of Lake Tuz in Turkey (Metagenomic Profiling). The sequence revealed that Firmicutes (88%) was found to be the most dominant followed by Fusobacteria (6%) and Proteobacteria (5%). A novel dehalogenase producing bacterium was isolated from Lake Tuz identified as *Pseudomonas halophila* strain HX (ID. KR071871). Under optimal growth conditions *P. halophila* HX almost completely degraded (99.3%) of the 2,2-dichloropropionic acid (20 mM), a model contaminant. The dehalogenase gene (dehHX) of *P. halophila* HX was amplified via PCR and the deduced amino acid sequence (DehHX) revealed that it belongs to a Group I dehalogenase, with high sequence identity (82%) to the previously reported DehI. The putative amino acid and protein structure of this halostable bacterial proteins is possibly due to their adaption over the course of evolution for enhancing functionality in hypersaline environments, an important aspect in their survival under such extreme condition. In this context, bio-prospecting for haloalkanoic degrading microorganisms in highly saline environment may prove to be a practical bioremediation of contaminated coastal areas. This work is a joint project between Ondokuz Mayıs University, Turkey and University Teknologi Malaysia under research grant project awarded by TUBITAK of Turkey.



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## **A Research Story of Science Teacher Development in Thailand**

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### **Abstract**

Here is my research experience about science teacher development in Thailand, where I implemented action research as a strategy to promote change in teaching practices in primary schools. Sunny, Anna, and Jane were research participants in the rural educational area of a province in the north. There I found the professional changes through the qualitative research paradigm for two years. With an inductive approach, data collection and analysis of participant observations and conversational interviews revealed the school's different contexts and the teachers' significant changes. The data suggested the teaching progression needed teacher scientific conception as a priority for change, and a community of science teachers in school transformed passive to active teaching styles. Also, school leadership participation in the action research process and university expert reflection were the successful conditions for the science teacher development.



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## Role of Organic Fertilizer on Greenhouse Gases emissions and Soil Microbial from Tropical Soil

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### Abstract

#### Introduction

Increasing soil organic matter can enhance crop productivity, but it can also enhance nitrous oxide (N<sub>2</sub>O) and Methane (CH<sub>4</sub>) emission, the potent greenhouse gases (GHGs), by increasing application of nitrogen (N) and Carbon (C) to the soil. Nitrous oxide and CH<sub>4</sub> are contribute to global warming by destroying or removing the troposphere and stratosphere of the ozone layer. The major source of N<sub>2</sub>O and CH<sub>4</sub> is the agriculture sector, and their global warming potential is 25 which is 298 times more than that of carbon dioxide (CO<sub>2</sub>). The effort has been conducted to escalate nitrogen use efficiency by additional substrates in synthetic nitrogen fertilizer, e.g., use of organic material and nitrification inhibitors through an optimized fertilizer utilization rate to reduce negative environmental impact of N<sub>2</sub>O losses to atmosphere and NO<sub>3</sub><sup>-</sup> leaching. The current report was to investigate role of addition of organic matter to emission of GHGs, soil microbial community and crop production in the South-Sulawesi Province, Indonesia.

#### Methods and Materials

The field and incubation experiments were conducted to examine the effect of addition organic fertilizer on emission of GHGs, soil microbial community and crop production. The GHGs were determined by closed chamber technique, ammonium and nitrate were analyzed by colorimetric methods. Soil microbial were determined by most probable number and bacteria metagenomic and, the growth of plant was determined weekly and, the end of the growth period, the aboveground plant material was harvested, and the dry weight was determined.

#### Results and discussions

The observations suggest that application of organic fertilizer has the potential to reduce N<sub>2</sub>O emission when compared to urea fertilization. Organic fertilizer contribute to produce GHGs via major process methanogenesis, nitrification and denitrification directly through the release of GHGs from C and N compounds present in organic fertilizer. Organic fertilizer application to paddy soils makes a large contribution to CH<sub>4</sub> and N<sub>2</sub>O. However, the GHGs emission from organic fertilizer depends on several factors including organic type and amount application to soil, carbon and nitrogen contents of soil and environmental properties. The soil microbial communities as affected by C and N input via organic matter and their role on the degradation of organic and the subsequent release of GHGs.



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## **BIOLOGY EDUCATION (OFFLINE)**

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### **The Effect of Contextual Teaching And Learning (CTL) on Learning Outcomes of Students of SMA Negeri 11 Makassar.**

Khairurrahimin, Nurhayati B., A. Mu'nisa\*, Nur Athirah Hadis

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#### **Abstract**

This study aims to determine the learning outcomes of students who are taught using the Contextual Teaching and Learning (CTL) approach to the respiratory system material at SMA Negeri 11 Makassar and to determine the effect of using the Contextual Teaching and Learning (CTL) approach to student learning outcomes on respiratory system material. At SMA Negeri 11 Makassar. This type of research is a quasi-experimental research (quasi-experimental) using the Pretest-Posttest Comparison Group Design research design. In this design there are two study groups. The XI IPA I study group used the conventional approach and the IPA II study group used the CTL approach. Each study group was first given a pretest, then learning was carried out and given a post-test. The data analysis technique used in this study is descriptive statistical data analysis to describe the biology learning outcomes obtained by students after being taught using the Conventional approach and Contextual Teaching and Learning (CTL) calculated using the SPSS 24.0 application program. And inferential statistical analysis used t-test (t-test) to determine the effect of the CTL approach on student learning outcomes through the SPSS 24.0 application program. The results of this study indicate that the learning outcomes of students who are taught with a conventional approach with an average pretest value of 50.89 and an average post test score of 60.64 with an N-gain of 0.21 in the low category compared to the Contextual Teaching and Learning (CTL) approach. The average value of pretest was 59.89 and the average value of post test was 82.53 with an N-gain of 0.56 in the medium category. There is a significant effect of using the Contextual Teaching and Learning (CTL) approach in learning the respiratory system material on student learning outcomes at SMA Negeri 11 Makassar.



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## **The Effectiveness Of Authentic Assessment Instruments Based On Science Literacy On Learning Outcomes And Science Literacy Abilities In Biology Subjects Of MAN 2 Soppeng Students**

Nurhayati B.<sup>1</sup>, Abdul Hadis<sup>2</sup>, Dian Dwi Putri Ulan Sari Patongai<sup>3</sup>, Nurul Ilmi R.H.<sup>4</sup>

<sup>1&3</sup>*Department of biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Makassar*

<sup>2</sup>*Education Administration Department, Faculty of Education, Universitas Negeri Makassar*

<sup>4</sup>*MAN 2 Soppeng*

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### **Abstract**

This research focuses on the Effectiveness of Application of Authentic Assessment Instruments Based on Science Literacy on Science Literacy Ability in Biology Subjects of MAN 2 Soppeng Students. This study aims to determine the learning outcomes and scientific literacy skills assessed by using authentic assessment instruments based on students' scientific literacy at MAN 2 Soppeng and whether or not the application of these instruments has an effect on student learning outcomes and literacy skills. This type of research is a quasi-experimental research design with a One Shoot Case Study. The results of this study were analyzed using descriptive analysis and inferential statistical analysis with t test. based on the results of the study showed that the average student learning outcomes were in the sufficient category with a value of 76.75. For students' literacy skills, they are also in the sufficient category with a value of 78.04. By comparing the average pretest and posttest scores for learning outcomes and scientific literacy, it can be seen that there was a significant increase in the average score. The results of the N-Gain calculation also show that the N-Gain values in both variables are in the medium category. Hypothesis testing using Paired Sample Test shows that the significance value for each hypothesis is at 0.00 where the value is smaller than the 0.05 significance value. So it can be concluded that H1 is accepted, which means that there is a significant effect on the implementation of an authentic assessment based on scientific literacy on learning outcomes and students' literacy abilities.



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## **Development And Validity Of Biology Learning Tool Using The Tpack Framework With Guided Inquiry Settings To Improve Student's Science Literacy Skills**

Ismail , Nurul Fadhillah Bafa Hasja

Biology Department, Universitas Negeri Makassar

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### **Abstract**

This research is a development research that aimed to describe the development and validity of biology learning tool based on guided inquiry integrated TPACK to improve scientific literacy skills in the digestive system material. This research method used a 4D research and development model developed by Thiagarajan. The stages of 4D development consist of the stages of define, design, develop, and disseminate. In this study, the stages of development in sequence have been described, namely the definition, design and development of learning tool products. The instrument used in this research is a validation questionnaire as a measure of the validity of the learning tool product and a response questionnaire as a measure of the practicality of using the learning tool that has been developed. The quality of the developed learning tool products was tested through the validation stage which was carried out with the help of a validation questionnaire for 2 validators, then a practicality test would be carried out by reviewing the responses of teachers and students. Data analysis used quantitative descriptive method. The results showed that the learning tools developed were valid with the validity values obtained for the lesson plans, worksheets and instruments about students' scientific literacy skills, namely 3.7; 3.42; 3.5 with the average of the three components included in the valid category. After the degree of validity was obtained, then an effort was made to determine the degree of practicality and the response scores of teachers and students were 84% and 81.01%, respectively, in the practical category, supported by results classified as classically categorized, it is known that the development and used of biology learning tools based on guided inquiry and integrated TPACK is valid and practical.



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## **E-Module Application Development Based on Results Project-Based Macrozoobenthos Diversity Research Hypertext Application-Based Learning (PjBL) Preprocessor (PHP) to improve Environmental Attitude Class X High School Students**

Qurniasty<sup>1</sup>, Andika Isma<sup>2</sup>, Oky Nur Pratiwi Johansyah<sup>3</sup>, Zarni Adia Purna<sup>3</sup>

<sup>1</sup>Faculty of Mathematics and Natural Sciences, Universitas Negeri Makassar

<sup>2</sup>Faculty of Economics and Business, Universitas Negeri Makassar

<sup>3</sup>Faculty of Social Science, Universitas Negeri Makassar

### **Abstract**

The purpose of this research is to produce a project-based e-module application learning (PjBL) assisted by hypertext preprocessor (PHP) applications based on research results diversity of macrozoobenthos that meet the validity requirements. Data analysis techniques using quantitative and qualitative percentage results. The results of the test on students get a percentage value 86.14% with a very valid category, so that the developed electronic module is valid and very practical to use and hypertext-assisted PjBL-based electronic modules. The preprocessor on the environmental change material in this development research has been effective on the improvement of environmental attitudes of class X high school students.



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## **Guided Inquiry Learning To Science Process Skills and Scientific Attitudes the Experimentals Evidence**

Rani Ramadani, Yusminah Hala, Andi Rahmat Saleh

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### **Abstract**

This research is a quasi-experimental research that aims to determine the influence of the guided inquiry learning model on science process skills and scientific attitudes of students in class XI MIPA on the motion system material at SMA Negeri 1 Kodeoha. The independent variable was guided inquiry learning model and the direct instructional model, while the dependent variable was the scientific process skills and scientific attitudes of students on the motion system material. The population in this study were all students of class XI MIPA SMA Negeri 1 Kodeoha as many as 4 classes. The sample class was XI MIPA 2 as a control and class XI MIPA 1 as an experimental class. Both class having also with 30 students. The research data were obtained by giving a science process skill test in the form of a pretest and posttest and a scientific attitude questionnaire in the form of a posttest on the motion system material. Data analysis of posttest science process skills in the experimental class and control class using the t-test obtained tcount of 2.6837 and ttable at a significant level ( $\alpha = 0.05$ ) of 2.0484, so tcount > ttable. The results of the analysis of the scientific attitude questionnaire data for the experimental class and the control class using the t-test obtained tcount of 4.288 and ttable at a significant level ( $\alpha = 0.05$ ) of 2.0484, so tcount > ttable. It can be concluded that there is an influence of the guided inquiry learning model on science process skills and scientific attitudes of students in class XI MIPA on the motion system material at SMA Negeri 1 Kodeoha.



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## **Validity Testing of e-Atlas Monocot Plants Anatomy Family *Poaceae* as a Learning Media**

Siti Nurfadhilah M A, Hilda Karim, Andi Asmawati Azis, Ahmad Fahrezi Diab\*

Universitas Negeri Makassar

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### **Abstract**

The development of the anatomical e-Atlas of the monocotyledonous plants of the Poaceae family is one of the media that can be used in conducting learning. The purpose of the research is to produce e-Atlas as a valid learning media in plant anatomy courses. This research was conducted at the Biology Laboratory, Department of Biology, FMIPA UNM. The design of this research is Research and Development (R&D) with the ADDIE development model which has five stages, namely analysis, design, development, implementation, and evaluation. The instrument used is the e-Atlas validation sheet. The instrument was assessed by 2 expert validators. Data is collected through analysis of validation sheets that have been filled out by expert validators. The data analysis process was carried out using Microsoft Excel to obtain data in the form of a validity score. The results showed that the anatomical e-Atlas of the monocot plant family Poaceae as a learning medium was declared valid with an average validity score of 4.35. Based on the research, it can be concluded that the anatomical e-Atlas of the monocot plant family Poaceae as a learning medium meets the valid criteria.



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## **Analysis of Character Value of Natural Science Education Students at Bosowa University**

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Universitas Bosowa

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### **Abstract**

This study aims to analyze the character values that exist in students of the Natural Science Education at University of Bosowa. In this study, character values are integrated into four dimensions, namely the dimensions of thought, taste, heart, and exercise. The research method used is descriptive research with a quantitative approach with three stages; planning, data collection and data processing. The sampling method is the saturated sample technique. The technique of collecting data is through a questionnaire distributed in the form of a google form. The number of statements is 33 items. The sample in this study were all students of the Natural Science Education Study Program. Data collection was carried out from August to September 2022. The data analysis technique used was quantitative descriptive data analysis. Based on the results of the data analysis of the average practice of character values by students of the Natural Science Education Study Program at the University of Bosowa, data was obtained, namely the percentage of experience with the lowest character values in the thinking dimension of 75.63% which was in the good category. While the percentage of experience the highest character value is in the sports dimension, which is 82.52% which is in the very good category. In general, the practice of character values by students of the Natural Science Education Study Program at the University of Bosowa for all dimensions is an average of 79.96% in the good category. This indicates that the students of Natural Science Education Study Program at the Bosowa University have implemented and practiced character values well.



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## **Analysis Of School Field Introduction I Implentation Biology Education Faculty of Mathematics and Natural Sciences Makassar State University at Sman 14 Makassar**

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### **Abstract**

The School Field Introduction Program (PLP) I is a compulsory subject at the Department of Biology, Faculty of Mathematics and Natural Sciences, Makassar State University for students of the Bachelor of Education Program to study aspects of learning and management in the Education Unit. The PLP implementation took place at SMAN 14 Makassar in September-October through qualitative descriptive methods in the form of observation, interviews, and documentation. This research was also carried out using the snowball sampling technique. The aspects of the implementation of PLP I are observing school culture, organizational structure and school work procedures, school vision and mission, student co-curricular and extracurricular activities, and teaching and learning processes. Based on the observation result, it can be concluded that the school field introduction implementation was running properly because of the data from all aspect as indicators of this research.



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## **How literate prospective science teacher in this digital era? Profile of digital literacy skills of preservice science teacher in South Sulawesi, Indonesia**

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### **Abstract**

It is lack of information about the digital literacy skill of prospective science teachers in Indonesia, specifically in South Sulawesi. The focus will be placed on their digital literacy skills in three dimensions; technical, cognitive, and social emotional. The population was undergraduate students from educational science program at three universities in South Sulawesi namely Universitas Negeri Makassar (State University of Makassar), Universitas Bosowa (Bosowa University), and IAIN Parepare (State Islamic Institute of Parepare). Sample was 313 students. Results show that the average of digital literacy skill is in the medium category.



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## **Relationship of Knowledge, Attitudes, and Community Participation on Clean Water Management in Camba District, Maros Regency**

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### **Abstract**

This study aims to analyze: 1) Knowledge of clean water, 2) Attitudes towards clean water, 3) Management of clean water, 4) Relationship of knowledge and attitudes with clean water management, 5) Relationship of knowledge and management of clean water, 6) Relationship of attitudes and management clean water for the people of Camba District, Maros Regency This research is an ex-post facto research. When examining causal relationships between variables, this type includes correlational research. The population of this research is the people who live in Camba District, Maros Regency. Determination of the sample using the Isaac and Michael table with an error rate of 5%, the research sample obtained is 143 households. The results of the research showed: 1) Community clean water knowledge was in the low category, 2) Attitudes towards community clean water were in the neutral category, 3) Community clean water management was in the poor category, 4) Community clean water knowledge had a positive and negative relationship. Significantly with clean water management, 5) Attitudes towards clean water in the community have a positive and significant relationship with clean water management, 6) Knowledge and attitudes towards clean water in the community have a positive and significant relationship with clean water management in Camba District, Maros Regency. Based on the results of the study, the suggestions put forward by the researchers are as follows: 1) It is hoped that the Government, specifically the Maros Regency government, will increase knowledge of clean water through education and training both at the district level and at the sub-district level, 2) the Health Office to always carry out counseling directly to the community to increase knowledge of environmental sanitation and clean water, 3) It is expected that the community in Camba District will actively participate in the management of environmental sanitation and clean water. 4) Other researchers who want to do more research to develop this research with broad research objects and use different types of research.



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## **Practicality of Learning Media Video Tutorial Biology Digestive System Concept**

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### **Abstract**

This research is a development research that produces a video learning the concept of the digestive system. The resulting learning media is a video tutorial learning media that can be accessed anytime and anywhere via a laptop or through a gadget. The resulting learning videos are learning videos that are practical to use. This study aims to determine the practicality of the digestive system video tutorial learning media. The instrument used is a practicality questionnaire. The data collection technique is the practicality questionnaire sheet distributed to the validator to get the practicality value of the video tutorial learning media. The data obtained were analyzed using the criteria of practicality. The results showed that the Camtasia Studio software-based learning media was practical. The results of the media practicality research based on the practicality questionnaire obtained an average of 3.54, which is in the high category. Based on the results of this study, it can be concluded that the Camtasia Studio-based learning media has been practical, so it is feasible to use both in independent learning and in classroom learning activities.



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## **Critical Thinking and Learning Achievement in Higher Education: How They are Correlated**

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### **Abstract**

The current study was designed as a correlation study to reveal the correlation between critical thinking skills and learning achievement. The study population consisted of the fourth-semester students from classes of 2021-2022 at the Department of Biology, Universitas Negeri Makassar. A cluster random sampling technique was used to select two classes consisting of 80 students in total. Data on the students' critical thinking skills were gathered using essay tests integrated into achievement tests on Animal Physiology. The critical thinking instrument that was integrated into the achievement test contained 12 essay questions. The results of the data analysis showed that there was a correlation between critical thinking skills and learning achievement. This finding shows that critical thinking skills need to be handled properly in learning so that it can have an impact on increasing student achievement.



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## The Implementation Of Blended Learning To Enhance The Student's Cognitive Learning Outcomes

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### Abstract

This study aims to determine the effect of the implementation of Blended Learning in terms of the learning outcomes of class XI students on biology lesson cell. This type of research is a quasi-experimental research using the Non-equivalent Control Group Design. The population in this study were students of class XI at SMA Negeri 2 Makassar. The sample of this study was selected by purposive sampling technique. Each study group consists of 30 students. The first study group (Biology Class 1) is taught by using a blended learning learning environment. Group two (Biology Class 7) is taught by using a face-to-face learning environment. The composition of blended learning is 75% face-to-face and 25% online using the Blended Learning Inside-Out model. The data collection technique used is a test in the form of multiple choice. The data analysis method used is descriptive analysis and inferential analysis using SPSS 20.0. The results of descriptive data analysis showed that the learning outcomes of students who were taught using a face-to-face learning environment with an average Pre-Test score of 41.00 and an average Post-Test score of 69.27 with an average N-Gain value of 0.49 which means moderate. While in the blended learning group, the average Pre-Test score was 44.03 and the Post-Test average was 83.13 with an average N-Gain value of 0.71, which means it is in the high category. Then in the Independent Sample T-Test test, the sig value is 0.000, which means  $H_0$  is rejected. Thus, it can be concluded that there is a significant difference in the effect of using blended learning on student cognitive learning outcomes. It is expected that blended learning can be a recommendation for teachers to improve the teaching performance by using blended learning to enhance the student's learning outcomes.



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## **The Effect of Problem Based Learning Model on Critical Thinking Skills and Learning Outcomes of Class X High School Students in Biology Learning**

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### **Abstract**

This study aims to determine the effect of the Problem Based Learning model on critical thinking skills and learning outcomes of Class X high school students in learning. This research is a quantitative research. Sampling in this study was conducted by random sampling with a total sample size of 54 students. The data collection technique used is through a critical thinking test instrument and learning outcomes in the form of Essay of 10 numbers and multiple choice of 30 questions. The results showed that there was an effect of the Problem Based Learning learning model on Critical Thinking Skills of Class X High School Students in Biology Learning. This is indicated by hypothesis testing using the T test which shows the sig value. (2 tailed) of 0.000. In addition, there is an effect of the Problem Based Learning learning model on the learning outcomes of Class X high school students in Biology Learning. This is indicated by hypothesis testing using the T test which shows the sig value. (2 tailed) of 0.009.



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## **Profile of Students' Problem Solving Ability Through the Application of Problem Based Learning Model on Environmental Change Material**

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### **Abstract**

This research aims to determine the problem solving ability of students through the application of the Problem Based Learning Model on the material of environmental change at the Semen Tonasa Senior High School. This type of research is descriptive quantitative. The subjects in this research were all students of class X Semen Tonasa Senior High School with a research sample consisting of one study group. The data collection technique used the test method with the type of essay questions. The data analysis technique used is descriptive statistical analysis by categorizing the value of each sample. The results showed that the student's problem solving ability on environmental change material at the Semen Tonasa Senior High School by applying the PBL model obtained an average score of 82.7 with a good category.



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## **Analysis Of Teacher And Student Needs On The Use Of E-Module Based On Project Based Learning Materials Of Environmental Change In Class X SMA/MA**

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### **Abstract**

This study aims to analyze the needs of students and teachers on the use of environmental change teaching materials. The research used a descriptive method. The subjects in this study were 32 students of class X MIA 2 and 2 biology teachers at State Senior High School 22 Gowa. Data collection techniques using interviews and questionnaires. Based on the interview results with biology teachers, it was obtained that, (1) the teaching materials used in environmental change was limited quantity and not integrated with technology, (2) teaching materials do not meet all learning indicators, (3) students are less active in learning because teachers use direct learning model. While the information obtained from questionnaires is, (1) as many as 58% of students stated that the teaching materials used in schools were not sufficient for all students, (2) as many as 65% of students stated that the teaching materials used were uninteresting and irrelevant with daily life, (3) as many as 61% of students stated that teaching materials did not increase learning motivation, (4) as many as 90% of students stated that had never been given project based assignments, (5) as many as 100% of students stated that they needed interesting and technology-based teaching materials to study environmental change materials. Therefore, teaching materials are needed that can increase students' motivation and independence in learning, of course with the application of technology, namely e-module based on project based learning (PjBL).



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## **Analysis Of The Need For Development Of Google Sites Web-Based Learning Media On Motion System Materials For Class Xi SMA**

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### **Abstract**

This study aims to analyze the level of needs of students and teachers in high school (SMA) for learning media for motion system materials. The research method used is descriptive. The research subjects were two biology teachers and 30 students of class XI IPA 2. Data collection techniques used interview methods and questionnaires. Based on the results of interviews with biology teachers, especially in the presentation of motion system material, information was obtained that (1) the learning media used in the learning process were in the form of printed books and modules containing material with a less attractive and monotonous appearance. (2) Teachers rarely use learning media that are integrated with technology even though there are adequate Wi-Fi facilities (3) The use of PowerPoint in the form of text that is displayed makes students not focus on the material because the display is monotonous and lacks supporting images and animations. Meanwhile, the information obtained after distributing needs analysis questionnaires to students obtained information that (1) as many as 87% of students stated that the use of learning media in the form of printed books and power points did not motivate students in learning (2) As many as 63% of students stated that media in the form of printed books is inadequate so that students have to share textbooks, which results in not all students being maximal in learning (3) Up to 100% of students claim to own smartphones. (4) As many as 83% of students need learning media that is integrated with technology in other words can be accessed through mobile learning on motion system material. Need for the development of web-based learning media Google sites aim to increase students' motivation and interest in learning so that there is an increase in the quality of learning and to assist teachers in the learning process who still use conventional learning media. In addition, the development of learning media based on the Google Sites web is a media innovation and is a form of integrating technology into the learning process in the 21st century. Based on the results obtained, it can be concluded that the development of Google Sites web learning media is needed to support a more effective learning process.



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## **Profile of Student's Level of Scientific Reasoning on Biology Material for Class XII Senior High School 7 Luwu**

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### **Abstract**

This study aims to obtain an overview of the scientific reasoning abilities of class XII students of Senior high school 7 Luwu in the subject of biology. The type of research used is descriptive research with survey method using simple random sampling technique. The research subjects in this study were students of class XII science which consisted of 6 classes and there were 2 classes represented by 10 people and there were 4 classes represented by 9 people, so the research subjects amounted to 56 people. The data collection in this study used 5 numbers of scientific reasoning test questions in the form of essays which included 2 indicators of scientific reasoning, namely correlational reasoning and probabilistic reasoning. The results of the essay test were analyzed using the rubric for assessing scientific reasoning abilities developed by (Rimadani, 2017). Based on the test results, the level of scientific reasoning of students is in the medium category with an average score of 44.73. The minimum score achieved by students is 10 while the maximum score achieved by students is 90. As for each indicator, students get an average score of 46.4 on correlational reasoning (Currently) and 43.6 on probabilistic reasoning (Currently). Based on these data, it can be concluded that the level of scientific reasoning of class XII students of Senior high school 7 Luwu is still at a Currently level, so it needs to be improved again.



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## **Analysis Of Student's Higher Order Thingking Skill In Biology Learning Class XI SMA Negeri 1 Kolaka**

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### **Abstract**

This research is a survey research with descriptive quantitative method that aims to analysis higher order thinking skills of students in class XI MIPA SMA Negeri 1 Kolaka in the academic year 2021/2022 in biology subjects with immune system material and using HOTS indicators. Higher order thinking skills in this study include the ability to analysis, evaluation, and creation. The research subjects in this study were 129 students of SMA Negeri 1 Kolaka. Collecting data in this study using test instruments otalling 10 numbers of essay questions, documentation and interviews. The results of the research used were learning outcomes test sheets in the form of skills tests that were in the cognitive domains of C4 (analysis), C5 (evaluation), and C6 (creation) to determine higher order thinking skills. Based on the test results, the average score of students in the cognitive domain of C4 (analysis) is 63.6% in the currently category, in the cognitive domain of C5 (evaluation) 62.1% in the currently category and in the cognitive domain of C6 (creation) 55,3% with low category.



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## **The Relationship between Knowledge Levels about Viruses and Health Behavior of Class X MAN 2 Makassar City Students**

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### **Abstract**

This study is a correlational quantitative study that aims to explain the level of knowledge about viruses, explain students' healthy behavior, and analyze the relationship between knowledge of class X MIPA students about viruses and healthy behavior related to preventing the spread of COVID-19. Class X students for the 2022/2023 academic year who have been equipped with knowledge about viruses in odd semesters are expected to have better awareness and understanding than the general public about the dangers of the corona virus and the importance of implementing health protocols to prevent the spread of COVID-19. The variables of this study consisted of the independent variable, namely the level of knowledge about viruses and the dependent variable, namely the healthy behavior of students. The sampling technique in this study used a probability sampling technique with simple random sampling. The population in this study were all students of class X MAN 2 Kota Makassar with a total sample of 165 people based on sample calculations using the slovin formula. The research instrument used in this study was in the form of questions about viruses and questionnaires related to students' healthy behavior. The data obtained were then analyzed using descriptive analysis and inferential analysis using a simple regression test. Based on the research conducted, the level of knowledge about viruses and healthy behavior of class X students is included in the high category. The results of the calculation of the Pearson product moment correlation analysis using SPSS obtained the value of Sig. 0.501. Value of Sig. obtained  $> 0.05$  so that  $H_0$  is accepted and  $H_1$  is rejected, then there is no relationship between knowledge about the virus and the healthy behavior of class X MIPA MAN 2 Kota Makassar.



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## **Profile of Students' Scientific Argumentation Skills Through Biology Learning Based on Scientific Social Issues**

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### **Abstract**

This study aims to determine the quality of students' scientific arguments on biology learning based on scientific social issues and to determine students' perceptions of biology learning. The type of research used in this research is descriptive research using combination methods or can be called mix methods. The research subjects in this study consisted of 2 classes consisting of 72 students. The data collection in this study was a test question and an open questionnaire. The test questions consist of 2 numbers that will be analyzed using TAP (Toulmin Argumentation Patern) which includes 6 indicators, namely claims, data, guarantors, supporters, qualifications and rebuttals (Riwayani et al, 2019). Then an open questionnaire consists of 4 questions. Based on the results of the students' scientific argumentation quality test, level 0 has 6 students, level 1 has 23 students, level 2 has 28 students, level 3 has 12 students, level 4 has 3 students and there is not a single student at level 5. Based on these data it can be concluded that the quality of students' scientific argumentation skills is still lacking because there are still students who do not present their arguments, so that argumentation skills need to be developed again.



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## Science Literacy Ability Level Of Class Ix Students Of Smp Negeri 40 Makassar With Pisa Standard Questions

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### Abstract

This study aims to measure the level of scientific literacy ability of class IX students of SMP Negeri 40 Makassar with PISA standard questions. Using this type of quantitative descriptive research with a sample of 40 students from SMP Negeri 40 Makassar. The sampling technique used purposive sampling. Data collection using the test instrument developed by Pusmenjar totaled 17 questions consisting of multiple choice and essay questions in science subjects. The researcher concludes that the average result of the students' overall score is 37.50 and is categorized in the low category. The test results are then grouped based on Gormally indicators including: (1) Identifying valid scientific opinions, the percentage of the average score of students who answered correctly is 41.67 and can be categorized in the sufficient category, (2) Understanding the elements of research design and how they impact based on the findings/conclusions, the average score percentage of students who answered correctly is 34.64 and can be categorized in the low category, (3) Understanding and interpreting basic statistics, the average score percentage of students who answered correctly is 54.17 and can be categorized in the sufficient category, 4) Inferring, predicting, and drawing conclusions based on quantitative data, the percentage of the average score of students who answered correctly was 26.88 and could be categorized in the low category.



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## Improving Student's Science Literature Ability Through Problem-Based Learning At SMPN 40 Makassar

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### Abstract

This research is pre-experimental research that aims to determine the scientific literacy ability of class IX students of SMPN 40 Makassar through *Problem Based Learning* (PBL) study. The research design used was a one group pretest-posttest design with the sample of the study amounted to 39 students of class IX SMPN 40 Makassar that selected using purposive sampling technique. The data collection technique was conducted by using a science literacy test developed by Pusmenjar consisted of 17 questions consisting of multiple-choice questions and essay questions in science subjects. The average N-gain result obtained is 0.41 and is in the category of moderate increase. The results of hypothesis testing on the paired sample t-test have a significance level of less than 0.00; smaller than  $= 0.05$  which means  $H_0$  is rejected. The results of this test indicate that students' scientific literacy skills after applied problem-based learning are not the same and there are differences in students' scientific literacy abilities before and after PBL-based learning is applied. The results of this study indicate that problem-based learning can improve students' scientific literacy skills in science subjects.



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## **Analysis Of Increased Activity And Scientific Attitudes Of Students On Human Excretory System Materials Through Cooperative Jigsaw Types In Class Xi Students Of Man Pinrang**

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### **Abstract**

This study aims to see the increase in learning activities, and scientific attitudes of students in class XI IPA 3 MAN Pinrang through the Jigsaw type cooperative learning model. This research is a classroom action research. The subject of the research conducted at MAN Pinrang recruited 19 students. The method of data collection is observation using an observation sheet. Classroom action research conducted in class XI IPA 3 MAN Pinrang using quantitative descriptive data analysis and then stored as a percentage. Based on the research, it showed that there was an increase in learning activity by 89% (26% very active and 63% active) in the first cycle and by 89% (42% very active and 47% active) in the second cycle. cycle. The results of the data obtained in cycle II showed that the score had reached the minimum criteria that had been set at 50% for the number of very active and active categories. There are 7 activity indicators in this study and the seven indicators have reached the minimum specified criteria. As for scientific attitudes, there are 16 indicators that become criteria in classroom action research. In the cycle, the percentage of students' scientific attitudes was 42% (16% very active and 26% active), while the results of the analysis of scientific attitudes in the second cycle showed an increase of 63%. (0% very active and 63% active). These results indicate that the scientific attitude has reached the 50% criteria for the number of very active and active categories. The conclusion of this study is that through the Jigsaw type cooperative learning model, it can improve learning activities and scientific attitudes of XI IPA 3 MAN Pinrang students on the material of the human excretory system.



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## **Effectiveness of The Circulatory System Learning Unit With Guided Inquiry Based Flipped Classroom Learning Settings to Improve Self Regulated Learning and Student Learning Outcomes in Class XI**

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### **Abstract**

This study aims to determine the effectiveness of the circulatory system learning unit with guided inquiry-based flipped classroom learning settings to improve self-regulated learning and student learning outcomes in class XI. This research is a development research using one group pretest posttest design. The subject of this research is class XI IPA 2 MAN 4 Bone, totaling 33 students. The technique of collecting data is by giving essay tests and giving self-regulated learning questionnaires. The results of this study indicate that student learning outcomes using the circulatory system learning unit with guided inquiry-based flipped classroom learning settings have increased after being given treatment. Based on the N-Gain test, student learning outcomes are in the low (6%), medium (55%), and high (39%). Meanwhile, in the results of the self-regulated learning questionnaire analysis, students are in the medium (64%) and high (34%). This shows that learning using the circulatory system learning unit with guided inquiry-based flipped classroom learning settings is quite effective in improving self-regulated learning and student learning outcomes in class XI.



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## **Analysis of The Need For Development Of Mind Mapping-Based Biology E-Book on Animalia Materials for Class X Senior High School**

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### **Abstract**

This study focuses on needs analysis in the form of an electronic book (e-book) biology based on mind mapping on animalia material for class X Senior High School. The purpose of this study was to determine the needs of teachers and students for the teaching materials to be developed. The method used is a qualitative descriptive method. The data collection technique used in this research is the survey method, using research instruments in the form of a questionnaire. The data analysis used is by reducing the survey data into more specific data to be presented descriptively. The results of the initial observations obtained are that teachers and students need teaching materials in the form of e-books with more attractive material designs, that can support learning activities. Based on this, it is necessary to develop a mind mapping-based biology e-book on animalia material that can support the learning process in schools.



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## **Analysis of the Implementation of the School Field Introduction (PLP) 01 at State Senior High School 12 Makassar**

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### **Abstract**

PLP is one of the educational courses designed to provide students with a broader and direct experience of the world of schooling and to develop various professional teacher competencies. Introduction to the school environment (PLP) at State Senior High School 12 Makassar is still rarely done, therefore further research is needed regarding the implementation of PLP. The purpose of this research is to find out the dynamics of schooling, organizational structure and school culture of State Senior High School 12 Makassar. The research method used is descriptive qualitative with data collection through direct observation, and interviews. The research subjects were students of class XI Mipa 5 conducted by PLP students. The results showed that the conditions for implementing PLP were less than optimal. It was concluded that the process of existing activities in schools was good but there were still many things that needed to be improved so that the implementation of PLP was better. Thus in the future it is hoped that improvements in the management of school dynamics are expected.



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**The effect of the Problem Based Learning (PBL) model on students' critical thinking skills in the cell material of class XI at SMA Negeri 6 Luwu Timur**

Winny Criswi Pratama, Yusminah Hala, Arsad Bahri

State University of Makassar

**Abstract**

This study aims to determine the effect of the problem based learning (PBL) model on students' critical thinking skills in the cell material of class XI SMA Negeri 6 Luwu Timur. This research is a quasi-experimental study using the Pretest Posttest Control Group Design. The research samples were selected randomly (random sampling) so that two classes were obtained, namely class XI IPA 2 as a control class used the lecture method (conventional) and XI IPA 3 as an experimental class with used a problem based learning (PBL) model. The data collection technique used is through tests or evaluations. The collected data is analyzed by descriptive statistics and inferential statistics. The results of descriptive statistical analysis show that the average posttest score in the experimental class is 73.33 higher than the average posttest score for the control class, which is 63.03. The results of inferential statistical analysis show that there is an effect of the problem based learning (PBL) model on students' critical thinking skills in the material for class XISMA Negeri 6 Luwu Timur.

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## **Correlation between Learning Motivation and Science Literacy Skills of Class XII High School Students on Coordination System Materials Using NOSLiT Questions**

Alfina Putriyani Ahmad, Firdaus Daud, Arsad Bahri

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### **Abstract**

This study aims to determine the correlation between scientific literacy skills and learning motivation of Students in Class XII SMA Negeri 2 Luwu on coordination system materials. This research is a correlation research using a simple correlation quantitative descriptive research. The research sample was chosen randomly (random sampling) so that 62 students from 5 study groups in class XII obtained. Data collection techniques used are through tests, questionnaires. The data collected were analyzed by descriptive statistics and inferential statistics. The results of the descriptive analysis showed that the average value of students' scientific literacy skills was 8.19 while the average value of learning motivation was 58.05. The results of inferential statistical analysis on the correlation test between scientific literacy ability and students' learning motivation showed the value of Sig. (2-tailed) of 0.920 which means that there is no correlation between scientific literacy ability and learning motivation of Class XII students in SMA Negeri 2 Luwu on Coordination System Material.



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## **The Effectiveness of Utilizing the Environment Around the School as a Learning Resource for Ecosystem Materials Through Group Investigation Learning with the Surrounding Nature Approach in Class X at SMAS Semen Tonasa**

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### **Abstract**

The problem in this research is how effective is the use of the environment around the school as a source of learning material for ecosystems through group investigative learning with the Exploration of the Environment approach. This research aims to determine the effectiveness of the use of the environment around the school as a learning resource for ecosystem materials through group investigation learning with the Exploration of the Surroundings approach. This type of research is descriptive quantitative. The subjects in this study were all students of class X SMAS Semen Tonasa. The research sample was class X with 17 students. The research data was taken using a test consisting of 25 questions. Data were analyzed using descriptive statistics. The learning outcomes of students before and after being taught using the cooperative learning model of group investigation type with the Surrounding Nature Approach on the Ecosystem material have increased with the average achievement of learning outcomes in the post-test of 81.18 and is in the Good category, while the pre-test of 34.06 is in the very poor category. The increase that occurred in the post-test was caused by the special treatment given to the sample class in the form of the application of the group investigation learning model with the Natural Exploration Approach. The N-Gain test was conducted to determine the increase in student learning outcomes. It is known that the highest increase in student learning outcomes is in the high category of 11 people (64.7%), the medium category of 6 people (35.3%) and none in the low category.



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## **BIOLOGY EDUCATION (ONLINE)**

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### **An Overview of Project-Based Learning in Genetics Courses at Universitas Negeri Malang**

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#### **Abstract:**

Genetics is one of the branches of Biology which is the basis of other branches of Biology. Genetics courses in the Department of Biology, Faculty of Mathematics and Science are conducted as lectures and laboratory work. There are two types of laboratory work in genetics courses: classical and project-based laboratory work. In classical laboratory work, all students conduct practical activities on the same topic, while in project-based laboratory work, each group gets a different topic. This study aims to describe the implementation of project-based practicum in the genetics course. This research is survey research involving students and lecturers. Data were collected through observation, interviews with lecturers of genetics courses, and questionnaires distributed to students who had taken genetics courses. Data analysis was done descriptively. Observation results show that the project progress record is not yet systematic, and there are no indicators of achievement of project progress. In addition, most project groups still received less than 50% of the data that should have been collected. The interviews showed that students had difficulty relating theory to project activities. The questionnaire was distributed to fifty-one students from three batches (2015, 2016, and 2017) who had taken Genetics courses. Based on the questionnaire, it can be seen that 60.8% of students felt that some project procedures were difficult to understand. Some procedures that are difficult to comprehend include cross-reconstruction, treatment, data collection, data analysis, and data discussion. As many as 94.2% of students have not been able to complete their project data. This is due to several reasons: poor time management, difficulty finding literature, and lack of cooperation between group members. The description of the implementation of project-based practicum in the Genetics course becomes the basis for developing various innovative research to optimize the learning of Genetics.



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## **The Effects of Application of Student Worksheets Based on PITA Questions (Productive, Imaginative, Open, and Analytical) and Local Wisdom on Student Independence**

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### **Abstract**

This study aims to see student independence through the provision of student worksheets based on "PITA" questions (Productive, Imaginative, Open, and Analytical) and local wisdom. The research was conducted at the Teacher's Training and Education Faculty Universitas Riau (Biology Education Study Program). The research was conducted in the Invertebrate Systematics course, during March-April 2022. This research is a quantitative descriptive study. Data collection using e-questionnaire (google form) and interview guidelines. The e-questionnaire (google form) is used through a summative response scale, using a modified Likert scale with 4 answer choices. The results of the study explain that the application of LKM based on "PITA" questions (Productive, Imaginative, Open, and Analytical) and local wisdom has an impact on increasing student independence by 88%. The dominant indicator that develops is self-regulation by 93%. The results of the interview also explained that 95% of students were more independent in mastering the concept of Invertebrate Systematics and were able to relate it to local wisdom. The increase in student independence is due to the existence of a question guide that is able to stimulate students to study independently and be able to relate it to local wisdom.



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## **Biology Learning Innovations Through The Development of E-Module on Coordination System Material for Class XI Senior High School**

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### **Abstract**

This research aims to develop teaching materials in the form of e-modules for biology class XI Senior High School in coordination system materials that meet valid and practical criteria. This research is development research (R&D) using the ADDIE development model, which has five stages, namely analysis, design, development, implementation, and evaluation. This e-module development research was carried out in the biology education laboratory and a limited trial to obtain product practicality data was carried out at Senior High School 3 Makassar. The subjects in this research were Biology teachers and students in class XI Math and Science 1. The instruments used were validation sheets and e-module practicality sheets. Based on the analysis of the validity test data, an average total validity of 4.10 with a valid category was obtained. The results of the practicality test from the teacher's responses were 4.50 and the students' responses were 4.28, with a very practical category. Based on the findings of the research, it is possible to conclude that the developed e-module for biology class XI Senior High School in coordination system materials meets the valid and practical criteria. Based on this data, learning innovations can be carried out through the development of e-modules for biology class XI Senior High School in coordination system materials.



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## **Improving the Skills of Science Teachers at the Junior High School Level in Maros Districts Through Training on Utilizing Natural Resources Around Schools as a Science Learning Method**

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### **Abstract**

The service program with the title "Improving the skills of junior high school science teachers in Maros through training on the use of natural resources around the school as a science learning method" as stated in the Maros districts on Capacity Building for Human Resources in the field of education. Science learning is known to require strong interactions between living things and their surroundings. The learning method by utilizing natural resources is carried out as an effort to better understand science for students. The activities consist of 1) Introduction of medaka fish, a fish endemic to South Sulawesi which is the local fauna of Maros 2) Utilization of science as a tool to understand natural phenomena around students 3) Introduction natural dyes and training on making shibori batik. To understand the improvement of teaching method skills to teachers, this event was attended by local stakeholders from the Maros district Education Office, Science Teachers at Senior High School of Maros, Faculty of Math and Science – University of Hasanuddin Lecturers and Dekranasda Takalar district. The targets and results to be achieved are 1) The results of the service become a reference for science teachers in implementing an integrated science curriculum by providing various alternative learning methods by utilizing local natural resources 2) The results of the service provide solutions to overcome curriculum disruption during the Covid 19 pandemic with alternative methods interesting alternative science learning 3) journal draft 4) publication in mass media. All participants understand well about the application of the science curriculum by utilizing learning methods from other natural resources around the school. They all also showed enthusiasm during the training. In conclusion, the training has succeeded in improving the skills of teachers regarding science learning methods.



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## The Use of Media by Undergraduate Students in Presentations and Discussions on Genetics Courses; A Qualitative Study

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### Abstract

Genetics is compulsory in all biology and biology education curricula in Indonesia - and even the world. Understanding genetic concepts is essential in understanding and underpinning understanding in other branches of biology. So, the success of genetics learning becomes crucial to the success of the Biology and Biology Education S1 curriculum. There are many methods applied in genetics learning, and among them, all use learning media to carry out their activities. This study revealed the PowerPoint-based presentation used by students in the Department of Biology, The State University of Malang, in Genetics 1 Course, the academic year 2022/2023. The analysis was carried out qualitatively on all PowerPoints presented by students in presentations and group discussions. From the results of the analysis, it was found that the entire group of students gave their presentations using Microsoft's PowerPoint application. However, during the presentation, there are variations; some students present it with a slide show, and some only show the primary PowerPoint display (not in a slide show). While some others display a PDF version of the PowerPoint. Based on the content of the PowerPoint presented, almost all groups of students put very long descriptions in their PowerPoint slides; only one group presented their power points systematically, balanced between facts and pictures or schematics. Further investigation showed that the group of students who presented their PowerPoint with long descriptions raised questions already contained in the PowerPoint itself. This study concludes that the preparation of PowerPoint, which is not good, is proven to be less able to deliver messages accurately, which raises questions from the audience. On the other hand, using pictures and schematics in slides is beneficial for the recipient of the message in understanding the concepts explained through PowerPoint.



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## **The Need Analysis Of Multiliteracy Learning Model Based On Self Regulated Learning to Improve Students' Science Self-Efficacy**

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### **Abstract**

Self- efficacy in science learning is very important to improve learning achievement and ability to solve science problems in life. One of the obstacles to increase students' scientific self-efficacy is that the learning model used in the learning process does not involve students in complex problem solving activities through brainstorming activities, creative thinking, conducting research activities, and building conceptualization of knowledge. This research aims to find out the initial conditions in the field regarding to the development of the scientific multiliteracy learning model to improve students' scientific self-efficacy. The research method used was the descriptive qualitative method using questionnaire and interview. The questionnaire used was adapted from the scientific self-efficacy instrument developed by Lin and San consisting of 30 statements with the range of values from 0 to 10 of confidence levels. Meanwhile, the interview was addressed to the science teachers. The research subjects were students of class X MAN 3 Makassar, South Sulawesi Indonesia which involved 30 students and science teachers who were members of the science working group (MGMP=Consensus Teacher Subjects) community consisting of 10 teachers. The findings of research results are the students' science self-efficacy is in the low category and the multiliteracy learning model applied by the teacher in science learning has not been stimulated by scientific phenomena, independent learning and emphasis on increasing students' scientific self-efficacy . Therefore, it is necessary to have a multiliterate learning model based on self-regulated learning to improve students' science self-efficacy. This research is very important for science teachers and curriculum developers to think about the importance of a multiliterate learning model based on a self-regulated learning strategy that can improve students' learning achievement by stimulating students' scientific self-efficacy.



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## **Profile Of Learning Critical Thinking Through Strategy Project Based Learning (Pjbl) At Sma Negeri Kota Parepare**

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### **Abstract**

Learning in the 21st century requires every student to have thinking skills, work habits, and character to achieve an independent and successful life. Learning must equip students with 6 competencies (Communication, Collaborative, Critical thinking, Creative, Compassion, and Computational logic). Learning in schools must be able to develop students' thinking skills, including in learning biology. Empowerment of students' critical thinking skills through integration of learning strategies is one of the efforts to train students' thinking skills. Project Based Learning (PjBL) learning strategies support the empowerment of students' critical thinking skills, which are needed so that students can become independent learners who can manage their own learning. This survey aims to determine the profile of biology learning that integrates critical thinking skills in senior high schools through PjBL learning strategies. The method used is a survey with a questionnaire technique. The results of the study show that critical thinking learning through PjBL learning strategies has mostly been implemented, but most of the students have difficulty in using their critical thinking skills. In addition, the results of the survey on the implementation of critical thinking skills can be seen from 6 indicators, namely the ability to interpret (100%), analysis (100%), evaluation (100%), inference (28.6%), explication (85.7%), and regulation. self (14,3%). This shows that critical thinking learning for students at SMA Negeri Parepare still needs to be trained and improved through the use of constructivist learning strategies such as PjBL combined with cooperative learning so that all students with different academic abilities can jointly improve their critical thinking skills. analysis (100%), evaluation (100%), inference (28.6%), explication (85.7%), and self-regulation (14.3%). This shows that critical thinking learning for students at SMA Negeri Parepare still needs to be trained and improved through the use of constructivist learning strategies such as PjBL combined with cooperative learning so that all students with different academic abilities can jointly improve their critical thinking skills. analysis (100%), evaluation (100%), inference (28.6%), explication (85.7%), and self-regulation (14.3%). This shows that critical thinking learning for students at SMA Negeri Parepare still needs to be trained and improved through the use of constructivist learning strategies such as PjBL combined with cooperative learning so that all students with different academic abilities can jointly improve their critical thinking skills.



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## **Information Literacy Profile of Undergraduate Students in Different Grades**

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### **Abstract**

Information literacy is one of the basic skills that students must have in today's digital era. This study was conducted to analyze the information literacy profile of students in different years. This quantitative research compares three groups of data based on the year of student grades. The research population is all students of biology education at UIN Walisongo Semarang. The research sample was determined using a stratified random sampling technique to obtain 94 students divided into three batches. The data was obtained using an information literacy test instrument and analyzed using the Anova test. The results showed that students in all grades had information literacy skills in the moderate category, but there were significant differences between grades. The study results indicate the need for efforts to increase information literacy in students.



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## **Analysis of Science Literature Capabilities of SMA Class X IPA Students in Makassar City in Solving Pisa Questions**

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### **Abstract**

This study aims to determine the scientific literacy ability of high school students in class X IPA in solving PISA questions in Makassar City. The research method used is descriptive quantitative. The population of this research is all students of class X science in Makassar City. The research sample was 254 students of class X science from 8 sample schools, namely: SMAN 6 Makassar, SMAN 21 Makassar, SMAN 5 Makassar, SMAN 9 Makassar, SMAN 16 Makassar, SMAN 4 Makassar, SMAN 20 Makassar, and SMAN 14 Makassar. The sampling technique was cluster random sampling using the slovin formula. Data collection techniques in the form of multiple choice test questions of scientific literacy ability as many as 25 numbers. Based on the results of data analysis, it is known that the percentage of scientific literacy abilities of students of SMAN class X IPA in Makassar City in solving PISA questions is in the moderate category of 50% with a total of 127 people. Furthermore, 12.2% of students are in the high category with a total of 31 people, 5.91% of students are in the very high category with a total of 15 people, 31.89% of students are in the low category with a total of 81 people, and 0 % of students are in the very low category with a total of 0 people. The average value of scientific literacy skills from the three aspects of scientific literacy competence, the highest average value is found in the competence aspect of evaluating and designing scientific questions, which is 33.92 in the medium category. While the lowest average value is found in the competence aspect of the item explaining the phenomenon scientifically, which is 29.69 in the low category



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**Analysis Of The Need For The Development Of An Enrichment Flipbook  
From The Study Results Of Orchid Diversity In Mallawa Resort, Bantimurung  
Bulusaraung National Park, Maros Regency**

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**Abstract**

In order to create an enrichment flipbook that will serve as an additional learning resource for students studying biodiversity material, this study will analyze the needs of teachers and students. The research looked at the diversity of orchids at the Mallawa resort, Bantimurung Bulusaraung National Park, and Maros Regency. This study employed a descriptive qualitative methodology. A questionnaire was used to gather the information. The results of the needs analysis show that all teachers and 96.55% of students would support the creation of an add-on book in the form of a flipbook as a learning resource that can be used as an additional source of information to support learning, particularly when it comes to biodiversity-related topics. Based on this, it is important to create a flipbook-style orchid diversity enrichment book that may aid in the teaching of biology in classrooms.

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## **Development of Ecosystem Material E-modules as a Source of Learning Biology of Class X SMA**

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### **Abstract**

Electronic modules (e-modules) for Ecosystem Materials as Biological Learning Resources with the aim of 1) producing valid e-modules for class X high school ecosystem materials, 2) to produce practical e-modules for class X high school ecosystem materials. This type of research is Research and Development (R&D) with the ADDIE development model which has five stages, analysis, design, development, implementation, and evaluation. The subjects of this study is an expert lecturers who conducts the validity of the instruments and products developed, Biological subject teachers, and students of X MIA 1 SMA Negeri 19 Gowa as subjects to test the practicality of the product. The results showed that the developed e-module product was valid and practical. The results of the validity are in the very valid category with the validity of the e-module values obtained is 4.29. The results of the practicality test of the teacher's response of 4.97 with the category is very practical, and the results of the practical test of the student's response of 4.33 with the category is very practical. So, it can be concluded that e-module ecosystem materials as a source of Biological learning in the grade Senior High School developed highly (SMA) used in the learning process.



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## **Development of E-Book Biology Material Classification of Living Things Class X SMA**

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### **Abstract**

This study aims to produce a E-book Biology Material Classification of Living Things Class X SMA that meets the valid and practical criteria. This type of research is Research and Development (R&D) with the ADDIE development model which has five stages, namely analysis, design, development, implementation, and evaluation. The research subjects were Biology subject teachers, and students of class X MIPA 1 SMA Negeri 3 Makassar. The instrument used is the validity and practicality of the e-book. The results showed that the e-book product developed was valid and practical. The results of the validity are in the valid category with an average validity of 4.15, the practicality test results from the teacher's response are 4.30 and the students are 4.40 in the very practical category. Based on this, it was concluded that the biology e-book material on the classification of living things for class X SMA that had been



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## **The Effect Of Problem Based Learning (PBL) Model On Interest Motivation and Learning Outcomes**

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### **Abstract**

This research is an experimental research. The purpose of this study was to determine student interest in learning through the application of the Problem Based Learning learning model on ecological materials and environmental changes, to determine student learning motivation through the application of the Problem Based Learning learning model, to determine student learning outcomes through the application of the Problem Based Learning learning model, to knowing the difference in interest in learning between the application of the Problem Based Learning learning model and conventional learning, to determine the difference in learning motivation between the application of the Problem Based Learning learning model and conventional learning and to determine the difference in learning outcomes between the application of the Problem Based Learning learning model and conventional learning. This type of research is a quasi-experimental research design with nonequivalent control group design. The population in this study were students of class X MIPA SMAN 1 Sinjai. The sample of this research is class X MIPA 2 as many as 35 people and X MIPA 3 as many as 36 people. The data was collected using learning outcomes tests in the form of multiple choice questions and essays totaling 30 numbers and a questionnaire of interest and motivation to learn. The analytical technique used is descriptive analysis and inferential analysis



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## **Analysis of Needs Development of E-book Based on Case Study on Environmental Change Subject For for Grade 10<sup>th</sup>**

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### **Abstract**

This study focuses on analyzing of need for teaching materials in the form of electronic books (E-books) based on case studies on environmental change materials for senior high school students in grade 10th as a means of the learning process. The purpose of this study was to determine the needs of students for the E-book teaching materials to be developed. The data retrieval technique used in this research is lesson plans and survey observations and the research instruments used are questionnaires and checklists. The method used is the descriptive qualitative method. The data analysis used is by reducing the data into more specific data to be presented descriptively. The results of the initial observations obtained are that students need electronic teaching materials in the form of E-books that can train higher-order thinking skills. Based on this, it is necessary to develop an E-book based on case studies on environmental change materials that can support the biology learning process in schools.



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## **Analysis of Science Process Skill-Based Learning Tasks in Biology Textbook Class X SMA/MA**

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### **Abstract**

This research is a quantitative descriptive study with the final result in the form of written words from the evaluation results on the document being reviewed. This picture is revealed by analyzing textbooks published by Erlangga Publishers. This study aims to determine the learning tasks based on science process skills contained in biology textbooks for class X SMA/MA. Sources of data in this study are all Learning Tasks in Class X Textbooks Published by Erlangga. The research data were obtained by documenting all learning tasks and then analyzed using the ITAI Instrument (Inquiry-based Tasks Analysis Inventory). This ITAI instrument was created by Yang & Liu (2016). The ITAI instrument was used as a reference in analyzing the data so that 56 categories of Science Process Skills were obtained which were spread in learning tasks in class x biology textbooks, namely from Observing Skills to Model Formulating Skills with different percentages. Observing with the highest percentage is 30.35%, while the skill to formulate a model with the lowest percentage is 1.80%.



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## **The Effect of Self-Efficacy and Learning Independence on Biology Learning Outcomes in Online Learning of State Senior High School Students in Pangkajene District**

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### **Abstract**

This research is an ex post facto study that aims to describe self-efficacy, self-regulated learning, and biology learning outcomes of students on online learning, to determine the effect of self-efficacy and self-regulated learning biology learning outcomes on learning online partially and simultaneous. The population in this study were all students of class XI State Senior High School in Pangkajene District, Pangkep Regency, namely State Senior High School 1 Pangkep, State Senior High School 11 Pangkep, and State Senior High School 20 Pangkep. The total population is 556 people and based on the sample calculation using the Slovin formula, a sample of 361 people is obtained. The sampling technique used was the Cluster Random Sampling technique. The variables of this study consisted of the independent variable, namely self-efficacy, and self-regulated learning, and the dependent variable, namely biology learning outcomes. The data analysis technique is descriptive and inferential analysis. Based on the results of inferential data analysis, it's found that (i) there is a partial effect of self-efficacy on biology learning outcomes, (ii) there is a partial effect of self-regulated learning on biology learning outcomes, (iii) there is an effect of self-efficacy and the simultaneous self-regulated learning on biology learning outcomes



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## **Analysis Of Science Literature Capabilities Of Biology Learning Students At SMAN In Bone District**

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### **Abstract**

This study aims to determine the scientific literacy ability of students in biology learning at SMAN in Bone Regency. The research method used is descriptive quantitative research method. The population of this research is all students of MIPA class at SMAN in Bone Regency. The research sample was 304 class XII students from 4 sample schools namely, SMAN 1 Bone, SMAN 15 Bone, SMAN 18 Bone and SMAN 26 Bone with purposive sampling technique of determining the sample. The data collection technique was in the form of multiple choice test questions for students' scientific literacy skills with a total of 30 questions. Based on the results of data analysis, it was found that the scientific literacy ability of SMAN students in Bone Regency as a whole was in the medium category with a percentage of 70.7%. Furthermore, 11.8% are in the high category, and 17.4% of students are in the low category.



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## **Profile of Science Process Skills of Class XII Students at SMAN 5 Luwu Timur on Excretory System Material**

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### **Abstract**

This study aims to see the description of the Science Process Skills of Class XII Students at SMAN 5 Luwu Timur on Excretory System Material. This type of research is quantitative descriptive. The population in this study were all students of class XII MIPA SMAN 5 Luwu Timur, with a sample of 85 people selected using a saturated sampling technique. The data collection technique is in the form of essay test questions based on indicators of basic science process skills, namely observing, classifying, communicating, measuring, inferring and predicting. The results showed that the observation aspect got a percentage value of 78% in the high category, the classification aspect got a percentage value of 62% in the medium category, the inference aspect got a 60% percentage value in the medium category, the prediction aspect got a percentage value of 37% with the very low category, communication gets a percentage value of 70% with a medium category, the measurement aspect gets a percentage value of 18% with a very low category. Based on the results of the study, it can be concluded that the science process skills of class XII students of SMAN 5 Luwu Timur are in the medium category.



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## **Analysis of Science Literacy Ability of Biology Learning Students at SMA Negeri 3 Majene**

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### **Abstract**

This study aims to determine the scientific literacy ability of students in learning biology at SMA Negeri 3 Majene. The research method used is descriptive quantitative research method. The population of this research is all students of class X MIPA at SMA Negeri 3 Majene. The research sample was 46 students of class X SMA Negeri 3 Majene with a saturated sample determination technique. The data collection technique was in the form of multiple choice test questions for students' scientific literacy skills with a total of 20 questions. Based on the results of data analysis, it is known that the highest percentage of students' scientific literacy skills is in the medium category of 78.2%. Furthermore, 17.3% are in the high category, and 4.4% of students are in the low category. Based on data analysis, it was also found that of the three aspects of scientific literacy the highest score was on the aspect of explaining phenomena scientifically with a total score of 146. For each indicator the highest score was on the indicator explaining the potential implications of scientific knowledge for the community and the indicator evaluating how to explore scientifically towards the questions given with the percentage of students answering correctly as much as 54.3% and a total score of 50. Based on these data it can be seen that some students have used their scientific thinking skills in making a decision.



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## **Analysis of The Need For Development of E-Book Weed Plants as A Student Learning Source**

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### **Abstract**

This research is the result of needs analysis of weed plant e-books as a source of student learning. The purpose of this study is to determine the needs of students for the e-book that will be developed. The method used is a research and development (R&D) method. The research subjects are 2 teachers of the basics of plant cultivation and 30 students of class X UPT SMKN 3 Sidrap. The data collection technique used is the survey method, the research instrument used is a questionnaire. The data analysis used is by reducing the data into more specific data to be presented descriptively. The results of the analysis of the needs of teachers and students on the development of weed plant e-books as a source of student learning are needed to develop e-books, especially weed plant material to support the learning process in terms of weed plants.



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## **The Effect of Implementing School Garden Activities on Learning Experience among Primary Students in Australia**

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### **Abstract**

This study aimed to investigate the effect of Implementing School Garden Activities on the learning experience among Primary Students in Australia. The authors construct this study by implementing a systematic review approach. In this regard, some relevant pieces of literature and sources are collected, analyzed, and synthesized to produce systematic findings. The result indicated that the implementation of school gardening activities has positively affected students learning experience in three ways. It includes the impact on students' psychological estate, physical health, and academic performance. However, this study also noted that the appropriate task evaluation still needs to be examined when teachers implement this activity in the class. Moreover, the significance of this study implicates positively on providing teachers an insight into how to promote an active learning approach in the classroom. Besides, this study also contributes to informing the policymaker about effective learning strategies that may be useful to be integrated into the curriculum to improve learning and teaching quality.



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**BIOLOGY et al. (OFFLINE)**

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**Development Opportunities of Waxy Corn in South Sulawesi**

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**Abstract**

Waxy corn was specialty corn is local variety in South Sulawesi IND which is commonly farmer's were selling of young ear. Characterized was flint type of seeds, color of clear white, early maturity less 85 days for fisiology maturity to harvested, having taste of young cobs was very nice, and grain yield could be founded 6.0 t/ha (wc. 15%). The height amylopectin in endosperm was become as good taste for consumption, content starch is approximately 72% amylopectin and 28% amylose. The farming system of waxy corn in one ha, farmer's was growing after land preparation in spacing 70x25 cm one plant per hill. Production facilities by seeds 20 kg, Urea and NPK Phonska (150 -100) kg, irrigated by pump well three times and harvested time in 70 days after planting. The population were founded around 57,143 on young ear and in the field area could be sold of Rp 800 per ear. The income of the farmer's would be received of profit Rp 36 million in three mounth and result of calculated to founded of B/C ratio : 5.18 (rate : 1 US\$ = Rp 15,000)

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## **The Existence Of The Bajo Language Lexicon In The Marine Field On The Coastal City Of Kendari**

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### **Abstract**

Ecolinguistics examines the interrelationships between humans and nature. Damage to the ecosystem, the presence of data collection in an area, and the influence of other languages can affect the survival of the language and can even result in a shift. So it threatens the existence of language at the lexicon level. This study aims to: 1) Analyze the existence of Bajo language lexicon in the marine sector on the coast of Soropia District; 2) Analyzing the level of survival and displacement of marine environmental lexicons in the Bajo language in the Coastal District of Soropia; 3) Describe the survival factors and shifts in the marine lexicon of the Bajo language on the coast of Soropia District. This study uses a quantitative descriptive method. Data collection is done in several ways, namely providing questionnaires, conducting interviews and documentation. The data obtained is then analyzed through tabulation and then the frequency is calculated. Results Based on the research, it can be said that the Bajo language lexicon in Soropia sub-district still exists. The existence of the lexicon based on the age category of the respondents, 12-17 years 74.66%, 18-40 years 82.07%, and 41-65 years 84.30%. The existence of the lexicon is based on the gender category of the respondents, male 80.00% and female 74.42%. Existence based on the category of respondent's occupation, as a fisherman 87.48%, as a fish trader 72.81%, and as a student 74.17%. Then the survival of the Bajo language lexicon can be said to still survive. The survival of the fauna lexicon is 83.04%, the flora lexicon is 80.30%, the facilities and infrastructure lexicon is 67.91%, and the marine activity lexicon is 84.93%. However, there is a lexicon that has been shifted, such as lepa. factors, changes in marine ecosystems, technological advances, and modernization of fishing gear, as well as changes in behavior in how to obtain marine products have an influence on the survival and age shift of the lexicon.



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## Application Of Black Soldier Fly (*Hermetia illucens*) Frass Affected Grenhouse Gas In Corn Field

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### Abstract

The aim of the study is to determine the emission concentrations of methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), concentrations of ammonium (NH<sub>4</sub><sup>+</sup>) and nitrate (NO<sub>3</sub><sup>-</sup>) in corn field. The research design used was a Randomized Block Design which consisted of 5 treatments with 3 replications. The treatments consisted of control with plots without fertilizer, UPK (urea, phosphate, potassium) 200 kg-N ha<sup>-1</sup>, Frass BSF 500 kg ha<sup>-1</sup>, Frass BSF 1000 kg ha<sup>-1</sup>, and Frass BSF 1500 kg ha<sup>-1</sup>. The emission of CH<sub>4</sub>, N<sub>2</sub>O, CO<sub>2</sub> gases, and concentrations of NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup> were determined. The result showed that the treatment Frass BSF 500 kg ha<sup>-1</sup> has less emitted of greenhouse gases compare to other treatments, especially N<sub>2</sub>O and CO<sub>2</sub> gases. However, concentration of the NH<sub>4</sub><sup>+</sup> of frass BSF 500 kg ha<sup>-1</sup> was higher than the others frass treatments, except UPK. Application of BSF Frass in corn field can be an option to mitigate the greenhouses gases from field.



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## Effect of Application Mealworm Frass (*Tenebrio molitor*) on Emission of CH<sub>4</sub>, N<sub>2</sub>O, CO<sub>2</sub>, Ammonium (NH<sub>4</sub><sup>+</sup>), Nitrate (NO<sub>3</sub><sup>-</sup>) in Paddy Field

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### Abstract

The aims of study to determine the effect of the application of mealworm frass (*Tenebrio molitor*) on CH<sub>4</sub>, N<sub>2</sub>O, CO<sub>2</sub> missions, concentrations of ammonium (NH<sub>4</sub><sup>+</sup>), nitrate (NO<sub>3</sub><sup>-</sup>) and the growth of rice plants in agricultural land. The research design used was a Randomized Block Design which consisted of 5 treatments with 3 replications each, the application of mealworm frass, UPK (urea, phosphate, potassium), frass granule and UPK granule. which the treatment of frass granule and UPK granule are combined with biochar, zeolite and lignosulphate. Parameters determination were include the emission of CH<sub>4</sub>, N<sub>2</sub>O, CO<sub>2</sub>, concentrations of NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup>. and growth of rice plant (plant height, number of tillers, fruit biomass and plant biomass). The results showed that mealworm frass treatment reduced greenhouse gas emissions for N<sub>2</sub>O, CO<sub>2</sub> compared to the UPK treatment, while for CH<sub>4</sub> has a high total emission compared to other treatments. The concentration of NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup> were monitored fluctuating concentration changes in the soil. Mealworm frass addition had a significantly different effect on rice plant height, number of tillers, fruit biomass and biomass compared to UPK. This shows that the application of mealworm frass can be an option to reduce greenhouse gas emissions of N<sub>2</sub>O, CO<sub>2</sub> except for CH<sub>4</sub>, and have an effect on the concentrations of NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup> and the growth of rice plants.



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**The Effects of Golden Sea Cucumber (*Stichopus hermanii*) Ethanol Extract on the Lung Histopathology of Mice (*Mus musculus*) Exposed to Hydrochloric Acid (HCl) 37%**

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**Abstract**

This study aims to determine the effect of giving ethanol extract golden sea cucumber (*Stichopus hermanii*) has on a histopathological picture of the lung mice (*Mus musculus*). The negative control was not given treatment (K-), the positive control was exposed to 37% HCl for seven days and was not given sea cucumber extract gold (K+), treatment group one was exposed to 37% HCl for seven days and was given 500 mg gold sea cucumber extract (P1), and treatment group two was exposed to 37% HCl for seven days and was given 1000 mg gold sea cucumber extract (P2). each treatment group was repeated five times. Extraction is done using the maceration method, then the extract was given to experimental animals orally for seven days. Subsequently, histopathological preparations was made using the Hematoxylin-Eosin staining method, with parameter observations, namely the alveolar membrane, the lumen of the alveolus, and the relationship between alveoli. The results showed that there was an effect of giving extracts of ethanolic sea cucumber (*Stichopus hermanii*) on histopathological features of the lungs mouse lung (*Mus musculus*). A dose of 1000 mg of golden sea cucumber extract is effective in reducing the level of lung damage caused by chemical compounds (HCl 37%). As a result, it can be concluded that the effects of golden sea cucumber (*Stichopus hermanii*) influence the histopathology of mice lungs (*Mus musculus*).

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## The Effect Of Sodium Bicarbonate (NaHCO<sub>3</sub>) Addition On The Growth of *Chlorella* Sp Type Microalgae

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### Abstract

This study aims to determine the effect of the addition of sodium bicarbonate (NaHCO<sub>3</sub>) on the growth of microalgae. This study is an experimental study using a Complete Randomized Design (RAK) research design which has 4 treatments and 1 control with 3 repetitions each. The four treatments for the addition of sodium bicarbonate have different concentrations, namely 50 ppm, 100 ppm, 150 ppm and 200 ppm while in the control without the addition of sodium bicarbonate. The data from the study were then analyzed using anaova variance analysis techniques at a confidence level of  $\alpha \leq 0.05$ , then continued with Duncan's further test using the statistical SPSS program. The results of the research that has been carried out can conclude that there is an influence of the addition of sodium bicarbonate (NaHCO<sub>3</sub>) on the growth of microalgae type chlorella sp. This is based on the results of biomass measurements with the highest average value found in treatment A (addition of sodium bicarbonate NaHCO<sub>3</sub> 50 ppm) of 2.319 g / L compared to the average control value of 1.819 g / L with, in contrast to the chlorophyll content - a the results obtained had no influence on the control, where the highest average value of chlorophyll content was 1,447 mg / mL result from the control (K) and the lowest average was 0.947 mg / mL results from the treatment C.



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## Important Value Index of Tree Vegetation In Buffer Zone of Samangki Village, Bantimurung Bulusaraung National Park

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### Abstract

The shrinkage of South Sulawesi's forest reached 66.158.64 ha from 2012-2019 leaving only 32% in 2022 which could threaten forest ecosystem. One of the conservation areas in South Sulawesi is the Bantimurung Bulusaraung National Park (Babul National Park) with an area of ±43.750 ha. The Samangki village is in the buffer zone that directly adjacent to Babul National Park. The people of this village fulfill their daily needs from the forest. The damage caused by the use of buffer zone's forest can affect the Babul National Park ecosystem. This study aims to determine the composition and structure of tree vegetation in flat area in the buffer zone of Samangki Village, Maros Regency, South Sulawesi. Data retrieval using the transect method. There are 4 transects each has 100m in size, each contains 10 plots of 10x10m. The first transect was placed randomly and the next was systematically with a distance of 10m. The Important Value Index (IVI) for each species is calculated with the formula:  $INP = \text{Relative Density} + \text{Relative Frequency} + \text{Relative Dominance}$ . The number of species found is 22, with 15 families, and 20 genera. Families with the highest number of species are Euphorbiaceae and Sterculiaceae. Genera with highest number of species are Artocarpus and Coffea. Species with the fifth highest IVI are Bambusa vulgaris, Tectona grandis, Aleurites moluccana, Arenga pinnata, and Guazuma ulmifolia. The species with fifth lowest IVI are Coffea canephora, Tamarindus indica, Terminalia catappa, Cananga odorata, and Pterospermum diversifolium



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## Important Value Index of Shrub Vegetation in Buffer Zone, Samangki Village, Bantimurung Bulusaraung National Park

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### Abstract

The south Sulawesi's forests are experienced many significant problems, forest land clearing until 2021 reaches an area of  $\pm 69.323$  ha. This can increase the threat to the environment due to habitat destruction which has an impact on decreasing biodiversity. The Samangki Village is one of the buffer zone in Bantimurung Bulusaraung National Park, which gets a lot of disturbances due to dynamic and diverse community interactions. The presence of understorey includes shrub plays a role in resisting rainwater and surface runoff, minimizing erosion, protecting soil organisms, maintaining the microclimate, and increase soil fertility. This study aims to determine the composition and structure of shrub vegetation at the flat area in buffer zone, Samangki Village, Babul National Park, Maros Regency. Vegetation data obtained through 4 transects with a size of 100m. At each transect, 10 plots of 5x5m were made alternately, with the distance was 5m. The first transect was placed randomly and the next systematically with a distance of 10m. The Important Value Index (IVI) of each species was calculated with the formula:  $IVI = \text{Relative Density} + \text{Relative Frequency} + \text{Relative Dominance}$ . The number of shrub species obtained was 27 with 16 families and 26 generas. The family that has most of the species is Fabaceae and the genus with has most species is Mimosa. The five species with highest IVI are *Barleria prionitis*, *Leea rubra*, *Chromolaena odorata*, *Sida acuta*, and *Christella parasitica*. The five species with the lowest IVI are *Bridelia tomentosa*, *Dryopteris carthusiana*, *Pilea melastomoides*, *Strobilianthes sp* and *Breynia oblongifolia*.



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## **Development of Chitosan Based siRNA-PLK1 Nanoparticles as Anticancer**

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### **Abstract**

PLK1 is one of the kinase enzymes that has a very important role in controlling eukaryotic cell cycle. Inhibition of PLK1 gene expression with small interfering RNA (*siRNA*) molecule impede cancer cell division leading to cell death. Therefore, PLK1 is recommended as a potential target gene for cancer therapy. The development of chitosan-based siRNA-PLK1 nanoparticles is expected to be a safe and effective alternative for cancer therapy. The purpose of this study was to develop a chitosan-based siRNAPLK1 nanoparticle product as an anti-cancer. The chitosan-based siRNA-PLK1 nanoparticles were developed using the ionic gelation method. Nanoparticle characterization and encapsulation efficiency of siRNA-PLK1 nanoparticles were measured by scanning electron microscopy (SEM), X-ray diffraction (XRD), Fourier transform infrared (FTIR) and Ultraviolet-visible (UV-Vis) spectroscopy analysis. The results showed that conjugation of chitosan with siRNA-PLK1 through the ionic gelation method has succeeded in forming a stable nanoparticle structure.



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## **Emission of Greenhouse Gas (N<sub>2</sub>O, CH<sub>4</sub>, CO<sub>2</sub>), Nitrification Rate and Metagenomics of Bacteria in Soil Treated with Organic Frass of *Black Soldier Fly* (BSF)**

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### **Abstract**

The aims of study to determine the effect of black soldier fly (BSF) frass on the production of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O emissions, concentrations of NH<sub>4</sub><sup>+</sup>, NO<sub>3</sub><sup>-</sup> and metagenomics of soil microbes. The research design used was a Complete Randomized Design which consisted of 5 treatments with 3 replication each. Parameters were include the emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, concentrations of NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup> and metagenomics of soil microbes. The results showed that BSF frass increased production of greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O) compared to UPK (urea, phosphate, potassium) and control (untreated soil). Concentrations of NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup> experience fluctuations in soil. Diversity of microbes and the number of species in the frass BSF, UPK and control with the most phylum members are Proteobacteria, Firmicutes, Acidobacteria, and Bacilli.



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## Isolation and bioactivity testing as antidiabetic of secondary Metabolites extract of chloroform purslane (*Portulaca oleraceae* L)

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### Abstract

This study aims to determine the class of compounds contained in purslane chloroform extract and the ability of its bioactivity as an antidiabetic. The research was carried out in several stages, starting from maceration, fractionation, purity test, and bioactivity test. The isolate obtained was in the form of yellowish-white crystals with a melting point of 127-129°C. The results of the bioactivity test of the chloroform viscous extract of purslane were mice adapted for 7 days while measuring the mice's initial body weight. The average miswritten of the mice was 32.5 grams after which the mice were fasted for 12 hours and then the fasting blood sugar levels were measured and then the mice were injected with alloxan at a dose of 120 mg / BW. After the 3rd adding coma after day the mice were measured for their blood sugar levels. The average blood sugar level in group III after alloxan administration was 154.6 removing the extra spaces. If the blood sugar level is more than 124 mg / dL, the mice are said to be diabetic. Mice that were considered diabetic were given purslane chloroform extract at a dose of 100, 200, 300 mg/kg BW. The results of the ANOVA analysis showed that the thick extract of chloroform had anti-diabetic bioactivity in mice.



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## Organoleptic Testing of Sweet Potato Tapai (*Ipomoea batatas* L.) FERMENTED BY Glutinous Rice Tapai Yeast

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### Abstract

The purpose of this study was to determine the organoleptic test results of white sweet potato tapai (*Ipomoea batatas* L.) using local yeast. This experiment uses six treatments and three replications. The treatments are three different yeasts that come from three traditional local markets: two manufacturing yeasts (brand A and brand B) and a control (without yeast). The tapai was made by applying 2% yeast to 20 grams of sweet potato and fermenting it for 48 hours at room temperature. 25 amateur panelists did the organoleptic test for taste, aroma, texture, and color of tapai. All characteristics were evaluated using a Likert scale (1–5). The results on the color parameters of the tapai showed that the five types of yeast and the control produced an ordinary color range of 3.2–3.72. All yeast produced an ordinary aroma ranging from 3.08 to 3.44. For the taste, panelists like the control (score 4), 3.24–3.48 for traditional yeast tapai, and dislike tapai fermented by manufacturing yeast (scores 1–2). For the texture, the panelists chose control (score 4) and ordinary for the rest. Overall, panelists preferred the control (score of 5) over all tapai fermented with traditional yeast and disliked tapai fermented with manufacturing yeast.



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## Isolation of Polysaccharide Degrading Enzyme Producing Bacteria from Digestive Organs of Abalone *Haliotis* sp.

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### Abstract

The aims of the research are to determine the diversity and relationship of bacterial species that produce polysaccharide-degrading enzymes which isolated from the digestive organs of abalone. The isolates obtained were examined for their polysaccharide degradation ability using 1% CMC media. Isolates that can degrade polysaccharide showed the presence of hydrolysis zone in CMC media. The characterization of the selected isolates was carried by morphological and biochemical determination. The biochemical determination was included IMViC, catalase, and oxidative-fermentative as well as Gram staining. To analysis the type of bacteria isolated, the molecular identification was carried out and a phylogeny tree was made to determine their relationship. The phylogeny tree was made using Mega-X software. Based on the results obtained, there are two types of bacteria that have the ability to produce polysaccharide-degrading enzymes, namely isolates with access number OP218021 and OP218022. Isolate OP218021 has a close relationship with *Bacillus* sp. while OP218022 with *Klebsiella oxytoca*. The results of this research are expected to be developed in producing enzymes that can contribute to various fields, especially in sustainable agriculture to produce organic fertilizers that are environmentally friendly and can reduce greenhouse gas emissions.



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## **Effect of Frass Mealworm (*Tenebrio molitor*) on Growth and Soil Microalgae Growth**

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### **Abstract**

The aims of study is to determine the effect of application of frass mealworms (*Tenebrio molitor*) on the growth of and soil microalgae. The design of research was a randomized block design with three replications. The treatments were frass with amount of (500, 1000, 1500) kg/ha and UPK (urea, phosphate, potassium) 250 kg/ha. The parameters include plant height (cm), rod circumference (cm), plant biomass (gram), cob weight (gram), cob weight without shells (gram), cob length (cm), cob diameter (cm), number of rows in and number of seeds in rows of maize. The results showed that the application of frass on the growth of corn plants significant effect on rod circumference, plant biomass, cob weight, cob diameter and the number of rows on maize, but did not significantly affect to plant height, weight of cob without husks, cob length, number of seeds in maize row and soil microalgae population. Although the application of frass has no significant effect to the control, but quantitatively the growth of maize plants which treated with frass (500, 1000, 1500) kg/ha tended to be better than the controls.



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**Inventory of Domesticated Orchids in the Buffer Area of Bantimurung  
Bulusaraung National Park  
(Case Study: In Realolo Village, Mallawa District, Maros Regency)**

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**Abstract**

The study aimed to determine the types of orchids from domestication in the buffer area of Bantimurung Bulusaraung National Park. This type of research is a descriptive study to provide an overview of the types of orchids that are maintained by the community in the study area. The purposive sampling method is used in data collection, which only orchids maintained by the community in the Realolo Village area. The results showed that there are 26 types of orchids that are conventionally maintained. Of the 26 orchid samples collected, 11 of them were identified at the species level and 15 others were identified only up to the genus level. The types of orchids recorded include *Acriopsis* sp., *Aerides inflexa*, *Aerides* sp, *Agrostophyllum* sp, *Appendicula* sp, *Apporum uncatum*, *Coelogyne celebensis*, *Coelogyne* sp., *Cymbidium finlaysonianum*, *Dendrobium anosmum*, *Dendrobium crumenatum*, *Dendrobium striaenopsis*, *Dendrobium* sp., *Eria* sp., *Flickingeria* sp., *Liparis* sp., *Luisia* sp., *Phalaenopsis amabilis*, *Phalaenopsis amboinensis*, *Phalaenopsis* sp, *Pholidota* sp, *Phreatia* sp., *Robiqueta* sp., *Spathoglottis* sp., *Trichoglottis geminata*, and *Vanda* sp. The type of orchid that is most widely maintained by the community is *Dendrobium striaenopsis* with visually visible clumps of many. It is mean that the community is quite capable of domesticating orchids through orchid cultivation independently.

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## **The Effects of the Application of Mealworm (*Tenebrio molitor* L.) Frass as Alternative Fertilizer on Greenhouse Gas Emissions (CH<sub>4</sub>, N<sub>2</sub>O, CO<sub>2</sub>), Concentration of Ammonium (NH<sub>4</sub><sup>+</sup>) and Nitrate (NO<sub>3</sub><sup>-</sup>) in Corn Field**

Yustika Indah Sari Noviar, Rachmawaty, Muhammad Junda, Muhammad Wiharto  
Yasser Abd. Djawad, Abd. Muis, Andi Asmawati, Oslan Jumadi

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### **Abstract**

The aims of study is to determine the effects of the application of mealworm (*Tenebrio molitor* L.) frass as organic fertilizer on gas emissions (CH<sub>4</sub>, N<sub>2</sub>O, CO<sub>2</sub>), concentrations of ammonium (NH<sub>4</sub><sup>+</sup>), and nitrate (NO<sub>3</sub><sup>-</sup>) in corn field (*Zea mays* L.). This research used a random design group which consisted of five treatments with three repetitions of each. The application of U-PK (urea, phosphate, potassium) and mealworm frass used three different concentrations is frass 500 kg-N/ha, 1000 kg-N/ha, and 1500 kg-N/ha. The test parameters include the concentrations of CH<sub>4</sub>, N<sub>2</sub>O, CO<sub>2</sub>, concentrations of NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup>. The results showed that mealworm frass treatment with three different concentrations reduced greenhouse gas emissions for N<sub>2</sub>O and CH<sub>4</sub> compared with U-PK treatment. Meanwhile, the treatment of organic fertilizer with the concentration of 1500 kg-N/ha of frass showed that CO<sub>2</sub> emissions was greater than with U-PK treatment. The concentration of NH<sub>4</sub><sup>+</sup>, it showed that the concentration of NH<sub>4</sub><sup>+</sup> increased in the soil because in several weeks the results showed that quantitative and statistical analysis were totally different between organic fertilizer and U-PK. The concentration of NO<sub>3</sub><sup>-</sup>, the organic fertilizer gave a change in a fluctuated concentration in the soil and leaching which the nitrate can be reduced from being washed out by water. This research suggested that the application of mealworm frass as organic fertilizer can be an option for reducing gas emissions (CH<sub>4</sub>, N<sub>2</sub>O, and CH<sub>4</sub>) and affecting NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup> concentrations.



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## The Effect of Ultraviolet Radiation on Mycelium Growth of White Oyster Mushroom (*Pleurotus ostreatus*)

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### Abstract

The aims of study to determine the effect of UV irradiation on the mycelium growth of white oyster mushroom (*Pleurotus ostreatus*). The research design used was RAL (*Completely Randomized Design*) which consisted of 5 treatments and three replications each. This study consisted of treatment without irradiation (control), 5 minutes, 15 minutes, 30 minutes and 60 minutes of irradiation. The irradiation was carried out on mushrooms cultured on agar media. The study began with the preparation of tools & materials, mixing media materials, pouring the medium into a petri dish, growing the fungus on the parent medium (F0), calculating the diameter of the fungus after irradiation, growing the fungus into F1 and F2 media and calculating the growth of the fungus after incubation. The results showed that there was no difference in fungal growth on fungal mycelium after irradiation on F0 medium, but after being grown on F1 and F2 media there was a significant difference between control and irradiated treatment. The conclusion of this study is that the fungal mycelium irradiation affects the mycelium growth of white oyster mushroom (*Pleurotus ostreatus*) grown on new media, especially in the 15 minute irradiation treatment.



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## Important Value Index of Herbaceous Vegetation In The buffer zone Area of Samangki Village, Bantimurung Bulusaraung National Park

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### Abstract

The Sulawesi Island is covering an area of 1,746,0000 ha, and its endemic plants has a fairly high value, one of which is located in Bantimurung Bulusaraung national park (TN. Babul) for preserving biodiversity. The village of Samangki in the buffer zone is directly adjacent to the National Park. the human living around TN. Babul generally own land in the area that is used for plantations and agriculture, and that people also take advantage from the understorey vegetation including herbaceous to support their daily lives. The herbaceous vegetation also plays an important role in preserving biodiversity in the national park area. This study aims to determine the composition and structure of herbaceous vegetation in flat areas in the buffer zone of Samangki Village, TN. Babul, Maros Regency, South Sulawesi. Data collection using the transect method. there are 4 Transects each has 100m size, each contains 10 plots with the size of 2x2m. The placement of the first transect was random and the subsequent transects were systematic with a distance of 10m. The calculation of the Important Value Index (IVI) for each species with the formula:  $IVI = \text{Relative Density} + \text{Relative Frequency} + \text{Relative Dominance}$ . The number of species found was 21 with 14 families and 20 genus. Family with the highest number of species was Fabaceae and the genus with the highest number of species was Piper. Species with the fifth highest IVI were *P. sarmentosum*, *C. erecta*, *M. charantia*, *L. scandens* and *M. scandes*, while the species with the fifth lowest IVI were *S. podophyllum*, *N. D. triflorum* and *S. helvola*.



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## **Cocoa pod husk extract as edible coating on shelf life and quality of Tomatoes**

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### **Abstract**

Edible coating is a packaging that can stop, inhibit, reduce or slow down the growth of pathogenic microorganisms in food and packaging materials. Various studies have shown that edible coatings/films can function as carriers of food additives, such as anti-browning agents, antimicrobials, dyes, flavourings, nutrients, and seasonings. Cocoa pod husks have a fairly complex chemical composition. One of the chemicals it contains is phenol. Phenol is a chemical compound that has antimicrobial properties. Therefore, this study was conducted to develop an edible coating using Cocoa pod husks extract with the addition of alginate on the shelf life and quality of tomatoes. Cocoa pod husks were extracted by maceration method. The effect of adding alginate with different concentrations can be seen from the parameters tested, including: weight loss, pH, vitamin C and organoleptic levels. The results of the study of weight loss had the best value at a temperature of 4<sup>0</sup> C with a concentration of 2%, namely 2.61, at a concentration of 0%, which was the highest loss at 9.40. Testing the best pH value at a temperature of 30<sup>0</sup> C with a concentration of 1.5% which is 4.50, a concentration of 0% has the highest pH value of 5.20. The best treatment for vitamin C testing is a temperature of 30<sup>0</sup> C with a concentration of 2.5%, which is 8.72, storage at 4<sup>0</sup> C with a concentration of 2% has the lowest value of vitamin C, which is 6.15. It can be concluded that Cocoa pod husks extract with the addition of alginate affects the quality of tomato fruit and can inhibit faster ripening.



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## Decreasing the Population of Decomposer Bacteria, Phosphate Solvents, and Nitrification by Herbicides

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### Abstract

Herbicide that is widely used to control weed growth. The long-term use of paraquat can disturb the balance of ecosystems including soil microorganisms due to the presence of residues in the soil. This study aims to evaluate the effect of paraquat herbicide exposure on bacterial populations that act as decomposers, phosphate solvents, and nitrification on plantation soils. This research is an observational study. The effect of paraquat exposure on microbial populations was evaluated from the Total Plate Count (CFU / g Soil) value. Bacteria that act as decomposers, phosphate solvents, and nitrification in exposed soils and those not exposed to paraquat herbicides. The research data were analyzed descriptively. The results showed that the TPC values of bacterial populations that act as decomposers, phosphate solvents and nitrification include amylolytic, cellulolytic, proteolytic, lipolytic, phosphate solvent, and nitrogenfixing soils in soils not exposed to paraquat herbicides respectively by 7.34, 7.04, 7.48, 7.04, 7.77 and 5.00 (CFU / g). Whereas in soils exposed to paraquat herbicides respectively 6.42, 6.04, 6.25, 6.41, 6.29, and 4.85 (CFU / g).



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**Preliminary Study On Field Application Of Human Urine Fertilizer On Cultivation of Green Amaranth In Bajeng Distric, Gowa, South Sulawesi.**

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**Abstract**

A field study was conducted in District Bajeng, Gowa regency, South Sulawesi to evaluate the efficacy of human urine as fertilizer on green amaranth (*Amaranthus* sp.). Amaranth planted on two seedbeds for fertilize application and the other two seedbeds for unfertilized amaranth planting. Fertilizer made of fresh human urine were collected from farmers around the cultivation area, then diluted with water to obtain a concentration of 25%. Using an electric sprayer, fertilizer waterreddirectly to the soil, once in four days. Its efficacy was observed based on growth rate and yield performance including plant height, number of leaves, leaf width and biomass yield. The results indicated that all the fifth parameters are significantly higher in urin-fertilized amaranth compared to unfertilized one. In conclusion, human urine might be effective as alternatif fertilizer for growing *Amaranthus* sp in field scale.

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## **Effect of Addition of Tapioca Waste and Molasses to Mushroom Media on The Weight of White Oyster Mushroom (*Pleurotus ostreatus*)**

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### **Abstract**

Industrial waste without treatment has a negative impact on the environment and human health including tapioca industrial waste. It contains high organic matter and occasionally cyanide. To overcome these problems, tapioca waste is used in a mixture to mushroom growth media as additional nutrients for Oyster mushroom (*Pleurotus ostreatus*) growth. The aim of this study is to evaluate the effect of mixing tapioca waste and molasses on the weight of Oyster mushrooms. Four types of growth media, namely: K (control), M1 (+molasses 10%), T1 (+tapioca waste 10%), and TM1 (+tapioca waste 10%, & molasses 10%). Each treatment was repeated 3 times. The highest fresh weight (24.5 kg) was obtained from growth medium TM1, which was significantly different from the control (K). The lowest fresh weight (20.22 kg) was obtained from growth medium M1. The moderate fresh weight (23.32 kg) resulted from growth medium T1. The study showed that mixing substrate for oyster mushrooms with additional nutrients of tapioca waste and molasses can increase the fresh weight of oyster mushrooms significantly. Further, research should be carried out to evaluate the effect of mixing tapioca waste with different concentrations.



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## Utilization of Molasses and Tapioca Dregs on Media White Oyster Mushroom (*Pleurotus ostreatus*)

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### Abstract

The aims this research is an experimental study that aims to determine the utilization of molasses and tapioca dregs in the white oyster mushroom (*Pleurotus ostreatus*) media. The research design used was RAL (*Completely Randomized Design*) which consisted of 4 treatments and 3 replications each. This study consisted of treatment without the addition of molasses and tapioca dregs (control), adding 0.05% molasses, adding 1% tapioca dregs, adding molasses 0.05% + 1% tapioca dregs. Addition of molasses and tapioca dregs is done on the media (baglog). The study began with the preparation of tools & materials, mixing baglog media materials, filling baglog media, sterilizing baglog media, inoculation of F2 seeds, incubation of baglog media, maintenance and harvesting. The results showed that there was use of addition of molasses, tapioca dregs, and molasses + tapioca dregs with no addition to the media (control). The conclusion of this study is that the utilization of molasses and tapioca dregs in the media of white oyster mushroom (*Pleurotus ostreatus*) affects the yield of white oyster mushroom (*Pleurotus ostreatus*) which is added to the media (baglog) especially in the treatment of adding molasses + tapioca dregs.



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## **Analysis Of Coliform Escherichia Coli Contamination On Single And Mixed Fruit Of Apple (*Malus Domestica*) And Grapes (*Vitis Vinifera*) From The Traditional Market And Fruit Stores In Makassar**

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### **Abstract**

This research is a descriptive study aimed at knowing if there is any coliform *Escherichia coli* on single and mixed fruit of apple (*Malus domestica*) and grapes (*Vitis vinifera*) from the traditional market and fruit stores in Makassar by using Most Probable Number (MPN) method with a three-tube retail series and three replication. The result of the positive tubes were then matched by the MPN chart according to the SNI 2897:2008. The result of the research were samples on the single and mixed fruit of apple and grapes positive were contamination by *Escherichia coli*. The value of the MPN obtained at assessments  $> 1,1 \times 10^5$  MPN/mL on defined affirmation test have higher MPN value is  $1,1 \times 10^5$  MPN/mL. The value of MPN produced does not qualify bacteriological requirement according to SNI 7388: 2009, where the maximum extent of microbial contamination in food is  $<20/g$ . Single fruit samples of apples and grapes from traditional markets had the same accumulation of 89% while mixed fruit were 85,20%. Samples of single fruit apples from fruit store had an accumulation of 85,20% and grapes 88,80% while mixed fruit was 81,50%. It can be concluded that there is coliform *Escherichia coli* contamination on single and mixed fruit from the traditional market and fruit store. The higher contamination was found in single fruit apples and grapes from traditional market.



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**Effect of Biofertilizer Application on Growth and Nitrate Reductase Activity of Brassica rapa L. to Salinity Stress**

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**Abstract**

Mustard greens (*Brassica rapa* L.) is a herbaceous plant from the Cruciferae or Brassicaceae family which has 3700 species. *B.rapa* L. has a taproot system, short stems and segmented and winged leaves and long stems that are flat in shape. Giving biofertilizer is one way to help increase crop production and quality. This research aims to determine the effect of biofertilizer application on the growth and productivity of mustard in water growing media (hydroponics). Parameters measured were plant height, number of leaves, wet weight, dry weight, leaf chlorophyll content, and nitrate reductase activity. Mustard greens are grown in a hydroponic system at the Sawitsari green house, Faculty of Biology, UGM. Media in the form of clean water is added with biofertilizer in various doses. The biofertilizer doses were graded from 0, 10 mL/L, 20 mL/L, and 30 mL/L. The resulting data was then analyzed by ANOVA (Analysis of Variance) using SPSS and tested by DMRT (Duncan Multiple Range Test). The results showed that biofertilizer at a dose of 30 mL/L was able to increase the growth of plant height (20.28 cm) and number of leaves (8.6 strands) and productivity of wet weight (82.67 g) and dry weight (5.76 g) compared to controls negative. At a dose of 20 mL/L biofertilizer showed an increase in Nitrate Reductase Activity with a value of 0.037 mol NO<sub>2</sub><sup>-</sup>/gram leaf wet weight/hour of incubation).

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## Structural Redesign of Lankacidin to Improve the Biological Activity Inspired by Computational Analysis

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### Abstract

We investigated the importance of the  $\delta$ -lactone ring (C1–C5) in lankacidin C using chemoenzymatic synthesis and computational prediction and assessing biological activity, including antitumor activity. Lankacyclinone C, a novel lankacidin C congener lacking the  $\delta$ -lactone moiety, was synthesized through chemoenzymatic synthesis using pyrroloquinoline quinone-dependent dehydrogenase (Orf23) in *Streptomyces rochei*. Orf23 could convert the monocyclic lankacidinol derivatives, lankacyclinol and 2-epi-lankacyclinol, to the C-24 keto compounds, lankacyclinone C and 2-epi-lankacyclinone C, respectively, elucidating the relaxed substrate specificity of Orf23. Computational prediction using molecular dynamics simulations and the molecular mechanics/generalized Born surface area protocol indicated that binding energy values of all the monocyclic derivatives are very close to those of lankacidin C, which may reflect a comparable affinity to tubulin. Monocyclic lankacidin derivatives showed moderate antitumor activity when compared with bicyclic lankacidins, suggesting that the  $\delta$ -lactone moiety is less important for antitumor activity in lankacidin-group antibiotics.



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## Utilization of Bacteria and Fungi as Biodegradation of Agricultural waste for Organic Fertilizer

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### Abstract

Food crop waste such as corn is slow to decompose naturally, so special treatment is needed. Selection and testing of the effectiveness of bacteria and fungi decomposers or a combination of both against corn plant waste for organic fertilizer is one way to overcome this problem. The evaluation results of 120 isolates were filtered at 50 oC and found 29 decomposer bacteria. Furthermore, 29 isolates of cellulolytic bacteria were tested in vitro and 16 isolates were found that were effective as decomposer cellulolytic bacteria. Of the 16 isolates that were effective as cellulolytic bacteria, tested in a greenhouse against corn stalks and leaves waste and found 6 bacteria were effective isolates: E7.1, E7.3, B7.1 (*Bacillus* sp), E7.7 (*Pseudomonas* sp), H7.1 (*Escherichia* sp), and C4.1 (*Micrococcus* sp). Meanwhile, fungal in soil samples were isolated by making a suspension that was inoculated on PDA media with 10 l of chloramphenicol added at a concentration of 500 ppm and then incubated for 7 days. Test the effectiveness of corn plant waste and observed its weight every two weeks. The decomposer fungi obtained 26 isolates of fungi that grew well. Identification of isolates found five genera of fungi namely *Trichoderma*, *Penicillium*, *Gliocladium*, *Fusarium* and *Aspergillus*. Of the 26 isolates after being tested on corncob and corn leaf litter, 13 isolates were found to be effective as decomposer fungi. The single decomposer E7.7 gave corn seed yields that were not significantly different from N,P,K (200,45,60) fertilization, and five single decomposers fertilized with 75% N,P,K (E7.11, B7.1, M7, O5 and P7), but significantly different from the combination decomposers fertilized with 50% N,P,K (B7.1+O5, E7.11+M7, E7.7+P7, B7.1+E7.7+O5 and EM4 ). Meaning that application of corn leaf stem compost was able to replace recommended inorganic N,P,K fertilizer at the research site up to 25%.



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## Proximate Analysis And Digestibility Of Modified Corn Flour

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### Abstract

This study aims to determine the effect of modification of corn flour by spontaneous fermentation, controlled fermentation using *Lactobacillus fabifermentans* or *Aspergillus sp* culture and mixed culture of *L. fabifermentans* and *Aspergillus sp* (1:3) followed by pregelatinization. The treatment variables in this study were spontaneous fermentation, controlled fermentation using single cultures of *L. fabifermentans* and *Aspergillus sp*, and mixed cultures of these two types of microbes with a ratio of 1: 3. This study consisted of 4 treatments with 3 groups each. This research is an experimental study using a Randomized Block Design (RAK). Observation variables in this study were proximate test (moisture content, ash content, protein content, fat content, carbohydrates) and starch digestibility. The data were processed using SPSS version 22 program, with the method of analysis of variance (ANOVA) and continued with the DMRT test (Duncan). The test results of analysis of variance analysis of spontaneous fermentation treatments, single culture fermentation of *L.fabifermentans* or *Aspergillus sp* and mixed cultures of *L.fabifermentans* and *Aspergillus sp* (1:3) gave a significant effect on water content, fat content, carbohydrates and starch digestibility. modified corn flour. The best modified corn flour was obtained by controlled single fermentation modified treatment using *L.fabifermentans* followed by pregelatinization. Modified corn flour has the characteristics of water content 14.48%, ash content 0.13%, protein content 7.37%, fat content 0.65%, carbohydrates 80.06% and starch digestibility 87.16%.



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## Role of Quinic acid from Coffee pulp as Inhibitor PLPro

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### Abstract

One of the protein targets to curve COVID-19 is PLPro protein because the protein has correlation to the virus replication. The coffee pulp has a metabolic seconder like Quinic acid which has function as therapy. The purpose of this study was to analyse the potential of the compound Quinic acid contained in coffee pulp as a candidate for corona therapy through inhibition of PLPro. In Silicostudy method, ligand quinic acid (CID: 6508) we obtained from PubChem while the protein PLPro (PDB ID: 6W9C) from Protein Data Bank. Interaction process used HEX however visualization and analysis by Discovery Studio. Interaction between Quinic acid and Papain Like Protease (PLPro) produced bind energy around -160,8 Kj/mol. We found amino acid residues which bind the ligand, they are THR74, ASP76, TR75, PRO77 (Hydrogen Bond- Conventional Hydrogen Bond), ASP76 (Hydrogen Bond-Carbon Hydrogen Bond), ASP76, ALA68 and PRO59 (Hydrophobic- Alkyl), PHE79 (Unfavorable-Unfavorable Donor-Donor) and ASP76 (Unfavorable-Unfavorable Acceptor-Acceptor). The interaction between the Quinic acid compound and the Papain Like Protoase (PLPro) complex has a low level of hydrophobicity on the surface ligand which is indicated by blue color on the surface, but there is a neutral part. It tends not to be marked with mostly white color but some parts function as acceptors to the Papain Like Protoase (PLPro) complex, this is indicated by a green colour on the surface. Tend to be neutral so that the ligand with a charge of 0.000 does not lead to blue or red. The presence of Van Der Waals forces was found on four amino acid residues, Pi-hydrogen donor on seven amino acid residues, and unfavorable bump on one amino acid residue and Pi-Alkyl on three amino acid residues. We concluded that the quinic acid has a role as anti COVID-19 by inhibiting PLPro, In vitro and In vivo research needed.



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**Assembly And Mapping Resistance Gene Against Powdery Mildew Using  
Characterized Amplified Sequence Region Marker On Melon  
(*Cucumis melo L*) Cultivar Tacapa**

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### **Abstract**

Cultivation of melon (*Cucumis melo L.*) has been developed in Indonesia. Cultivated melon varieties have different advantages, but generally still vulnerable to disease. Powdery mildew is a disease that infects nearly all melon plants at the melon cultivation centers in Indonesia. The disease is largely attributable to the fungus *Podosphaera xanthii*. Plant breeding methods continue to be developed for producing superior melon seeds and resistant to powdery mildew. In 2009, a new melon cultivar, called TACAPA has been produced and it is resistant against powdery mildew. The cultivar has good fruit quality, however still show segregation in second generation (F<sub>2</sub>). Assembly and the detection of resistance gene against powdery mildew with SCAR marker on melon cultivars TACAPA are needed to produce superior melon seeds of TACAPA. This study conducted crossing of TACAPA with PI 371795 and Action 343, so that the resulting two new generations are PI 371795 x TACAPA and TACAPA x Action 434. Melons from crosses were planted in a greenhouse as much as 110 plants. Then the sample of the leaves were used for DNA extraction and amplification with SCAR marker. DNA amplification products were analyzed by Chi-square (X<sup>2</sup>) test. Chi-square test results were used to analysis linkage map with map markers. The results showed that the pattern of inheritance of resistance genes against powdery mildew on melons TACAPA controlled by a single dominant gene (Pm-I). The position of SCAR molecular marker linked to gene Pm-I resistance against powdery mildew on TACAPA x PI 371795 was 31,5 cM, while on TACAPA x Action 434 was 3, 7 cM.

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**ANTI-CANCER ACTIVITY OF *Plectranthus amboinicus* L. Spreng EXTRACT IN WHITE RATS EXPOSED TO BENZO[a]PYRENE AND CHARACTERIZATION OF ACTIVE COMPONENTS USING MOLECULAR DOCKING TECHNIQUE**

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### **Abstract**

Cancer is a disease that is very dangerous and even a high cause of death. One of the causes of cancer is Benzo[a]pyrene (BaP) which is an environmental carcinogenic agent. This agent is found everywhere such as in tobacco smoke, charcoal-grilled foods, and PAH-contaminated roof surfaces, playgrounds, and highways. Some research results show that BaP can cause cancer in various organs of the body such as colon, liver, kidney, spleen and so on. This condition triggers researchers to conduct research on herbal medicinal plants as alternative medicine.. Bangunbangun (*Plectranthus amboinicus* L. Spreng) has anti-cancer properties due to several phytochemical components contained in it such as apigenin, quercetin and luteolin. This study aims to examine the anti-cancer potential of *Plectranthus amboinicus* extract. This study consisted of three stages, namely the stage of providing simplicia of *Plectranthus amboinicus* leaf extract, testing the anticancer efficacy of the extract in test animals, and characterizing the active substance apigenin as anti-cancer in *Plectranthus amboinicus* leaves. To test the anticancer efficacy on animals, used 24 male white rats aged 2 months divided into four treatment groups and each group consisted of six rats. The groups are P0, PB, PE, and PB+E. P0 is the control group given basal feed and drinking water and 0.5% CMC, PB was given BaP every day for 22 days, PE was given *Plectranthus amboinicus* extract 700 mg/kg bw, PB+E was given BaP for 22 days then given EEP one hour after daily BaP for 22 days. On the 23<sup>rd</sup> day of the week, all treatment rat were killed by neck decapitation. The anti-cancer test was observed through several parameters, namely the DNA profile parameters of several BaP target organs in rats. Target organs i.e. liver, kidney, spleen and intestines were removed slowly and weighed then frozen in liquid nitrogen for DNA analysis. To determine the characteristics of Apigenin as an anti-cancer active substance, molecular docking was carried out using AutoDockTools-1.5.6 and AutoDock\_vina 1\_1\_2. The results of the study were that DNA was extracted from the organs of the liver, kidneys, spleen and lungs. Quantitative DNA measurements showed an increase in DNA in each target organ. Molecular docking of apigenin has been carried out. The results showed that apigenin has potential as an anticancer of the liver. The results of the docking analysis of natural ligands showed that the natural ligand had a binding energy value of -9 .07. Meanwhile, the binding energy value of the comparison ligand is +150.22. Based on the results of the study, it can be concluded that when viewed from the value of binding energy, the ligand of the test compound has more potential to have liver anticancer compared to the ligand of the comparison compound, because the smaller the binding energy value of a ligand, the better.

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## Isolation and Characterization of Extremophile Bacteria from Waepella Hot Spring for Hydrolytic Enzyme Production

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### Abstract

Extremophiles are organisms that have been adapted to live in extreme environments. They have huge potential for various industrial application specifically for enzyme production. The aim of this study was to isolate and screen the potential of extremophiles bacteria from Waepella hot spring in Sinjai Regency, South Sulawesi, Indonesia for hydrolytic enzyme production. The water samples were collected from the hot spring at three different locations. The method of bacterial isolation was agar plating technique using Tryptic Soy Agar media. The obtained isolates were characterized by examination of colony colors, cell shapes, gram staining, endospore, catalase and enzymatic activity (amylase, cellulose, protease, lipase and pectinase). This is the first report on extremophile bacterial isolation and screening for enzyme production from the hot spring in South Sulawesi, Indonesia. Eight teen isolates are successfully established. Eight of them have amylolytic activity with the highest clear zone of about  $22.6 \pm 0.44$  (isolate BHSS10). Nine isolates have cellulolytic activity with the highest clear zone of about  $11.6 \pm 0.4$  (isolate BHSS7). Sixteen isolates have pectinolytic activity with the highest clear zone of about  $12 \pm 0.24$  (isolate BHSS16). Only 3 isolates have proteolytic activity with the highest clear zone observed of about  $9.83 \pm 0.40$  (Isolate BHSS15) and none of the isolates showed lipolytic activity.



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## **Biodegradation of Polyethylene (PE) and Polypropylene (PP) by The Consortium of Bacteria from The Sarimukti Landfill Leachate, West Bandung Regency**

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### **Abstract**

Polyethylene (PE) and polypropylene (PP) are the two most widely produced plastics globally. The use of high amounts of PE and PP causes an increase in the amount of plastic waste to the environment. Handling plastic waste requires an environmentally friendly and relatively low cost method by utilizing the biodegradation process. This study aims to determine the potential for biodegradation of PE and PP with a consortium of bacteria from the Sarimukti TPA leachate and is expected to be one of the alternative methods of plastic waste management. The main parameter is the plastic degradation rate which was validated using analysis of morphological changes with Scanning Electron Microscope (SEM), changes in surface profiles with the Formtracer Avant contour instrument, and changes in functional groups with Fourier Transform Infrared Spectroscopy (FT-IR). Furthermore, the supporting parameters are the percentage of plastic weight loss, the pH of the medium, as well as the total number of bacteria on the medium and plastic surface measured at each test time interval. Data analysis was carried out statistically and descriptively. Based on two-way ANOVA analysis with a significance level of 0.05, the bacterial consortium from the Sarimukti TPA leachate was able to degrade PE and PP significantly. PE plastic with the addition of a bacterial consortium has an average degradation rate of 0.00021 g/day and PP plastic with the addition of a bacterial consortium has an average degradation rate of 0.00020 g/day. The results of the validation test with SEM, FT-IR, and Formtracer Avant showed changes in the surface morphology, functional groups, and surface profile of the plastic. The measurement results of the supporting parameters indicate the activity of the bacterial consortium as indicated by changes in the percentage of weight loss, the percentage of plastic weight loss, the pH of the medium, and the total number of bacteria on the medium and plastic surface.



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## **Statistical Approach in Studying The Distribution of Chlorophyll A and Its Relationship to Temperature and Salinity in The Seas of Northern and Southern Indonesia**

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### **Abstract**

It is important to study the distribution of primary productivity to understand the condition of potential fish catches. However, geographical conditions that have a repeating monsoon pattern affect the physical conditions of Indonesian waters. The purpose of this study was to examine the distribution of chlorophyll A in the northern and southern parts of maritime Indonesia relative to temperature and salinity. The data used are sea surface temperature (Aqua MODIS Satellite, 4 km Resolution, Monthly Period), salinity (Aquarius SMAP Satellite, 10 km Resolution, Monthly Period) and Chlorophyll A (VIIRS MODIS Satellite, 4 km Resolution, Monthly Period). Data were collected for 5 years from 2016 – 2020 in spatially and pointed. The method used are statistical approach such as a probabilistic distribution adjusted for the DJF, MAM, JJA and SON periods. Monthly time series method. Regression method, and the correlation between chlorophyll A and temperature and salinity. The results showed that the spatial pattern of chlorophyll A repeatedly reversed relative to sea surface temperature in the northern and southern regions. In the DJF period, the average chlorophyll A in the northern part of Indonesia is 0.44 mg/m<sup>3</sup> while in the southern part it is 0.33 mg/m<sup>3</sup>. The reverse pattern is found in the JJA period where chlorophyll A in the northern part is 0.26 mg/m<sup>3</sup> and the southern part is 0.43 mg/m<sup>3</sup>. In time series, in the northern part of the Indonesian sea, Chlorophyll A experienced a decreasing trend while in the southern part there was an increasing trend. The relationship of chlorophyll A to changes in sea surface temperature correlation -0.53 and to salinity 0.09. These results can explain the distribution pattern of chlorophyll A is quite influenced by changes in sea surface temperature and is expected to be a consideration in determining potential fishing locations.



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## **$\alpha$ -Glukosidase Enzyme Inhibition by Ethanol Extract of Various varian of Kratom (*Mitragyna speciosa* Korth.) Leaf**

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### **Abstract**

Diabetes mellitus, characterized by acute hyperglycemia, has become a worldwide epidemic. Inhibition of  $\alpha$ -glucosidase in people with diabetes reduces post-prandial glucose levels by delaying glucose absorption.  $\alpha$ -glucosidase inhibitors such as acarbose have been used as antidiabetics and are effective in reducing hyperglycemia, but they have side effects and increase diabetic complications. Therefore, using natural medicine as an alternative therapy can be considered. One of the plants in Indonesia that have empirical potential as an antidiabetic is kratom (*Mitragyna speciosa* Korth.). There are 3 types of kratom variants that are widely used by the public, namely the green, red, and white kratom variants. These variants are distinguished by the veins on the kratom leaves. However, antidiabetic research with  $\alpha$ -glucosidase enzyme inhibition mechanisms from kratom leaves variant red, green, and white have not been investigated. This study aimed to the inhibitory activity of the  $\alpha$ -glucosidase enzyme by Ethanol Extract of Various varian of Kratom (*Mitragyna speciosa* Korth.) Leaf. Powder of three variants of kratom leaves was macerated with 96% ethanol for 72 hours, and the inhibition of  $\alpha$ -glucosidase enzyme activity was using ethanol extract and acarbose as a positive control. In vitro testing was carried out using a microplate reader instrument with a wavelength of 405 nm. The 96% ethanol extract of red, green, and white variants of kratom leaves at a concentration of 500 ppm could inhibit the activity of the  $\alpha$ -glucosidase enzyme by 10.57%, 13.06%, and 5.33%, respectively. This indicates that the three kratom variants have activity as inhibitors of the  $\alpha$ -glucosidase enzyme but are classified as very weak, with  $IC_{50} > 200$  ppm. The inhibition activity of the three extracts was significantly different ( $p < 0.05$ ). This difference may be caused by the secondary metabolites' content in each Kratom variant



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## **Antibacterial Activity Of Cocoa Leaf Extract *Theobroma Cacao L.* Against Acne-Caused Bacteria *Cutibacterium Acnes* And *Staphylococcus Epidermidis***

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### **Abstract**

Cocoa plantation waste (*Theobroma cacao L.*), cocoa leaves, is increasingly abundant, with efforts to increase cocoa production by trimming the shape. The Ladongi sub-district in Kolaka Regency, Southeast Sulawesi, as the area that produces the most cocoa beans, is also not spared from this. Cocoa leaves have not been used optimally, even though their phytochemical components have the potential as antibacterial. This study aimed to determine the antibacterial activity of cocoa leaf extract (*Theobroma cacao L.*) against acne-causing bacteria, *Cutibacterium acnes* and *Staphylococcus epidermidis*. The method used is the disc diffusion method (Kirby Bauer). The results showed that cocoa leaf extract had the potential as an antibacterial against acne-caused bacteria, *Cutibacterium acnes* and *Staphylococcus epidermidis* with respectively the best inhibitory concentration of 25%, 19mm and 22mm.



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**The Effect Of Local Microorganism From The Leaves Of Seruni Jalar (*Wedelia trilobata* (L.) Hitchc.) on The Growth of Cut Celery (*Apium graveolens* L. Var. *Sylvestre Alef*)**

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**Abstract**

The aim of this study was to determine the effect of local microorganism (MOL) administration of seruni jalar leaves (*Wedelia trilobata* (L.) Hitchc.) with different concentrations on the growth of cut celery (*Apium graveolens* L. var. *Sylvestre Alef*). This type of experimental research used a completely randomized design with 7 treatments, consisting of 1 positive control, namely the administration of EM4 and 1 negative control, namely the administration of distilled water and 5 treatments of Local Microorganism (MOL) concentration, namely 10%, 20%, 30%, 40%, 50%, with 5 repetitions each. The stages of the research carried out were (1) Production of MOL from Seruni Jalar (*Wedelia trilobata* (L.) Hitchc.), (2) Seedling and preparation of cut celery (*Apium graveolens* L. var. *Sylvestre Alef*) planting media. and (3) Test of MOL leaves of Seruni Jalar (*Wedelia trilobata* (L.) Hitchc.) on Cut Celery (*Apium graveolens* L. var. *Sylvestre Alef*). Observation parameters included stem diameter, stem height, number of leaves, root length and plant biomass. The results showed that MOL leaves of seruni jalar (*Wedelia trilobata* (L.) Hitchc.) had a significant effect on stem diameter, root length and number of leaves. The best concentration for the growth of Cut Celery Plants (*Apium graveolens* L. var. *Sylvestre Alef*) was given by MOL seruni jalar leaves (*Wedelia trilobata* (L.) Hitchc.) which was 50% concentration. This concentration gave a very good response to the stem dry biomass of cut celery (*Apium graveolens* L. var. *Sylvestre Alef*), which was significantly different with all treatments including the control (EM4).

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## Effect of Organic Nutrition in Morphological Character of Orchid Embryo

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### Abstract

*In vitro* culture of orchid embryos on suitable growth media will produce large amounts of orchid plants in a short time. The aims of this research are to identify germination phase of orchid embryos and the effect of adding organic nutrients to the medium of *Vanda* sp orchid embryos. The experiment was carried out using pod of *Vanda* sp. This was implanted on VW medium to observe the embryonic phase. Then embryos phase 3 ("Greenish" protocorm phase 4 MSP, slightly round in shape, green protocorm) planting on treatment medium used POC (liquid organic fertilizer) medium and fish emulsion with various concentrations (1; 1.5; 2; 2.5; 3; 3.5 ml/L) with 150 ml/L coconut water added, while VW medium was used as a control. Observations on the treatment medium were carried out for 2 months, with 8 times observation. Observations were made to measure the morphological characters (leaf length, number of leaves, and root length) produced until the 8th week of observation. The quantitative data obtained was then analyzed by Analysis of Variance (ANOVA) to determine the effect of liquid organic fertilizer on the measured parameters, then if there was a significant difference, then Duncan's Multiple Range Test (DMRT) at the test level of 5%. The results showed that there were 6 growth phases in *Vanda* sp. namely the "Swollen" Phase (Phase 1), the "Yellowish" protocol phase (Phase 2), the "Greenish" protocol phase (Phase 3), the "Polarity and Elongation" Phase (Phase 4), the "Leaf Primordial" Phase (Phase 5) f. Phase leaf and root (Phase 6). While the effect of the treatment medium on the growth and development of orchid embryos showed different responses to each morphological character. Especially the POC 1 treatment gave better results than the VW medium at the root length parameter, namely 642.23µm.



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## **Characteristics Of Maleo Senkawor (Macrocephalon Maleo) Egg Nests In Lake Towuti, East Luwu Regency**

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### **Abstract**

Maleo birds (*Macrocephalon maleo*) have habitats in the forest near the coast or in the middle of the forest near hot springs. However, in Pekaloa Village, East Luwu Regency, Maleo birds are found on Lake Towuti. This certainly shows that the habitat of maleo birds on the lake coast is new information, especially on the island of Sulawesi. This research was carried out in Pekaloa Village, Towuti District, East Luwu Regency, South Sulawesi. This research was conducted to collect data on the characteristics of the Maleo Senkawor (*Macrocephalon maleo*) nests. Secondary data collection starts from journals and scientific papers, as well as discussions with local communities and Lake Towuti TWA (Natural Tourist Park) managers, while primary data was obtained from measurements and direct observations in the field, as well as laboratory analysis. In this study, five nest plots were used with 13 nest holes, and the vegetation analysis used a sample plot of 175 m<sup>2</sup> in size. The characteristics of the nest hole have an average depth of 0.6 m, a surface diameter of 0.41 m, a temperature of 33.6oC, and a pH of 6.2. Vegetation analysis found eight species around the nests of Maleo Senkawor birds. Vegetation analysis uses the density formula: the highest frequency density is 19.5, and the highest frequency is 0.57, while the lowest density is 0.02 and the lowest frequency is 0.14. This research is the basis for new information in the preservation of maleo birds with the characteristic conditions of maleo bird nesting habitats, especially in the coastal areas of the lake.



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## Production of Antibacterial Substance by Immobilized Cell of *Geobacillus subterraneus* TM6Sp1 Against Gastrointestinal Pathogen Bacteria

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### Abstract

*Geobacillus* is a thermophilic bacteria that is able to utilize various substrates and produces various metabolites, such as thermostable enzymes, chemical compounds, and antimicrobial peptides, especially bacteriocins or BLIS. *Geobacillus subterraneus* TM6Sp1 was isolated from the crater of Mount Kamojang, West Java, Indonesia, which has potential as a source of antibacterial. This study was conducted to determine the antibacterial potential of *Geobacillus subterraneus* as a new antibiotic for oral, and gastrointestinal pathogens. The use of cell immobilization can facilitate an environment that supports bacteria in producing antibacterial substances, as well as increase cell density for more intensive communication between cells. Antibacterial preparations included growth studies on *Minimal Media* (MM) and *Mueller-Hinton Broth* (MHB) added with CaCl<sub>2</sub> and MgSO<sub>4</sub> at various pH (6, 7, and 8) for 36 hours. Furthermore, antibacterial preparations were carried out with immobilized cells at various pH at 55°C, and sampling was collected every 24 hours in repeated batch fermentation. *G. subterraneus* filtrates were tested for antibacterial activity against oral and gastrointestinal pathogens. The results showed in Minimal Media, the highest inhibition zones are 30.38 mm and 29.06 mm, respectively, against *E. coli* and *S. typhimurium* at pH 7 in fourth batch. Whereas in MHB media, the highest inhibition zones are 18.04 mm and 19.75 mm, respectively, against *E. coli* and *S. typhimurium* at pH 8 in fourth batch. This study concludes that immobilized cells of *G. subterraneus* are optimum to produce antibacterial activity in the fourth batch of fermentation in Minimal Media at pH 7 which are antagonistic against gastrointestinal pathogen bacteria.



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## **Cytotoxicity and Selectivity of Water Simpura (*Dillenia suffruticosa* (Griff.) Martelli) Fraction against Breast Cancer Cells**

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### **Abstract**

Breast cancer is the most frequently diagnosed and the leading cause of death in women worldwide. Several previous studies have proven that the water simpura plant (*Dillenia suffruticosa* (Griff.) Martelli) can be a potential anticancer agent. The aim of this study was to determine the cytotoxicity and selectivity of the simpura stemwood fraction against T47D, MCF-7 and 4T1 breast cancer cells. This research is an experimental laboratory and the test of anticancer activity against breast cancer cells is carried out *in vitro*. The extraction process of water simpura logs used maceration method with methanol solvent, then the extract was fractionated with n-hexane and ethyl acetate respectively and tested for cytotoxic activity by MTT assay method. The results obtained were the n-hexane fraction of simpura stemwood showed the highest cytotoxic activity compared to extracts and other fractions in all test results on breast cancer cells. The n-hexane fraction showed the highest cytotoxic activity in MCF-7 breast cancer cells with an IC<sub>50</sub> value of 2.32 g/ml which was classified as strong cytotoxic and with an IS value > 3 which indicated that the n-hexane fraction had high selectivity. Thus, simpura stem wood has the potential as a source of breast anticancer compounds.



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## Effect of ethanol extract Pirdot leaves in rat white induce B(a)P as anti - hepatocellular carcinoma through in vivo and in silico.

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### Abstract

Pirdot (*Saurauia vulcani* Korth.) is an ethnomedical used by Batak tribes, North Sumatera – Indonesia as antioxidant, wound healing, anti-inflammatory and immunomodulatory, and hepatoprotective agent. Our study explored more the effect of ethanol extract of Pirdot (*Saurauia vulcani* Korth.) leaves (EEP) through in vivo and in silico approach. The histopathology of liver in rat white induced by benzo(a)pyrene (B[a]P) would be determined following as 4 groups; Control group (K); G1 groups were given orally B(a)P 2 mg/kg; G2 groups were administered orally EEP at a dose 500 mg/kg; G3 group were given orally both of B(a)P 2 mg/kg + EEP 500mg/kg. The treatments were an experimental study with a completely randomized design (CRD) with six replications on 24 rats for 22 days. On the 23rd day, the animals were euthanized and the liver of all the group treatments were collected and stained using H&E method. The measurement of liver weight and histological of central vein diameter and the degree of hepatocyte were observed by ANOVA test. The results showed that the ratio of liver weight decreased in the family planning, K, G2, and G3 groups. The diameter of the central vein in the K and G2 groups was significantly lower than the BaP-induced G1 and G3 groups ( $p < 0.05$ ). The level of liver hepatocyte damage in the K and G2 groups was significantly lower than the level of hepatocyte damage in the G1 and G3 groups ( $p < 0.05$ ). This work identified the SIRT2 inhibition in hepatocellular carcinoma through in silico approach. Three bioactive compound Pirdot were associated in the pathway, such as Genistein, Ursolic acid and Sitosterol.



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## **Cytotoxicity and Selectivity of Water Fraction of Simpup Trunk (*Dillenia Suffruticosa* (Griff.) Martelli) against Colon and Cervical Cancer Cells**

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### **Abstract**

Colon and cervical cancers are the top two types of cancer that are ranked in the top five worldwide in terms of incidence and mortality. Water simpup plant (*Dillenia suffruticosa* (Griff.) Martelli) can traditionally be used for the purpose of treating various diseases, one of which is cancer. The aim of this study was to prove the cytotoxic effect and selectivity of the simpup water stem fraction on WiDr colon and HeLa cervical cancer cells. Water simpup stems were macerated using 96% methanol. The methanol extract was further fractionated by the liquid-liquid partition method using n-hexane and ethyl acetate. Cytotoxic test was carried out using WiDr colon cancer cells and HeLa cervical cancer using the MTT assay method. The results showed that the extract, n-hexane fraction, ethyl acetate fraction, and methanol fraction had IC<sub>50</sub> values in WiDr colon cancer cells of 138.275; 353,534; 134.111; > 500 g/mL. Meanwhile, HeLa cervical cancer cells all had IC<sub>50</sub> values > 500 g/mL. The data showed that the methanol extract and ethyl acetate fraction in colon cancer cells WiDr were moderately cytotoxic, the n-hexane fraction was weakly cytotoxic, and the methanol fraction was inactive. Meanwhile, the HeLa cervical cancer cells are not active. With a selectivity index value < 3 which indicates that the extract and fraction are less selective in killing cancer cells. Thus, simpup air wood has moderate potential which can be developed as a candidate for colon cancer prevention drugs.



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## Microorganism Contamination Test on Kratom Leaves

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### Abstract

Kratom (*Mitragyna speciosa*) is one of the most promising export commodities from Indonesia. This study aims to analyze the microbiological contamination of three variants of kratom leaves, namely red, white, and green kratom. The microbiological contamination test of kratom leaves includes bacterial contamination of *Salmonella* sp., *Escherichia coli*, and yeast. Test for contamination of *Salmonella* sp. carried out using Buffered Peptone Water (BPW), Rappaport Vassiliadis Medium + Soya (RVS), Muller Kauffmann Tetrathionate Novobiocin Broth (MKTTn), Lysine Deoxycholate (XLD) and Brilliant Green Agar (BGA) with an incubation temperature of 37°C for 24 hours. Contamination of *Escherichia coli* bacteria was carried out using Buffered Peptone Water (BPW) media and Coliform *Escherichia coli* Color Indicator with an incubation temperature of 35°C for 24 hours. Determination of yeast and mold contamination using Buffered Peptone Water (BPW) media and Yeast and Mold Color Indicator at 25°C for 72 hours. The results of the tests that have been carried out show that the red, white and green kratom leaves are not contaminated with *Salmonella* sp. and *Escherichia coli* but contaminated with yeast and mold.



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## Tyrosinase Enzyme Inhibition by Ethanol Extract of Various varian of Kratom (*Mitragyna speciosa* Korth.) Leaf

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### Abstract

Tyrosinase enzyme (EC 1.14.18.1) plays a role in skin pigmentation reactions to brown and browning of foodstuffs such as fruits and vegetables, by catalyzing the process of melanin production. Therefore, tyrosinase inhibitors are needed to prevent excess melanin production causing an adverse browning reaction. Kratom (*Mitragyna speciosa* Korth.) leaves contain secondary metabolites of alkaloids and flavonoids which have activity as a tyrosinase inhibitor that is better and safer than kojic acid. Therefore, kratom leaves can potentially be an inhibitor of the tyrosinase enzyme. Objective: This study aimed to examine the activity of the ethanol extract of kratom (*Mitragyna speciosa* Korth.) leaf as an inhibitor of the tyrosinase enzyme. Materials and Methods: The method used in this research is experimental laboratory. The samples were ethanol extract of kratom (*Mitragyna speciosa* Korth.) leaves with red, green, and white variations made with concentrations of 7,8125 ppm, 15,625 ppm, 31.25 ppm, 62.5 ppm, 125 ppm, 250 ppm and 500 ppm and kojic acid as a positive control. Determination of inhibitory activity is done by calculating the IC<sub>50</sub> value. Results: The results showed that there was an inhibitory activity of the tyrosinase enzyme in the ethanol extract of the leaves of kratom (*Mitragyna speciosa* Korth.) red, green, and white variants of kratom and the highest IC<sub>50</sub> value was obtained in red kratom, which was 21477756 g/mL, white kratom, which was 65139968 g/mL, and green kratom is 501788103 g/mL, while the IC<sub>50</sub> value of kojic acid is 32.85 g/mL. Conclusion: From the results, it can be concluded that the red, green and white variants of the ethanol extract of kratom (*Mitragyna speciosa* Korth.) leaves have no activity as an inhibitor of the tyrosinase enzyme because the IC<sub>50</sub> values of all three are >700 g/mL.



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## Potential Plants in KGPAA Mangkunagoro I Forest Park as Material for Botanical Printing Motifs

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### Abstract

KGPAA Mangkunegoro I Forest Park is a conservation area that has a role in the fields of education, conservation, and research development. Research related to potential botanical printing (ecoprint) plants in the Mangkunagoro I KGPAA Forest park area has never been done so it has a very high urgency. The baseline from the results of this study is expected to be the material for further developments in conservation efforts for several potential plants. Botanical printing is a printing technique using plants as the main raw material. The development of botanical printing techniques is increasingly paying attention to environmentally friendly principles and minimal chemical waste. One of the techniques used is steam botanical printing which consists of 6 stages: scouring, mordanting, printing, steaming, fixation and washing. The purpose of this study was to identify of potential plant species (endemicity, altitude, conservation status, morphological characters) to be used as ecoprint plants. The type of research conducted is qualitative descriptive research. Sampling was done by using purposive sampling technique. Collecting data using survey, observation and experimentation methods for making fabric products using basic ecoprint techniques. The results showed that 50 types of plants have the potential to be used as sources of natural motifs from botanical printing. Types of plants consist of groups of ferns and spermatophytes. The results of the research have been implemented in outreach activities, training and assistance in making ecoprints with the target community in buffer areas as a form of collective and sustainable utilization of natural potential (Sustainable Development Goals).



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## Antioxidant Activity And Total Phenolic Test Of Kratom Leaf (*Mitragyna speciosa* Korth.)

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### Abstract

Recent years, kratom leaves have been the center of attention of scientists in their use as an alternative in treating opium addiction. Pharmacological and chemical studies refer to one type of kratom. West Kalimantan has three variants of kratom, namely green, red and white. This study aims to determine and compare the antioxidant activity, total phenolic and flavonoids as well as the correlation between total phenolic and flavonoid with antioxidant activity in the three types of kratom. The ethanol extract of the three types of kratom leaves was obtained by maceration technique. Correlation test using statistical test that is Pearson correlation test. Antioxidant activity test was carried out using the DPPH method. The three extracts gave antioxidant activity values with  $IC_{50}$  values of 26.39  $\mu\text{g/mL}$  for green kratom, 30.25  $\mu\text{g/mL}$  for red kratom and 30.59  $\mu\text{g/mL}$  for white kratom. Examination of the total phenolic content using the Folin-Ciocalteu method and calculated based on the standard gallic acid curve while the examination of the total flavonoid content was carried out using the colorimetric method using a standard solution of quercetin. The results is 6.11 mg GAE/g extract and 0.86 mg QE/g extract for green kratom, 8.67 mg GAE/g extract and 0.68 mg QE/g extract for red kratom and 9.09 mg GAE/g extract and 1.13 mg QE/g extract for white kratom. The total phenolic content with  $IC_{50}$  value showed a weak relationship and was negatively correlated with the Pearson correlation value of -0.315 while the total flavonoid content with  $IC_{50}$  value showed a strong relationship and positively correlated with the Pearson correlation value of 0.808. Based on the above, the three variant of kratom have strong antioxidant activity with green kratom having the strongest antioxidant activity and the antioxidant activity of kratom is thought to be influenced by the total phenolic content.



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## **The Effectiveness Of Adding Seaweed To Feed In Reducing Fat and Cholesterol Levels In Broiler Chickens**

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### **Abstract**

This study aims to determine the effectiveness of adding seaweed to feed in reducing fat and cholesterol levels in broiler chickens. This type of research is experimental. This research method used a completely randomized design (CRD) consisting of 4 treatments with three replications. The treatments given were Ration without the addition of seaweed (K), R1 (Ration with the addition of seaweed 7 %), R2 (Ration with the addition of 9% seaweed), and R3 (Ration with the addition of 11%). The parameters observed were a decrease in meat fat content, a decrease in cholesterol levels, and the live weight of broiler chickens. Fat content was measured using the Soxhlet method, and cholesterol levels were measured using the Esey Touch GCU. The data analysis technique used is the Analysis of Variance (ANOVA) at the confidence level = 0.05; if the ANOVA results show a significant difference, proceed with Duncan's further test. The results showed that adding seaweed to the feed reduced broiler chickens' fat and cholesterol levels. Treatment with the addition of 7% seaweed reduced the fat content of the meat and cholesterol levels in broiler chickens and did not reduce the live weight of broiler chickens. Meanwhile, the 9% and 11% treatments reduced meat fat content, cholesterol levels, and reduced live weight of broiler chickens. So it can be concluded that the addition of 7% seaweed proved effective in reducing broiler chickens' fat and cholesterol levels



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## **The Plankton Community In The Mariah Bandar Springs, Pematang Bandar District, Simalungun Regency.**

Masdiana Sinambela

State University of Medan

### **Abstract**

The plankton community in the Mariah Bandar springs, Pematang Bandar District, Simalungun Regency is the title of the research that has been carried out. Parameters measured are biological, physical, and chemical parameters. Biological samples, namely plankton, were taken using a plankton net, water samples to measure physical and chemical parameters were taken using dark colored sample bottles. The identification results obtained that the plankton community in Mariah Bandar spring consisted of *Spirogyra setiformis*, *Spirogyra singularis*, *Spigogyra* sp, *Melosira* sp, *Fragillaria* sp, *Stigeoclonium* sp, *Aulacoseira* sp 1, *Aulacoseira* sp 2, *Ilyocryptus* sp 1, *Ilyocryptus* sp, dan *Synedra acus*. The physical and chemical parameters are, the average temperature value is 27.30C, depth is 56.76 cm, BOD is 1.27 mg/L, pH is 5.6, dissolved oxygen is 3.8 mg/L, the substrate is sandy rock. Generally, the physical and chemical parameters still support the life of plankton in Mariah Bandar springs, only the pH is slightly acidic.



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## **Profile of Deforestation in Maros Watershed South Sulawesi Province**

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### **Abstract**

Oxygen is an important requirement for human life. Oxygen is produced by forests. As population growth increases, the need for land use also increases, so that forest land is deforested. This study aims to determine the dynamics of forest land change and the profile of deforestation in the Maros River Basin. This study uses quantitative analysis with a descriptive approach. The data used in this study is land cover data in the form of shapefiles obtained from the Makassar Region VII Forest Area Consolidation Agency, which is then processed using a Geographic Information System (GIS). The results of the analysis show that for 30 years (1990-2020) the forest area has decreased by 1,057.90 hectares. Changes in forest land to shrubs, settlements/built-up land, savanna/grasslands, bodies of water, mixed gardens, and rice fields. The most preferred residential land use. The results for the deforestation profile in the Maros watershed obtained 4 different types of deforestation profiles, where overall the majority of the Maros watershed are not vulnerable to deforestation



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## **The Meiofauna Abundance as Descriptor of Environment Changes in The Coast of Losari Beach, Makassar**

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### **Abstract**

The Research aimed to analyze the ecological value of meiofauna as a bioindicator of water quality in the coast of Losari Beach, Makassar. The total meiofauna abundance identified in the study was 66791 indiv/m<sup>2</sup>, composed of 12 phylum and 91 species or genera. Stations at the estuary of the Jeneberang, Tanjung Merdeka, and Tallo River estuaries are research sites with a high level of abundance, this condition allows the presence of organic contaminants produced by the surrounding anthropogenic activity which triggers the high growth of meiofauna in these locations. The ostracoda, oligochaeta, tunicata and ciliophora are phylums with a high level of abundance compared to other phylum meiofauna, because the phylum has a high adaptability to the entry of pollutant materials into the waters. The range of diversity and uniformity indices shows that the meiofauna species on the Losari Coast are categorized with high diversity. The range of the dominance index shows that there is no species was dominant, except in the research stations around the Losari Beach reclamation project.



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## Optimization the factors that influence Pectin Extraction of Pomelo Peels (*Citrus maxima*) using the Central Composite Design from Response Surface Methodology

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### Abstract

The experimental design in this study was used to optimize the extraction of pectin from pomelo peels using the surface method. The prediction model and optimization of the pectin extraction process from pomelo peels consists of 20 experiments using central composite design (CCD) with DX6.0.4 software. The independent variables used in optimizing the yield of pomelo peel pectin extraction were pH between 1.5 - 2.5, temperature 60°C-100°C and extraction time 60 – 120 minutes. The yield of pectin extract ranged from 11.5 to 28.45 % (w/w, based on dry weight of kepok banana peel). The ANOVA results showed that the variables of pH and temperature had a very significant effect ( $P < 0,0001$ ) on the yield of pomelo peel pectin extract. Optimum conditions for the extraction of pomelo peel pectin were estimated at pH (1.5) and temperature (100°C). Extraction time was set at 120 minutes. The result of optimal conditions, the predicted yield of pectin is 28.00%, still under the estimated extraction conditions of 28.45%. Analysis of variance, adj  $R^2$  and  $R^2$ , model mismatch test, and p-value statistically showed that the model was adequate in representing experimental data. The effect of pH and extraction temperature was very significant ( $P < 0.001$ ) on the results of pomelo peel pectin extraction. This shows that these two variables are very important in the process of extracting pomelo peel, where the  $R^2$  value is 98.97%.



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## Vitamin D Level and Anti-SARS-CoV-2 Antibody Titre in convalescent COVID-19 patients

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<sup>2</sup>Department of Pulmonology, Tadjuddin Chalid Hospital, Makassar

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### Abstract

We investigated the production of antibodies against SARS-CoV-2 and vitamin D level among convalescent COVID-19 patients. We conducted a cross-sectional study involving recovered persons in Makassar, Indonesia. We evaluated the correlation of 25-hydroxyvitamin D level and the anti-receptor-binding-domain (anti-RBD) IgG titres at 0 months and 3 months post-recovery. A cut-off <25 ng/mL of the 25(OH)D was used to define vitamin D deficiency and vitamin D sufficiency. Anti-RBD IgG titres of subjects with vitamin D deficiency was lower from those with vitamin D sufficiency in both 0 month and 3 month-group. However, there was no significant correlation between 25(OH)D level and the antibody titer in both groups ( $r=-0.018$ ;  $p=0.93$ ; and  $r=-0.06$ ;  $p=0.79$ , respectively). We conclude that vitamin D levels is not associated with the development of anti-SARS-CoV-2 antibodies among COVID-19 survivors.

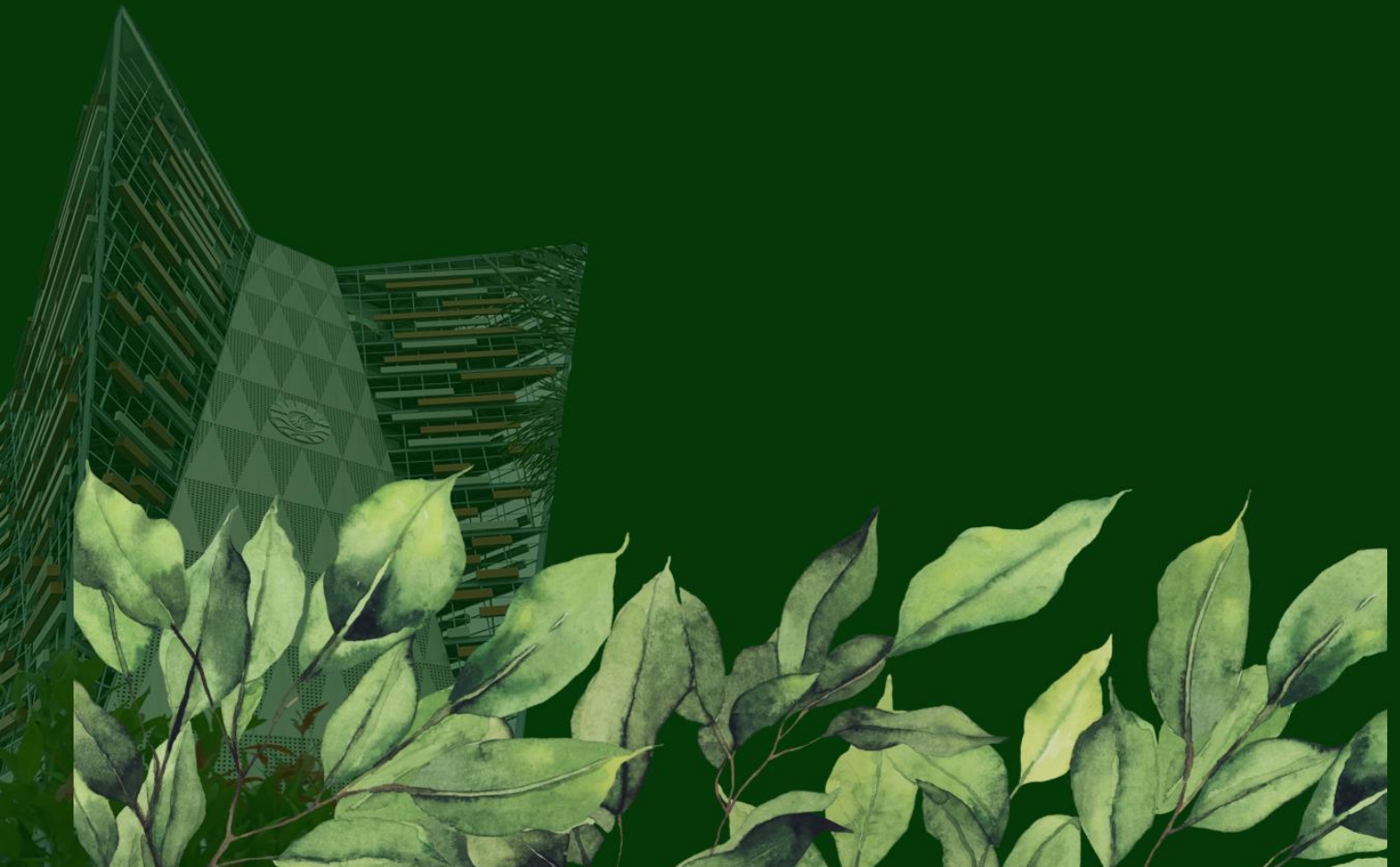


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# Certificate of Appreciation

This Certificate is Presented to

**Hartono**

as **Presenter**  
of a paper entitled

**Development of Chitosan Based siRNA-PLK1 Nanoparticles I  
as Anticancer**

in the 2<sup>nd</sup> International Conference on Life Science and Biology Education (ICoLiBE),  
Organized by Biology Department, Faculty of Mathematics and Natural Sciences (FMIPA)  
Universitas Negeri Makassar (State University of Makassar)

Makassar, November 15<sup>th</sup>, 2022

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**Drs. Suwardi Annas, M.Si., Ph.D.**

NIP. 196912311994031110

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# DEVELOPMENT of CHITOSAN BASED siRNA-PLK1 NANOPARTICLES as ANTICANCER

*Hartono<sup>1</sup>, Hasri<sup>2</sup>, Ika Yustisia<sup>3</sup>, Rusdina Bte Ladj<sup>4</sup>, Irma Rapi<sup>1</sup>, Eka Risdayanti<sup>2</sup>,  
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# Introduction

Technology siRNA has the potential to be developed as one of the new approaches to cancer therapy that has few side effects. Chitosan is such a negative cationic polymer that it was easy to form the complex with siRNA, and it not toxic, mucoadhesion, biocompatible, biodegradable, and so high in stability.

PLK1 is one of the kinase enzymes that have an important role in controlling the cycle and cell division.

The purpose of this study was to develop a chitosan-based PLK1 siRNA nanoparticle product that has potential as an anti-cancer.



## Research Methods

### **Location :**

The research locations used were three laboratories, namely verification of research methods and preparation of tools and materials carried out at the Chemistry Laboratory of FMIPA UNM, followed by nanochitosan formulations at the Biology Laboratory of FMIPA UNM and Hasanuddin University Medical Research Center (HUMRC) for the application of nanochitosan.

# Research Methods

Verification of Research Methods and Preparation of Research Tools and Materials



Formulation of Chitosan-Based siRNA-PLK1 Nanoparticles



Characterization of Chitosan-Based siRNA-PLK1 Nanoparticles



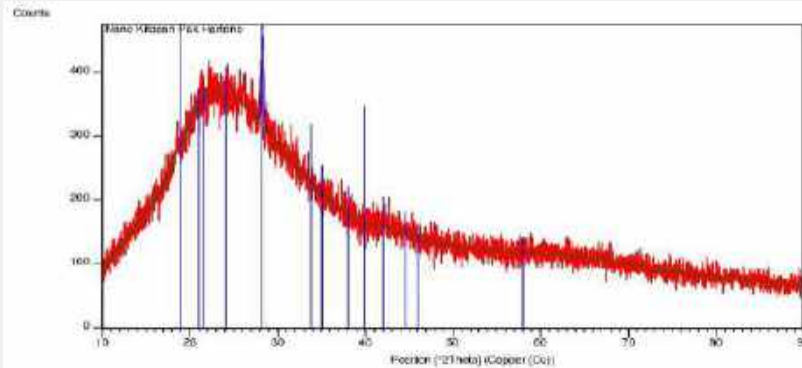
Application of Chitosan-Based siRNA-PLK1 Nanoparticles in Breast Cancer Cells (MCF7)

Chitosan-based siRNA-PLK1 nanoparticles were prepared by ionic gelation method combined with sonication method

- Characterization using X-ray diffraction (XRD)
- Characterization using Ultraviolet-visible (UV-vis)
- Characterization using Fourier Transform Infrared (FTIR)
- Scanning Electron Microscope (SEM)

# Results and Discussion

## Nanochitosan



### Peak List: (Bookmark 3)

Pos. [°2Th.]	Height [cts]	FWHM Left [°2Th.]	d-spacing [Å]	Rel. Int. [%]
28.2452	116.25	0.1920	3.15699	100.00

Based on the XRD data research that has been carried out, the results obtained are the nanochitosan particle size of 41,393 nm, where these results fall into the nanoparticle range from 1-100 nm. This data is obtained based on the particle size formula used.

### a. Characterization using X-ray diffraction (XRD)

$$k = 0,9$$

$$\lambda = 0,15406$$

$$\beta = \text{FWHM} = 0,1920 \rightarrow 0,003351 \text{ rad}$$

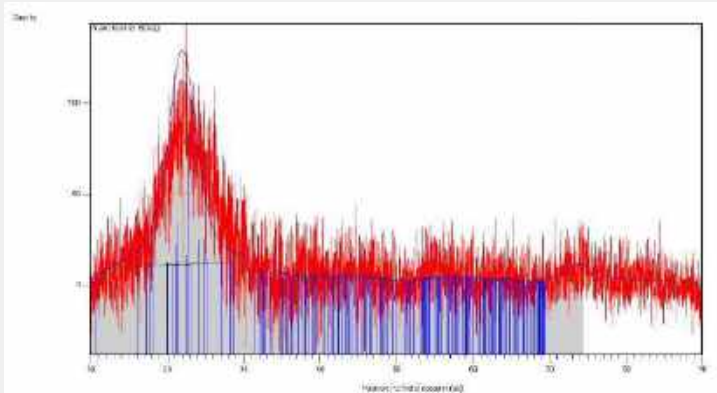
$$\theta = 28,2452 \rightarrow \frac{28,2452}{2} = 14,1226 \rightarrow 0,2464 \text{ rad}$$

Nanoparticle size(D)...?

$$D = \frac{k \cdot \lambda}{\beta \cos \theta}$$

# Results and Discussion

## Nanochitosan siRNA control



### **Peak List:** (Bookmark 3)

Pos. [°2Th.]	Height [cts]	FWHM Left [°2Th.]
21,9689	78,68	4,4083
73,9024	6,06	5,0381

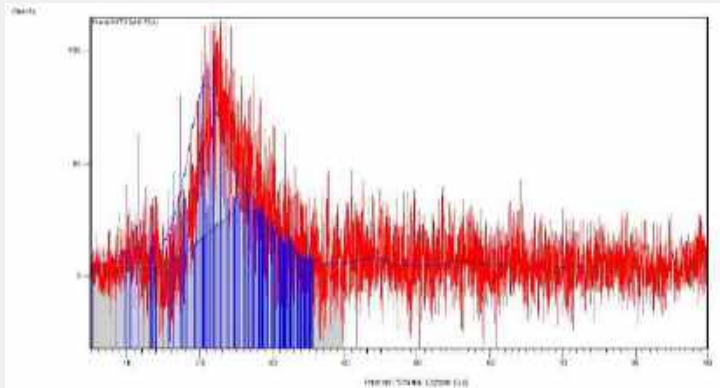
$$D = \frac{k \cdot \lambda}{\beta \cos \theta}$$

Based on the XRD data research that has been done, the results of siRNA nanochitosan particle sizes are 1,835 nm. These data are obtained using the terms for the particle size formula. The results of these data are numbers that fall into the range of nanoparticles that range from 1-100 nm.



# Results and Discussion

## Nanochitosan siRNA-PLK1



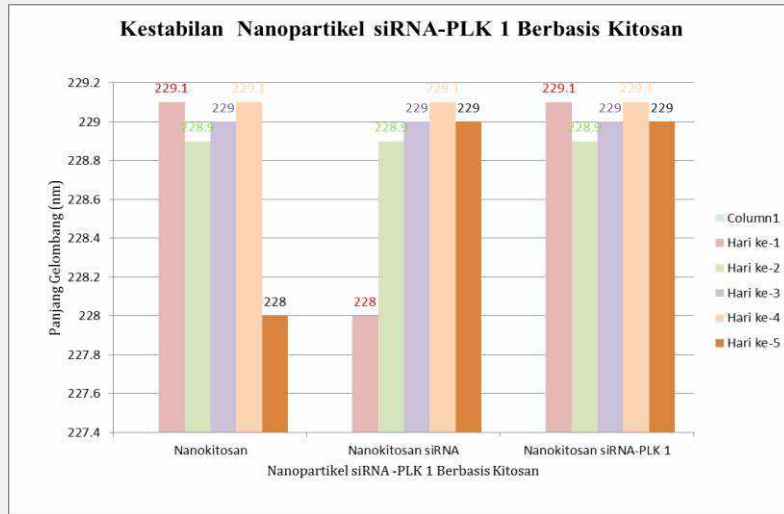
### **Peak List:** (Bookmark 3)

Pos. [ $^{\circ}2\theta$ .]	Height [cts]	FWHM Left [ $^{\circ}2\theta$ .]
11,1273	4,50	6,2976
20,6310	44,74	5,6678

Based on the XRD data research that has been carried out, the particle size of the siRNA-PLK1 nanochitosan is 1,264 nm. The results of the data included in the range of nanoparticles range from 1-100 nm.

# Results and Discussion

## b. Characterization using UV-vis

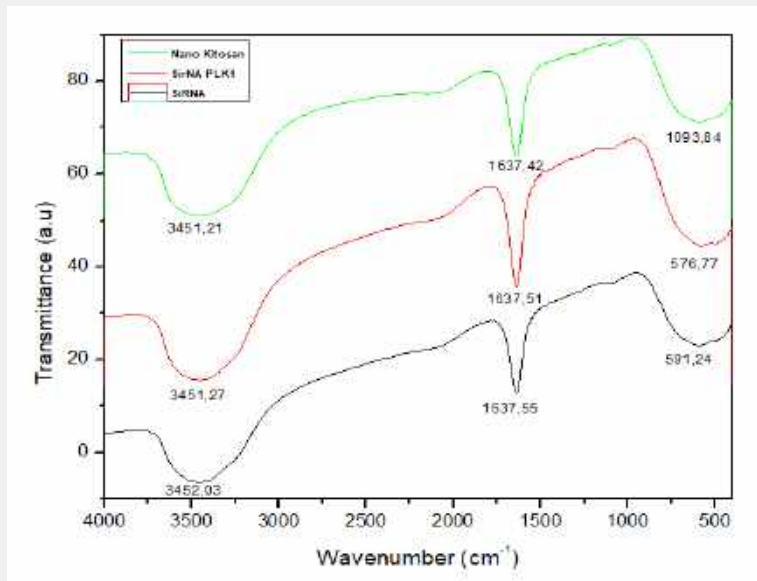


Based on the results of the UV-Vis analysis the stability of nanochitosan shows that up to 5 days the stability level is fairly constant with a wavelength of 229.1 nm. And then, nanochitosan siRNA control is stable for up to 5 days because the wavelength obtained is the same as the initial measurement, namely 229 nm.

This is because the wavelength is almost the same at the time of the initial measurement, namely the first day with a wavelength of 229.1 nm. Nanochitosan siRNA-PLK1 was stable for up to 5 days with a wavelength of 229 nm because the wavelength was almost the same as the initial measurement on the first day, namely the wavelength of 229.1 nm.

# Results and Discussion

## c. Characterization using Fourier Transform Infrared (FTIR)



The results of data analysis on FTIR are reflected in the form of the functional group peaks at each wave number. The functional group in nanochitosan is -OH in the presence of an absorption wave of 3451.21 cm then a P=O group is formed with a wave number of 1637.42 cm and at a wave number of 1093.84 cm C=C.

Functional group is formed nanochitosan siRNA control has a -HO functional group with a wave number of 3451.21 cm and a wavelength of 1637.51 cm, a P=O functional group is formed which indicates the characteristics of nanochitosan.

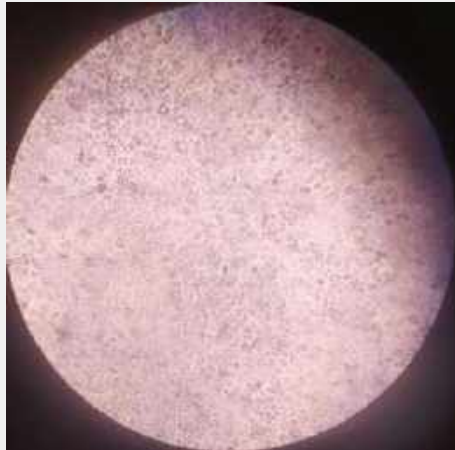
In the synthesis of nanochitosan siRNA-PLK1 at a wavelength of 3452.3 cm a -HO functional group is formed and at a wave number of 1637.55 cm a P=O functional group is formed which indicates the characteristics of nanochitosan.

The test was continued by using an FTIR spectrophotometer in the wave number range of 4000–500 cm to determine the formation of cross-links between chitosan, TPP and siRNA-PLK1 on nanoparticles. This is indicated by the presence of functional groups from the obtained nanoparticle compounds.

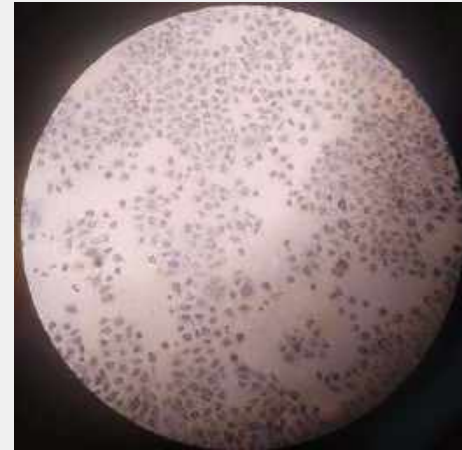
# Result and Discussion

- **Application of Chitosan-Based siRNA-PLK1 Nanoparticles in Breast Cancer Cells (MCF7)**

Nanochitosan siRNA control



Nanochitosan siRNA-PLK1



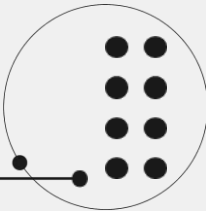
Based on qualitative data, cancer cells (MCF7) that were treated with the control siRNA nanochitosan grew normally until confluent or the cell density was up to 100%. Meanwhile, cells treated with nanochitosan siRNA-PLK1 had stunted growth because many cells died so that a lot of empty space was formed.



# Conclusion

Based on the results of the research that has been carried out, it can be concluded that the development of siRNA and PLK1-based nanochitosan can be tested using 2 methods, namely ionic glass and sonication to test stability through characterization of each sample used. The resulting nanochitosan was formed with an average size of 41.393 nm with stability reaching 229.1 nm. The results of the test on breast cancer cells (MCF7) were reviewed based on qualitative data, cancer cells (MCF7) treated with control nanochitosan siRNA grew normally until their cell density reached 100%. Meanwhile, the growth of cells in siRNA-PLK1 nanochitosan was inhibited due to the large number of dead cells so that the empty space formed was quite a lot.

**THANKS FOR YOUR ATTENTION**





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**The Effectiveness Of Adding Seaweed To Feed In Reducing Fat  
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**Drs. Suwardi Annas, M.Si., Ph.D.**

NIP. 196912311994031110

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# International Conference on Life Science and Biology Education (ICoLiBE)

**“The Effectiveness of Adding Seaweed to  
Feed in Reducing Fat and Cholesterol  
Levels in Broiler Chickens”**

**Rosdiana Ngitung  
Patma Elis  
Hartono**

**Department of Biology, Faculty of Mathematics and Natural Sciences,  
Makassar State University**



# INTRODUCTION

Excess fat and cholesterol can cause obesity which can cause the body to be susceptible to various other types of diseases. **Also, high blood pressure can cause the risk of coronary artery disease**

The addition of seaweed in this feed is still considered so that fat and cholesterol are not lost in the meat but only reduced. **Based on the research of Ngitung, et al (2017), seaweed can reduce fat and cholesterol levels in broiler chickens with the highest concentration of addition of 7% seaweed, which is significantly proven to have an effect on cholesterol and fat levels in broiler meat.**



Judging from the effect of adding seaweed to broiler chicken feed in previous studies, seaweed can reduce fat and cholesterol levels in broiler chickens. **In this study the concentrations used to reduce fat and cholesterol levels were 7%, 9% and 11%. This research was conducted to determine the effectiveness of adding seaweed to feed in reducing fat and cholesterol levels in broiler chickens.**

**Fat is an important source of energy for the body to carry out daily activities.** Meanwhile, cholesterol is a fatty substance made in the liver and saturated fat obtained from food. **Fat and cholesterol are mostly obtained from meaty foods such as beef, goat, shrimp, fish, and chicken.**

The death toll in the world due to excess fat and cholesterol is increasing every year according to data from the Ministry of Health of the Republic of Indonesia in 2017. **One way that can be done is to reduce consumption of foods that contain sources of saturated fat and cholesterol because these sources of fat and cholesterol can cause heart disease, obesity, stroke, and hypertension, especially those contained in broiler chicken meat which is currently very booming among the general public is by modifying broiler feed which is high in fat and cholesterol by adding fiber-rich ingredients, namely seaweed.**

## Methods

### Type of Research and Time & Place of Research

Experimental research; June – August 2022, Balleanging Village, Bulukumba Regency and Integrated Biotechnology Laboratory, Faculty of Animal Husbandry, UNHAS

### Research variable

Addition of seaweed to feed (independent variable)  
Decrease in broiler cholesterol levels (dependent variable)  
Decrease in broiler fat content (dependent variable)

### Tools

250 mL beakers, blenders, Esey Touch GCU, Soxhlet Toolkit, etc.

### Materials

Ration, Waste Seaweed, broiler chickens aged 17 days, alcohol, hexane, etc.

### Research design

Completely randomized design (CRD)



## Methods

### Implementation of Research and Observation

1 Giving treatment

2 Observation

3 Harvesting

4 Measurement of fat and cholesterol





## Data Collection Technique

The data was obtained by measuring fat content using the Soxhlet extraction method and blood cholesterol levels in chickens being measured using a cholesterol test kit (Esey Touch GCU). The data obtained from these measurements were used as raw data for statistical analysis.

## Data Analysis Technique

Data processing was carried out using the ANOVA analysis technique at a confidence level of  $\alpha = 0.05$  using the SPSS Version 23 program.



## Results & Discussion

### Percentage of Decreased Cholesterol Levels in Broiler Chickens

Table 4.1 SPSS Results Average Data and SD Broiler Blood Cholesterol Levels (mg/dL)

Treatment	Cholesterol (mg/dL)	
	Initial	Final
K	255.00 ± 4.00 <sup>c</sup>	243.67 ± 6.80 <sup>c</sup>
R1	236.67 ± 23.96 <sup>c</sup>	196.67 ± 3.21 <sup>a</sup>
R2	223.67 ± 25.54 <sup>c</sup>	205.67 ± 31.94 <sup>a</sup>
R3	251.67 ± 20.20 <sup>c</sup>	218.00 ± 17.34 <sup>ac</sup>

**Note :**

Different superscript letters in the same column indicate a significant difference and the same letters in the same column indicate there is no significant difference between each treatment based on Duncan's test at the confidence level  $\alpha = 0.05$ .

Different superscript letters in the same row indicate significant differences and the same letters in the same row indicate there is no significant difference in the initial and final cholesterol levels based on Duncan's test at the confidence level  $\alpha = 0.05$ .

## Results & Discussion

### Percentage of Decrease in Fat Content of Broiler Chicken

Table 4.2 SPSS Results Average Data and SD Fat Content of Broiler Chicken (%)

Treatment	Fat (%)	
	Thighs	Chest
K	2.71 ± 0.17 <sup>b</sup>	1.66 ± 0.34 <sup>b</sup>
R1	1.92 ± 0.77 <sup>ab</sup>	0.94 ± 0.03 <sup>a</sup>
R2	1.68 ± 0.12 <sup>a</sup>	1.16 ± 0.13 <sup>a</sup>
R3	1.70 ± 0.58 <sup>a</sup>	1.02 ± 0.29 <sup>a</sup>

**Note:** Different superscript letters in the same column show significant differences and the same letters in the same column indicate no significant differences based on Duncan's test at the confidence level = 0.05.

## Results & Discussion

The results obtained from the table are that the addition of seaweed to broiler rations has an effect on reducing broiler fat and cholesterol levels, as well as affecting live weight of broiler chickens. The higher the concentration of seaweed given to broiler feed, the lower the live weight of broiler chickens. **This happens because seaweed can reduce feed digestibility and appetite for broiler chickens, causing the broiler body weight to decrease.** So it was concluded that the most effective treatment using seaweed with R1 treatment was the addition of 7% seaweed, this was seen from the positive effect of giving seaweed to broiler chickens in reducing fat and cholesterol levels close to normal cholesterol levels and normal fat levels in broiler chickens without reducing weight. broiler live weight significantly.

This is in accordance with Setyaji and Mulyati (2013) that fiber can reduce more than 5% of cholesterol levels in the blood. Fiber found in the digestive tract can bind bile salts which will then come out with feces.

**Ngitung et al (2017) also stated that the low fat content of meat in broiler chickens was treated with the addition of seaweed to the ration because the absorption of fatty acids from the ration was reduced by the addition of seaweed which is rich in fiber and good for the growth of broiler chickens.**

Cristiani (2019) stated that seaweed which has a high content of carrageenan and fiber can increase gastrointestinal viscosity so that it inhibits the absorption of lipids and carbohydrates in the intestine. Carrageenan is also able to form colloid ions and reduce serum lipid levels by inhibiting lipid absorption

## Conclusions

- Based on the results of the research that has been done, it can be concluded that the addition of seaweed is effective in reducing cholesterol and fat levels in broiler chickens and does not affect broiler body weight with the addition of 7% seaweed.

## Recommendation

- The advice that the researchers gave from this study is that it is necessary to conduct deeper research regarding the effects of excess seaweed in relation to lowering fat and cholesterol and it is necessary to carry out laboratory tests that are more reliable in checking cholesterol levels to determine HDL and LDL cholesterol levels.





**THANK**

**YOU**

Sharing is caring,

Sharing is fun