

Proceedings Book

**International Conference on Biology Education,
Natural Science, and Technology (INCOBEST)**

*“Emerging Issues on Natural Science, Environment, and
Its Learning Innovation”*

**BUILDING C FLOOR 1, CAKAP ROOM FKIP UMS
Jl. A. Yani Tromol Pos 1 Pabelan Kartasura Surakarta, 57162
Phone. (0271) 717417 ext. 2147 , Fax. (0271) 715448
E-mail: incobest@ums.ac.id
Website: <http://incobest.ums.ac.id>**

**DEPARTMENT OF BIOLOGY EDUCATION
FACULTY OF TEACHER TRAINING AND EDUCATION
UNIVERSITAS MUHAMMADIYAH SURAKARTA
2023**

Copyright@2023 INCOBEST



**Proceedings Book of
International Conference on Biology Education, Natural Science, and Technology (INCOBEST) 2023**
Emerging Issues on Natural Science, Environment, and Its Learning Innovation

Surakarta, October 25th, 2023

Incobest 2023 Secretariat
Department Of Biology Education
Faculty Of Teacher Training And Education
Universitas Muhammadiyah Surakarta
Email: incobest@ums.ac.id
Website: incobest.ums.ac.id

FOREWORD

FOREWORD

Alhamdulillah, with all gratitude for the presence of Allah SWT, who has bestowed His grace, guidance, and inayah so that the Biology Education Study Program, Faculty of Teaching Training and Education (FKIP), Universitas Muhammadiyah Surakarta (UMS) can organize **International Conference on Biology Education, Natural Science, and Technology (INCOBEST) 2023**. The conference with the theme "Emerging Issues on Natural Science, Environment, and Its Learning Innovation" is a manifestation of concern and dedication to the enhancement of research and education quality in Indonesia. Educators (teachers and lecturers) must be aware of strategic issues in the fields of science, environment, and learning innovation in order to adapt and advance their knowledge.

This conference aims to achieve the implementation of the Tri Dharma of Higher Education, encompassing education, research, and community service, and to realize academic freedom by introducing the Biology Education Study Program FKIP UMS as a part of the Institute of Education Personnel, that is capable of collaborating with various educational and non-educational agencies.

The activities of this International Conference have been made possible by the assistance of an array of parties. Thus, on this occasion, appreciation is extended to:

1. Dean of FKIP UMS
2. All committees of INCOBEST 2023.
3. Reviewer team, both internal and external.
4. Participants and speakers.
5. Other parties that cannot be mentioned one by one.

Finally, we hope this International Conference will benefit all parties and improve education in Indonesia.

Surakarta, October 25th 2023

Committee

FOREWORD

INTRODUCTION

Science and the environment are ever-changing. The world is experiencing one of the most rapid advancements in science and technology. The world has numerous innovations and advancements in various disciplines, including industry, information, and telecommunications, high technology in space, robot technology, and biotechnology and molecular advances. In the era of globalization, where science and technology are one of the indicators of a nation's progress in facing global competition, almost every nation in the world has raced to develop every aspect of their life based on science and technology as a result of the development and progress in these various fields.

John Naisbitt and Patricia Aburdene, in the book 'Megatrends 2000', predicted that one of the 21st-century megatrends is the shift from physical models and metaphors to biological models and metaphors to help us understand today's dilemmas and opportunities. The prediction of John Naisbitt and Patricia Aburdene is realistic. Isn't it that before entering the 21st century, advances in biology have been felt up to the extraordinary advances in modern biology? He continued, we will prepare further on the threshold of a significant era: Biotechnology. In the era of the 21st century, biotechnology, as previously predicted, will be as important as computers. Biotechnology will be booming; at least the first directions of biotechnology that have been developed are in the fields of agriculture and animal husbandry, the food industry, to the clothing and health industries. Biotechnology companies are racing with new drug discovery and development to reach more than 300 drug products and 200 vaccines for diseases worldwide, including cancer, Alzheimer's, heart disease, AIDS, arthritis, and various infectious diseases in developing countries.

The genetic manipulation of plants and animals is another biotechnology development that is advancing rapidly at present. Transgenic vegetation can be produced through genetic engineering. This is an innovation in the development of high-yielding, disease-resistant, and postharvest storage-resistant plants of superior quality.

The accelerated advancement of science and technology has an effect on education. In order to actualize the expectation that education will produce graduates who can compete in the workforce, numerous innovations must be developed. Curriculum modifications at various levels, including elementary, secondary, and tertiary education, seek to equip graduates with life-applicable skills.

The preparation of the Indonesian National Qualifications Framework, a competency alignment framework that can juxtapose, equalize, and integrate between the fields of education and job training as well as work experience in the context of providing recognition of work competence by the structure of work in various sectors, enables the alignment of graduates at various levels of education in Indonesia so that they can compete globally. Regarding Indonesia's national education and training system, the framework is a manifestation of the quality and identity of the Indonesian nation.

Educators (teachers and lecturers), as well as researchers and observers in these disciplines, must be aware of current issues in science, the environment, and learning innovation in order to adapt and continually expand their knowledge. Following the most recent developments in their field is hoped to be a catalyst for improving the quality of research and education in Indonesia.

In response to the extremely rapid development of science, the environment, and learning innovations, the Biology Education Study Program FKIP UMS has scheduled the first **International Conference on Biology Education, Natural Science, and Technology (INCOBEST) 2023** as the continuation of the previous National Education and

FOREWORD

Science Seminar (SNPBS) VII 2022 as a form of concern and commitment to the improvement of the quality of research and education in Indonesia. This is the first International Conference to continue SNPBS, which was implemented successfully between 2016 and 2022.

INCOBEST 2023
Universitas Muhammadiyah Surakarta
**International Conference on Biology
Education, Natural Science, and
Technology**

FOREWORD

COMMITTEE COMPOSITION OF 1ST INCOBEST 2023

Person in charge of activities	:	Chief of Biology Education Department, Faculty Of Teacher Training And Education UMS (Putri Agustina, S.Pd, M.Pd)
Advisory Board	:	Prof. Dr. Sofyan Anif, M.Si Dra. Aminah Asngad, M.Si Dra. Suparti, M.Si Dr. Djumadi, M.Biomed
Chairman of the committee	:	Yasir Sidiq, S.Pd., M.Sc .Ph.d
Secretary and Secretariat	:	Dwi Setyo Astuti, M.Pd Siti Kartika Sari, M.Pd Annur Indra Kusumadani, M.Pd Dr. Paramita Cahyani, M.Pd
Treasure	:	Rina Astuti, M.Pd. Endang Setyaningsih, S.Si, M.Si
Public relations	:	Dra. Hariyatmi, M.Si
Food	:	Ima Aryani, S.Pd, M.Pd
Equipment	:	Rifky Arif Rahmat, S.Pd, M.Pd Mazwar Ismiyanto, M.Pd
Event organizer	:	Erma Musbitha Tyastuti, S.Si, M.Si Dra. Titik Suryani, M.Sc Dr. Triastuti Rahayu, M.Si M. Imam Fatkhurrohman, M.Sc Muhammad Wisnu, M.Biotech
Proceedings and Book of Abstracts	:	Dr. Efri Roziaty, M.Si Dr. Santhyami, M.Si Dr. Ambarwati, M.Si Guntur Nurcahyanto, ST., M.Pd

TABLE OF CONTENT

TABLE OF CONTENT

COVER	i
FOREWORD	iii
INTRODUCTION	iv
COMMITTEE COMPOSITION OF 1ST INCOBEST 2023	vi
TABLE OF CONTENT	vii
KEYNOTE SPEAKERS' MATERIALS	
The ecology of Zaprionus genus in Brazil and adaptation process during the bioinvasion Prof. Dr. Luís Gustavo da Conceição Galego.....	1
Emerging Innovations In Natural Science Education. Haniza Hanim binti Mohd Zain, PhD. Assoc Professor.....	22
Metagenomic studies and their applications. Dr. Triastuti Rahayu, S.Si., M.Si.....	23
PARALLEL SESSION SPEAKERS MATERIALS	
Development of Android-Based Interactive Teaching Materials Using the Ispring Application with Insight into Sustainable Development. Nurhasnah, Lufri, Abdul Razak, Festiyed, Prima Aswirna, Windy Kasmita, and Wetri Yesmoneca.....	33
The Effect of STEM Approach on Students' Critical Thinking Skills. Media Roza, Minda Azhar, Festiyed, Prima Aswirna, and Rika Purnama Sari.....	42
Inventory of Montane Zone Weeds in the Selo Tourism Area, Boyolali Regency, Central Java. Nila Permatasari, and Santhyami.....	52
Development of Problem-Based HOTS (Higher Order Thinking Skill) Question Instruments on Class VIII Pressure Material. Rina Irawati, Sukarmin, and Sri Yamtinah.....	62
The Characteristics of Herbal Tea Combination Between Butterfly Flower with Mint and Pandan Leaf on Drying Duration Variation. Titik Suryani, Ria Anisa Rahmasari, and Riza Ainun Nisa.....	68
Preservice Biology Teacher's TPACK Integration into Lesson Planning. Putri Agustina, Lina Agustina, Rina Astuti, Yesi Chotimah, Putri Gayatri Ramadhanty, and Alanindra Saputra.....	77

TABLE OF CONTENT

Students' Creative Thinking Ability in view From The Level of Understanding in Waste Management.
 Syarifah Zahrah, Rita Retnowati, and Rita Istiana 84

Monitoring The Correlation of Climatics to The Airborne Bacteria at The Manggarai Station, South Jakarta, Indonesia.
 Reza Anindita, Auliya Rahmawati, Maulin Inggraini, Melania Perwitasari, Dede Dwi Nathalia, Maya Uzia Beandrade, and Intan Kurnia Putri 91

The Effect of Active Learning Integrated with Everyone Is A Teacher Here Strategy Based on Questioning and Answering on The Critical Thinking Skills and Biology Learning Retention of Class XI Senior High School Students In The Industrial Agriculture Area.
 Kurnia Suciningsih, Bea Hana Siswati, Nadyatul Ilma Indah Savira 101

The Effect of STEM (Science, Technology, Engineering, and Mathematics) based Textbooks in Biotechnology Learning Material on The Critical Thinking Skills and Learning Results of Senior High School Students in The Industrial Agriculture Area.
 Kamilatul Khoiroh, Bea Hana Siswati, Kamalia Fikri 109

Quality of *Moringa oleifera* Leaf and Kiambang (*Salvinia molesta*) Solid Organic Fertilizer with Banana Peel Bioactivator.
 Desvia Puput Apriani, and Aminah Asngad 122

Quality of Solid Organic Fertilizers for Duck Manure and Trembesi Leaves with Papaya Peel Bioactivator.
 Musdhalifah Husna Firdausi, Aminah Asngad 133

Inventory of Moss Plants (Bryophyta) in the Montana Zone, Samiran Village, Selo District, Boyolali Regency, Central Java Province.
 Eva Diahayu Wardani and Santhyami 143

Diversity of Ferns (Pteridophyta) in the Montana Zone, Samiran Village, Selo District, Boyolali Regency, Central Java Province.
 Indah Rahmawati and Santhyami 152

Quality of Solid Organic Fertilizer from Moringa Leaves and Peanut Shells with Banana Peel Bioactivator.
 Nur Afifah Mustikasari, and Aminah Asngad 160

Quality of Liquid Organic Fertilizer Peanut Shells and Tofu Dregs With Banana Stems as Bioactivator.
 Muhammad Rizal Kahfi, and Aminah Asngad 171

The Quality of Infrastructure Facilities and the Readiness of Biology Laboratories to Support Learning in High School.
 Mei Renni Sholikhah, and Lina Agustina 181

Quality of Duck Manure Fertilizer and Paitan Leaves with the Addition of MOL Papaya Skin.

TABLE OF CONTENT

Hana Khairunnisa, and Aminah Asngad..... 193

Quality of Liquid Organic Fertilizer Combination Gamal Leaves and Tofu Dregs with Banana Stem Bioactivator.
 Feby Istifarini, and Aminah Asngad..... 204

The Effects of Socio-Scientific Approach on Junior High School Students' Learning Outcomes.
 Salsabila Nur Rahmadhani, Putri Agustina, and Sri Mulyani 215

Study of Science Practicum in Junior High School, Sukoharjo, Indonesia.
 Farikha Muya Sarah, Putri Agustina and Harini Hastowati 227

Quality of Kefir Combination Between Soy Milk and Skim Milk On Variation of Sugar and Fermentation Duration.
 Masithoh Uswatiningtyas and Titik Suryani..... 241

Coconut Husks and Eggshells Liquid Organic Fertilizer's Effect on The Growth and Calcium Levels of Kale.
 Nabila Junisky Susetyawati and Aminah Asngad 248

Phosphate Solubilisation Index and Antagonism Potential of Frangipani Tree Rhizosphere Bacterial Isolates from Cemetery.
 Vika Febriyanti, Erma Musbita Tyastuti, Yasir Sidiq, and Triastuti Rahayu..... 260

Coconut Husk and Eggshell Liquid Organic Fertilizer Effect On Lettuce Growth And Calcium Levels.
 Widya Husnul Khotimah, and Aminah asngad..... 269

Quality of Kirinyuh Leaf Liquid Organic Fertilizer and Coconut Water Waste With Pineapple Skin Bioactivator.
 Arisa Putri Jihan Nitami, and Aminah Asngad..... 280

Isolation and Characterization of Cellulolytic Bacteria from Bonoloyo, Cemetery.
 Wanda Datik Risnasari, Erma Musbita Tyastuti, Yasir Sidiq, and Triastuti Rahayu 291

Application of Project Based Learning Model to Improve Critical Thinking Skills of Students SMA Muhammadiyah 1 Sragen.
 Tasya Cahya Dwi Purwanti, and Rina Astuti 299

Quality of Kefir Combination Between of Goat's Milk and Skim Milk on Variations of Sugar and Fermentation Duration.
 Erna Kurniawati, and Titik Suryani 305

Quality of Herbal Tea Combination Between Corn Silk and Stevia Leaf on Variation of Temperature and Drying Duration.
 Feny Nafiza, and Titik Suryani 314

Isolation and Identification of Soil Bacteria in Pracimaloyo Public Cemetery, Kartasura.
 Bagas Adityaradja, Erma Musbita Tyastuti, Yasir Sidiq, and Triastuti Rahayu 326

TABLE OF CONTENT

LOF Kirinyuh Leaves and Liquid Waste Tempoh with Pineapple Peel Bioactivator: Sensory and Macronutrient Content.
 Nur Jati Sekaringsih, and Aminah Asngad 335

Glucose Levels and Organoleptic Quality Probiotic Tepache of Pineapple Peel on Variation of Sugar and Fermentation Duration.
 Qurota A'yuni Nuha Sabira, and Titik Suryani 348

Empowerment of Animalia Classification Material: A Review of Literature.
 Tunjung Nala Putri, Puguh Karyanto, Umi Fatmawati 356

Quality of Herbal Tea Combination Between Corn Silk and Mint Leaf in a Variation of Temperature and Drying Duration.
 Imroatul Husna, and Titik Suryani..... 368

Number of Erythrocytes of White Rats (*Rattus norvegicus*) Soded with a Combination of Porang Tuber and Moringa Leaf Extract.
 Alya Anggitasari, and Endang Setyaningsih 375

Pakcoy (*Brassica chinensis L.*) Growth Using Moringa Leaf Extract with the Addition of Red Onion Skin.
 Dwi Putri Widjaya, and Suparti 385

Mustard (*Brassica Juncea L.*) Growth Hydroponically Using AB-Mix and Liquid Organic Fertilizer Tea Pulp.
 Dinda Putri Trisnawati, and Suparti..... 394

The Effect of Cassava Peel Powder on the Productivity of the Brown Oyster Mushroom (*Pleurotus cystidiosus*).
 Emmalia Rahmawati, and Suparti..... 402

Analysis of Misconceptions on Reproductive System Material in Class XI IPS 2 Students of SMA Negeri 6 Madiun.
 Jevi Milda Rahmawati, Ima Agung Nurcahyo, and Cicilia Novi Primiani 411

Inventory of Epiphytic Lichen Foliose on Tea Plants in Ngargoyoso, Karanganyar, Central Java.
 Dika Dwi Irnawati, and Efri Roziaty 421

Manuscript Writing Guidelines: Analysis of Creative thinking skills profile of Senior High school students in Madiun City on Biotechnology topic.
 Herning Nurdiana, Ima Agung Nurcahyo, and Cicilia Novi Primiani 430

Plasma Protein of Obese White Rats Treated with of Glucomannan Porang Tubers and Moringa Extract.
 Sabila Dina Ikhsani, and Endang Setyaningsih 438

Effectiveness of *Flipped Classroom* Model with Instagram in Junior High School.
 Mega Amartya Istighfarin, and Lina Agustina 438

TABLE OF CONTENT

Application of the NHT Model Combined with Question Cards on Biology Learning Outcomes.	
Nabilla Riska Nurjannah, and Djumadi	455
Growth Red Spinach (<i>Amaranthus amoena</i>) by Hydroponics Using Charcoal Media Husk.	
Isherdini, Dyah Salma Nurlaila, and Suparti	464
Oxygen Consumption and BB <i>Rattus novergicus</i> Obesity Sonde Treatment Glucomanan Porang Tubers and Moringa Leaf Extract.	
Mustika Arum Mayang Sari, and Endang Setyaningsih	473
The Effect of Kepok Banana Skin Liquid Organic Fertilizer (<i>Musa paradisiaca</i>) on the Growth of Mustard Plants (<i>Brassica juncea</i> L.).	
Isherdini, Berliana Putri Athena, and Suparti	484
The Effect of PBL Learning Model Combined with Rewards and Punishment on Science Learning Outcomes.	
Annisa' Tri Yudhatami, and Djumadi	489
Antioxidant Activity and Organoleptic Quality of Probiotic Tepache of Pineapple Peel Sugar Variation and Fermentation Duration.	
Fithrotul Haq Rabbani Abdurrahman, and Titik Suryani	502
Analysis of Plant Vegetation in Sekipan Forest Tawangmangu District, Karanganyar District.	
Ima Aryani, and Shal Syabela Riskawati	509
Health Examination of The Digestion of Proboscis Monkey (<i>Nasalis larvatus</i>) Through Bacteriological Tests on Feces.	
Camalia Maisya, Anni Nurliani, Amalia Rezeki, and Rusmiati	518
The Phylogeny of Parasitic Hemiptera Using <i>Multivariate Statistical Package</i> Cluster Analysis.	
Dwi Setyo Astuti, and Murwanto Setyo Nugroho	533
Identification of Intestine Parasite Worms Eggs in Feces Proboscis Monkey (<i>Nasalis larvatus</i>).	
Fiqita Giulleta Irtifannisa Rahman, Anni Nurliani, Amalia Rezeki, and Rusmiati	541
Ethnobotanical Study of Tea Plants Based on Local Wisdom in Ngargoyoso District, Karanganyar Regency, Central Java.	
Kharisma Margiyana Dinda Hapsari, and Efri Roziaty	550
Scientific Learning with PJBL and PBL Models of Science Process Skills Student Learning Outcomes.	
Farid Nur Yusron, Sarwanto, Mohammad Masykuri	557
Water Quality in Satui River and Histological Structure Study of Liver of Baung Fish (<i>Mystus nemurus</i>).	
Dinda Triana, Heri Budi Santoso, and Anang Kadarsah	564

TABLE OF CONTENT

Profile of Creative Thinking Skill of New Normal Era at Junior High School Students.

Farida Amrul Almuharomah, Widha Sunarno, and Mohammad Masykuri 572

The Feasibility and Effectiveness of High-Level Thinking Tests on Virus to Mapping The Ability of Prospective Science Teacher (Introduction Study on The Development of Integrated Learning Models).

Annur Indra Kusumadani, Sentot Budi Rahardjo, Sri Yamtinah, and Baskoro Adi Prayitno 580

PBL-Based Science Learning on Living Things Interaction in Junior High School.

Hariyatmi, and Hidayatus Sholihah Tisniasari 587