UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCE

PROGRAMME BOOK

INTERNATIONAL CONFERENCE ON INNOVATION AND NEW PARADIGM OF SUSTAINABLE SCIENCE (ICONPASS) 2024

"SUSTAINABLE SCIENCE: PROSPECTS AND CHALLENGES IN ACADEMIC AND INDUSTRIAL ENVIRONMENTS"

International Conference on Innovation and New Paradigm of Sustainable Science (ICONPASS) 202

Surabaya, 10 August 20244

Foreword by Chairperson of the ICONPASS 2024

Assalamu'alaikum.wr.wb

Distinguished Rector of Universitas Negeri Surabaya or his representative
Distinguished Dean of the Faculty of Mathematics and Natural Science or his representative
Distinguished Head of Study Program at FMIPA
Distinguished keynote speakers,
Dr. Brent Clothier - President of New Zealand's Royal Society Te Apārangi
Prof. Jestoni P. Babia, LPT., MAEd, Ed.D – President of City College of Cagayan de Oro Philippines
Dr. Mohd Syamsul Nasyriq Samsol Baharin – Institute of Nano Optoelectronics Research and Technology – Universiti Sains Malaysia
Prof. Dr. Ir. Akhmad Herman Yuwono, M.Phil.Eng – Universitas Indonesia
Distinguished invited speakers
Haile Fentahun Darge MSc., PhD – University of Waterloo, Canada
Assoc. Prof. Wanty Widjaja Med., PhD – Deakin University, Australia, and
The conference speakers and participants I am proud of

"Welcome to the International Conference on Innovation and New Paradigm of Sustainable Science - 2024"
Sustainable Science: Prospects and Challenges in Academic and Industrial Environments

Praise and thanks to Allah SWT who has given the smooth implementation of this event. Our prayers and greetings to the Prophet Muhammad who has brought us from the dark to the bright era.

Distinguished guests.
Eradicating poverty is still a big challenge for humanity today. Even though extreme poverty has decreased by 50% from 1990-2015, there are still many people who have difficulty meeting their basic needs. In 2015, 736 million people lived on less than US$1.90/day, experiencing food, clean water, and sanitation shortages. This condition is exacerbated by extreme climate change which has also triggered water crisis, and food insecurity in various parts of the world.
Nothing is more important to life on Earth than water and our ability to overcome its scarcity. People worldwide have difficulty accessing clean water for drinking, cooking, bathing, washing hands, and growing food.
According to a 2023 UNESCO report, 2 billion people worldwide do not have safe drinking water and 3.6 billion do not have access to adequate sanitation. The global population facing water scarcity is expected to double from 930 million in 2016 to 1.7–2.4 billion people in 2050. Increasingly prolonged extreme droughts are putting pressure on ecosystems, with dire consequences for plants, animals, and humans. They also pose major risks, especially to food security and energy access.
The major risks to food security are becoming increasingly apparent due to the high scale of the current global hunger and malnutrition crisis. A shocking 37.2 million people face extreme hunger, while 1.3 million people are in the grip of catastrophic famine. A deadly combination of factors is triggering this seismic hunger crisis. Conflict remains the biggest cause of hunger, with 70% of people experiencing hunger living in areas affected by war and violence. Conditions in Sudan, Palestine, and Ukraine provide further evidence of how conflict is fueling famine by forcing people to flee their homes, wiping out sources of income, and destroying their countries' economies. On the other hand, extreme climate shocks destroy life, crops, and livelihoods, and weaken people's ability to forage. All of these conditions will spiral further out of control if the world fails to take immediate action against their various causes.
The global food crisis forms a "vicious" circle with many other complex problems, such as poverty, inequality, conflict, and climate change. As a consequence, there is no single solution that can be applied to every situation throughout the world. This condition requires cooperation from various elements of world society, including academics and industrialists, who understand local issues, have access to solutions, and the people with the ability to put these into place.
The other extremely important aspect of our pursuit of sustainability is in the field of education. We must focus attention on educating the younger generations on the importance of conserving our water and food supplies. Education on the benefits of recycling food manufacturing by-products or waste to help eliminate pollution and, at the same time enhance the local economy.
Responding to this need, the Faculty of Mathematics and Natural Science, Universitas Negeri Surabaya through the International Conference on Innovation and New Paradigm of Sustainable Science (ICONPASS) 2024 invites scientists and industrialists to come together and make their best contributions by conveying ideas to overcome various unsustainable problems in all parts of the world. Because unsustainable practices arise at the research and development stage, continue to the production stage, and supply chains on an industrial scale, a combination of

ideas in the fields of materials and particle physics, biomaterials, biotechnology, medical science, and science education from 121 presenters and 100 participants at ICONPASS 2024 are expected to be able to make a significant contribution to breaking the terrible chain of unsustainable practices that cause damage to the earth.
On behalf of the entire committee, I would like to express my gratitude and thanks for your attention to various issues related to sustainable development and support for this event.
Once again… Thank You and may God Help Us from this damage…
Wassalamu'alaikum wr.wb.

Surabaya, 10 August 2024

Prof. Dr. Nita Kusumawati, M.Si., M.Sc

COMMITTEE

International Conference on Innovation and New Paradigm of Sustainable Science (ICONPASS) 2024

"Sustainable Science: Prospects and Challenges in Academic and Industrial Environments"

Saturday, 10th August 2024

Chair	**Prof. Dr. Nita Kusumawati, M.Sc.**
Secretary	**Fasih Bintang Ilhami, S.Kep., MT., Ph.D.**
Treasurer	**Amalia Putri Purnamasari, S.Si., M.Si.**
Secretariat	**Dr. Sapti Puspitarini, S.Si., M.Si.** **Aris Rudi Purnomo, S.Si., M.Pd., M.Sc.**
Manuscript & Proceeding	**Dr. Indah Ardiningsih, S.Si., M.Sc.** **Firas Khaleyla, S.Si., M.Si.** **Dr. First Ambar Wati, S.Si.** **Dr. Dina Kartika Maharani, M.Sc.** **Dr. Fitriana, S.Si.** **Dr. Andika Pramudya Wardana, M.Si.** **Arie Realita, S.Si., M.Si.** **Muhammad Nurul Fahmi, S.Si., M.Si.**
Event	**Mukhayyarotin Niswati Rodliyatul Jauhariyah, S.Pd., M.Pd.** **Ahmad Fudhaili, S.Si., M.Sc., Ph.D.**
Website, Publication, & Documentation	**Muhamad Arif Mahdiannur, S.Pd., M.Pd.** **Muhammad Habibbulloh, S.Pd., M.Pd.**
Logistic	**Erlix Rakhmad Purnama, S.Si., M.Si.**

TIMETABLE

International Conference on Innovation and New Paradigm of Sustainable Science (ICONPASS) 2024

"Sustainable Science: Prospects and Challenges in Academic and Industrial Environments"

Saturday, 10th August 2024

Activity	Time (UTC+7)	PIC
Online Registration	07.30 – 08.00	ICONPASS Secretariat
Viewing Profile Video of Universitas Negeri Surabaya		ICONPASS Venue
Opening and Rule Guidance	08.00 – 08.05	Master of Ceremony (MC)
Listening to Indonesia's National Anthem	08.05 – 08.10	ICONPASS Venue
Listening Hymne of Universitas Negeri Surabaya		ICONPASS Venue
Committee Chair Report	08.10 – 08.20	**Prof. Dr. Nita Kusumawati, M.Sc.**
Welcome Speech from Rector of Universitas Negeri Surabaya	08.20 – 08.30	**Prof. Dr. Nurhasan, M.Kes.** Rector of Universitas Negeri Surabaya
Photo session	08.30 – 08.35	ICONPASS Venue
Transition	08.35 - 08.40	MC to Moderator 1
Keynote speaker 1 presentation New Zealand (14.45) **Dr. Brent Clothier FRSNZ** *President of Royal Society Te Aparangi, New Zealand (2021-2024)*	08.40 – 09.25	Moderator 1 (Dr. Indah Ardiningsih, S.Si., M.Sc.)
Keynote speaker 2 presentation Philippines (10.30) **Prof. Jestoni P. Babia, LPT, M.A.ED., ED.D** *President, City College of Cagayan de Oro, Philippines*	09.25 – 10.10	Moderator 1 (Dr. Indah Ardiningsih, S.Si., M.Sc.)
Q & A Session 1	10.10 – 10.25	Moderator 1

Activity	Time (UTC+7)	PIC
		(Dr. Indah Ardiningsih, S.Si., M.Sc.)
Certificate of Appreciation Session	10.25 - 10.30	Moderator 1 (Dr. Indah Ardiningsih, S.Si., M.Sc.)
Parallel Session 1	10.30 – 13.00	Moderator of Parallel Session
BREAK 2 (Viewing Profile of FMNS Unesa and another information)	13.00 – 14.00	ICONPASS Venue
Keynote Speaker 3 presentation Malaysia (15.00) **TS. Dr. Mohd Syamsul Nasyriq Samsol Baharin** *Senior Lecturer, Institute of Nano Optoelectronics Research and Technology (INOR), Universiti Sains Malaysia*	14.00 – 14.45	Moderator 2 (Fasih Bintang Ilhami, Ph.D.)
Keynote Speaker 4 presentation Indonesia (14.45) **Prof. Dr. Ir. Akhmad Herman Yuwono, M.Phil.Eng.** *Professor, Metallurgical & Materials Engineering Department, Universitas Indonesia*	14.45 – 15.30	Moderator 2 (Fasih Bintang Ilhami, Ph.D.)
Q & A Session 2	15.30 – 15.45	Moderator 2 (Fasih Bintang Ilhami, Ph.D.)
Certificate of Appreciation Session	15.45 - 15.50	Moderator 2 (Fasih Bintang Ilhami, Ph.D.)
Parallel Session 2	15.50 – finish	Moderator of Parallel Session

Multiplex Detection Enabled by AlGaN/GaN HEMT-Based Advanced Potentiometric Water-Gated Configuration

Amirul Firdaus[1], Najihah Fauzi[1], Shaili Falina[2,3], Hiroshi Kawarada[3,4], Mohd Syamsul[1,3]

[1] *Institute of Nano Optoelectronics Research and Technology (INOR), Universiti Sains Malaysia, 11800 USM, Penang, Malaysia*

[2] *Collaborative Microelectronic Design Excellence Centre (CEDEC), Engineering Campus, Universiti Sains Malaysia, Nibong Tebal, Malaysia*

[3] *Faculty of Science and Engineering and Institute of Nano Science and Nano Engineering, Waseda University, Shinjuku, Tokyo 169-8555, Japan*

[4] *The Kagami Memorial Laboratory for Materials Science and Technology, Waseda University, 2-8-26 Nishiwaseda, Shinjuku, Tokyo 169-0051, Japan*

**Corresponding e-mail: e-mail: nasyriq@usm.my*

Abstract: High electron mobility transistor (HEMT) sensors have been extensively studied for over a decade, and many review articles have been published on HEMT biosensors, signifying their progressive development in this field. This work presents a potentiometric water-gated configuration using an aluminum gallium nitride/gallium nitride (AlGaN/GaN) HEMT for multiplex detection. The HEMT sensor was integrated into the water-gated configuration (WGHEMT) with an interchangeable ion-selective membrane (ISM). The ISM is placed between two pools which are an inner pool containing the HEMT and an outer pool containing a reference electrode that acts as a gate. As a pH sensor, WGHEMT showed a good voltage sensitivity and current sensitivity of 43.71 mV/pH and 144.42 μA/pH, respectively. The rapid response time of the WGHEMT pH sensor is recorded to be 12 seconds. The stability and reliability of the sensor in terms of coefficient of variation were 0.29%, 0.12%, 0.26%, 0.24%, 0.28%, and 0.28% for pH 2 to 12. This sensor also shows remarkable stability and reliability with no significant variance after repeated measurement and exposure to a wide range of pH with only a mere 10% degradation after a duration of 5 months. For glyphosate and paraquat detection, the result shows that the gate-source voltage, V_{GS} varies linearly with the concentration of glyphosate and paraquat. The water-gated system shows high sensitivities of 64.60 mA/wt% and 89.71 mA/wt% for glyphosate and paraquat, respectively. This demonstrated that the proposed WGHEMT configuration is a promising candidate for a stable biosensor that enables multiplex detection of a wide range of target solutions while offering high electron mobility, high sensitivity, and a good response time.

Effect of Pandan Leaf Extract on Antimicrobial Activity of Composites from Glycerol, Chitosan, and Gelatin

Eli Rohaeti*, Isana SYL, Dini Rohmawati, and Sekar Paramitha
Laboratory of Chemistry, Faculty of Mathematics and Natural Sciences, Yogyakarta State University, Yogyakarta, Indonesia
**Corresponding author: eli_rohaeti@uny.ac.id*

Abstract: The increasing waste of plastic packaging is harmful to health and the environment so, biodegradable-based food packaging is made. This study aims to determine the antimicrobial activity characteristics of gelatin, chitosan, and glycerol composites with and without the addition of pandan leaf extract as food packaging materials. Food packaging was made from a composite of gelatin, chitosan, glycerol with a composition of 6:2:2.5 ($^{v}/_{v}$) which was added with 5 variations of pandan leaf extract concentration, namely 0%, 5%, 10%, 25%, 50% ($^{v}/_{v}$). Characterization was carried out including physical properties test, tensile testing, water solubility, FTIR test, SEM-EDX test, and antimicrobial activity test against Staphylococcus aureus, Escherichia coli, and Aspergillus sp. The characterization results showed that the addition of pandanus leaf extract had no effect on thickness, elongation, and water solubility, but had an effect on tensile strength, Young's modulus, and antimicrobial activity. The thickness test results show that the composite samples have a thickness of <0.25mm in accordance with JIS food packaging standards. The results of the tensile strength, Young's modulus, and antimicrobial tests showed a significant difference between the composite samples with the best results in the composite sample with the addition of 25% pandan leaf extract.

Effect of Solvent Type on Antibacterial Activity of *Thalassia hemprichii* Leaves Extract from Blue Marlin Beach Tomini Bay Gorontalo

Asri Silvana Naiu[a], Maria Yasinta Goo[b] and Nikmawatisusanti Yusuf
Faculty of Marine and Fishery Technology Universitas Negeri Gorontalo, Jl. Sudirman No. 6 Gorontalo City, 96128, Indonesia
Corresponding author: [a]asri.silvana@ung.ac.id; [b]mariayasintagoo5@gmail.com

Abstract: Seagrass *T. hemprichii* can produce secondary metabolite compounds that can be utilized as antibacterials. The objective of the research was to ascertain the yield of *T. hemprichii* leaf extract using different solvents, identify the phytochemical content of seagrass leaf extract *T. hemprichii* with different solvents, and determine the antibacterial activity of *T. hemprichii* leaf extract against *Escherichia coli* and *Staphylococcus aureus* bacteria with different solvents by measuring the inhibition zone of those bacteria. The research stages comprised observation, sampling, extraction by maceration using methanol (pa), ethyl acetate (pa) and N-hexane (pa) solvents with a material to solvent ratio of 1:11, as well as phytochemical testing and antibacterial activity testing. The data analysis involved qualitative descriptive and quantitative analysis, conducted using a Completely Randomized Design (CRD) based on the treatment of different solvent types, namely P1 (methanol extract), P2 (ethyl acetate extract) and P3 (N-hexane extract), with repetition three times. The data were analyzed using the analysis of variance (ANOVA) method and tested further by *Duncan*. The yields of the methanol, ethyl acetate and N-hexane extracts were 12.19%, 3.41% and 2.58%, respectively. The phytochemical tests of the methanol extracts revealed the presence of alkaloids, flavonoids, saponins and tannins, while the ethyl acetate extract demonstrated the presence of alkaloids, saponins, tannins, steroids and triterpenoids. In contrast, the N-hexane extract exhibited the presence of alkaloids and tannins. The results of the bacterial inhibition zone of *S. aureus* and *E. coli* from the methanol, ethyl acetate and N-hexane extracts, respectively, were as follows: 5.71 mm (medium) and 7.87 mm (medium), 21.48 mm (very strong) and 19.15 mm (strong), 16.85 mm (strong) and 8.73 mm (medium).

Analysis of Chemical, Microbiological, and Sensory Characteristics of Vegetable Soft Cheese with Moringa Leaf Extract (*Moringa oleifera*) Added in Different Packaging Types

Lisna Ahmad*, Aldi Septiaiadi Abdillah, Suryani Une
Department of Food Science and Technology, Faculty of Agriculture, Gorontalo State University, Gorontalo, Indonesia
**Corresponding author: lisna.ahmad@ung.ac.id*

Abstract: This study aims to determine the effect of adding Moringa leaf extract on vegetable soft cheese's chemical, microbiological, and sensory characteristics with different packaging during storage. This research method used a two-factor factorial complete randomized design. The first factor is the addition of Moringa leaf extract (0, 10, 20, and 30 ml) and the second factor is the type of packaging (banana leaves and palm leaves). Observations were made on days 1, 4, and 7. Test parameters include moisture content, pH, peroxide number, mold, antioxidant activity, fat content, and organoleptic. The result shows that adding Moringa leaf extract significantly affects the chemical characteristics of plant-based soft cheese. The treatment of adding Moringa leaf extract up to 30 ml causes a decrease in water content and peroxide number. In addition, there is an increase in pH, antioxidant activity, and fat levels. Based on microbiological characteristics, increasing the concentration of Moringa leaf extract in plant-based soft cheese can prevent mold growth. The six ingredients of Moringa leaf extract also affect the panelists' acceptability of color, aroma, and taste, going from neutral to somewhat like.

Physical Stability Test of Transparent Solid Soap Using Active Ingredients of Basil Essential Oil (*Ociumum basillicum* L)

Mohamad Aprianto Paneo*, Nur Ain Thomas, Multiani S Latif, Fika Nuzul Ramadhani, La Ode Aman, Mohamad Adam Mustapa, Andi Makkulawu
State University of Gorontalo
**Corresponding author: apriyanto07@ung.ac.id*

Abstract: Transparent soap has a transparent and shinier appearance and is able to produce a softer foam on the skin. The appearance of transparent soap is attractive, classy and luxurious besides that, transparent soap can also be used as souvenirs, souvenirs so that it gives a unique impression and exclusive look. Basil plant (*Ociumum basillicum* L) is one of the plants that has antibacterial activity. This study aims to formulate and evaluate transparent solid soap from basil essential oil. The research began by formulating transparent solid soap preparations with varying concentrations of basil essential oil, namely F1 (as control), F2 (2%), F3 (4%), F4 (6%). All formulas were evaluated and tested for physical stability consisting of organoleptic test, foam stability test, cycling stability test, and other additional tests such as pH test, moisture content test, and irritation test. The results showed that all formulas had similarities but differed in F1 as a control that had an olive oil odor. Foam stability test showed F3 and F4 which had the best average percentage of stability compared to F1 and F2 when exposed to cycling test temperatures. In the pH test F2 has a pH of 9, F3 pH 10, and F4 pH 11. In the water content test F2 has a water content value of 1.13%, F3 1.10% and F4 1.02%. And in the irritation test, both F1, F2, F3 and F4 did not cause irritation to the skin such as redness or itching and peeling.

Effectiveness of dragon fruit peel extract on inhibition of photooxidative deterioration of plant-based ice cream

Siti Alisa Liputo, Cika Pebrika Katili, Suryani Une*
Department of Food Science and Technology, Faculty of Agriculture, Gorontalo State University, Gorontalo, Indonesia
**Corresponding author: [a)]suryani.une@ung.ac.id*

Abstract: Ice cream is a semisolid food made from frozen ice cream flour or a mixture of milk, animal and vegetable fats, sugar, with or without food additives. This study aimed to determine the effect of red dragon fruit peel extract on the inhibition of photo-oxidative damage of vegetable ice cream and panelists' preference for vegetable ice cream. This research employed a completely randomized design (CRD) with four treatments and three replications, where each treatment consisted of P0 = 0% (Control/without adding dragon fruit peel extract), P1 = 6% (79,5 ml w/v total ingredients), P2 = 8% (106 ml w/v total ingredients), and P3 = 10% (132.5 ml w/v total ingredients). Furthermore, the vegetable ice cream was tested by storing it in a refrigerator with exposure to fluorescent light (450 lx) at observation time intervals of 0, 5, and 10 days. The data were then analyzed using analysis of variance (ANOVA). The findings indicated that the addition of dragon fruit peel extract had an effect ($P<0.5$) on fat content, peroxide value, melting rate, and organoleptic color, but had no effect ($P>0.5$) on the overrun, odor, taste, and texture of vegetable ice cream. The characteristics of vegetable ice cream in this research were fat content was 3,89-5,5%, peroxide value was 0,4 Meq O2/Kg – 1 Meq O2/Kg, overrun was 20,72-23,75%, and the melting rate was 25,27 – 37,17 minutes. At the same time, the overall preference level of vegetable ice cream was acceptable to the panelists, where there organoleptic test results for color were 4,1 – 6,1 (neutral – like) the odor was 4,9-58 (slightly like – like), the taste was 5,1 – 6,4 (slightly like- like), and texture was 5,1 – 6,4 (slightly like – like). The best treatment for vegetable ice cream based on the peroxide value test was the addition of 10% dragon fruit peel extract until the 10th day of storage with test values ranging ftom 0,4 - 0,64 Meq O2/Kg where there was inhibition of the photo-oxidation process causing the damage to ice cream. This result was indicated by the peroxide value values, which decreased as the concentration of the dragon fruit peel extract increased.

Implementation of Lean Six Sigma in Enhancing Education Quality: A Systematic Literature Review

Suryadi*, M. Irvan Gunawan
Education Administrasi, faculty of education science, Universitas Pendidikan Indonesia
Corresponding author: suryadi@upi.edu

Abstract: This systematic literature review examines the implementation of Lean Six Sigma methodologies in the educational sector to enhance the quality of education. Lean Six Sigma, a hybrid approach combining Lean's focus on waste reduction and Six Sigma's emphasis on minimizing variability, has been widely recognized for its effectiveness in various industries. However, its application in education remains underexplored. This review aims to synthesize existing research on the impact of Lean Six Sigma practices in educational settings, identifying key benefits, challenges, and best practices. The analysis includes peer-reviewed articles, conference papers, and case studies published over the past two decades. Findings suggest that Lean Six Sigma can significantly improve educational processes, increase efficiency, and enhance student outcomes. Nonetheless, successful implementation requires strong leadership, adequate training, and a culture of continuous improvement. This review provides valuable insights for educators, administrators, and policymakers seeking to adopt Lean Six Sigma to foster educational excellence.

2041

Perceptions and Adaptation Strategies of Coastal Communities in Facing the Impact of Tidal Floods in Cirebon City, West Java

Kukuh Widiyanto, Ferry Dwi Cahyadi, Agung Setyo Sasongko
Universitas Pendidikan Indonesia
**Corresponding author: kukuhwidi@upi.edu*

Abstract: This research aims to determine the community's understanding and perception regarding coastal flooding and abrasion due to tidal flooding on the coast of Cirebon City, identifying the impacts caused by tidal waves, namely coastal flooding and abrasion based on field surveys and interviews, finding out community adaptation strategies for coastal flooding and abrasion. Another aim of this research is to find out the government's strategy or policy in managing coastal flood and abrasion disasters. This research mainly looks at the perceptions, attitudes and behavior of the community in minimizing the threat of coastal flooding and abrasion. 120 respondents from two sub-districts were selected using the purposive multistage area sampling method. This method aims to obtain the desired analysis unit. Respondents were interviewed using a questionnaire regarding their perceptions and adaptations to minimize the impact of coastal flooding and abrasion. The results of this research show that respondents' adaptation strategies for coastal flooding and abrasion in the study area are influenced by several factors, namely the depth and duration of the flood, the severity of the abrasion and community capacity which is related to the socio-economic conditions of the community. The efforts made by the Cirebon City government to minimize the impact of coastal flooding and abrasion consist of physical and non-physical efforts. Combining physical and non-physical mitigation efforts is the best alternative for minimizing the impact of coastal flooding and abrasion. Collaboration between stakeholders, namely the government, NGOs and affected communities, is the main key in dealing with problems related to coastal flooding and abrasion. Integration between strategies, policies, planning from the local government and involving affected communities can make coastal management and coastal disaster mitigation effective

Adaptive Capacity of Mangrove Ecosystem in Banten Bay towards Climate Change Impact

Ferry Dwi Cahyadi[1]*, Amalia Narya Saleha[1], Himawan Prasetiyo[1],Agung Setyo Sasongko[1],Kukuh Widiyanto[1]

[1]Marine and Fisheries Education, Universitas Pendidikan Indonesia

**Corresponding author: ferrydc@upi.edu*

Abstract: The Banten Bay area has experienced quite intensive environmental degradation in the last few decades marked by the process of coastal abrasion around Tanjung Pontang. In addition to climate change and the development of industrial areas, settlements around Bojonegara also contribute to environmental degradation in the coastal waters of Banten Bay and its surroundings. Mangroves in Banten Bay as one of the coastal ecosystems that have many benefits are vulnerable to this degradation. This study aims to analyze the level of adaptive capacity of the mangrove ecosystem in Banten Bay. Adaptive capacity refers to the ability of a mangrove species or ecosystem to accommodate or cope with climate change impacts with minimal disruption. The data collected includes mangrove protection status, local management capacity, stakeholder involvement, and elevation above mangroves. Interviews, questionnaires and surveys were used to obtain this data. The results of data analysis show that the adaptive capacity level of mangrove ecosystems in Banten Bay varies from low to high. Mangroves with high adaptive capacity are found in Pulau Dua area.

The Future of Digitalization of Education In The Era Industrial Revolution 4.0 and Socieity 5.0

Eviana Hikamudin[1]*, Rahman Wahid[2]
[1]*Indonesia University of Education*
[2]*Darul Falah Islamic College*
**Corresponding author: evianahikamudin@upi.edu*

Abstract: The integration of technology in the era of industrial revolution 4.0 and society 5.0 in education is something that cannot be avoided, therefore the ability to adapt quickly to changes and innovations in the dynamic world of education is needed. The aim of this research is to examine the challenges and obstacles faced by the world of education in the era of industrial revolution 4.0 and society 5.0. This research uses a qualitative approach with the library research method. The research results show that in the era of the industrial revolution 4.0 and society 5.0, there are many digital technologies that can be used in the educational process, such as augmented reality technology, cloud, virtual reality, smart desks and flexible screens. In this regard, it is hoped that digitalization of education can improve the quality of education to become better, more effective and efficient.

Producing Kombucha Beands by Spherification: Effect of Alginate Concentration and Exposure-Time on Release Behaviour of polyphenolic Compounds

D. Cakrawati[1]*, K. Tresuwan[2], D. L. Rahayu[1], A. Sulastri[4], M. N. Handayani[3], Y. Sugiarti[3], J. Tanesha[3]

[1]Study Program of Food Technology, Faculty of Vocational Education and Technology Universitas Pendidikan Indonesia, Bandung, Indonesia

[2]Department of Applied Microbiology, Institute of Food Research and Product Development, Kasetsart University, Bangkok, Thailand

[3]Study program of Agro-Industry Education Technology, Faculty of technology and Vocational Education, Universitas Pendidikan Indonesia

[4]Study program of Nursing, Faculty of Sport and Health Education and , Universitas Pendidikan Indonesia Bandung, Indonesia

**Corresponding author: dewicakrawati@upi.edu*

Abstract: Fermentation drink, namely kombucha gain interest due to the health benefit. Encapsulated kombucha was an alternative kombucha product to be added to food product conveniently. This study was investigated the effect of sodium carbonate concentration and exposure time on the release of bioactive compounds namely total phenolic content, total flavonoid content, and antioxidant capacity. Stability of kombucha beads in simulated gastric juice was also investigated based on viable bacteria. The result shows that concentration of 1-4% sodium alginate produce tear-shape like beads while 5% sodium alginate produce spaghetti-shape like beads. The size of kombucha beads increase as the increasing of sodium alginate. Low pH value of initial kombucha lead to strong gel formed during gelation that resulted in low release of polyphenolic compounds from kombucha beads. The total flavonoid content was range from 0.024 to 0.059 CE/ 100 g beads. While total phenolic content released from kombucha beads was 0.098 ± 0.01 mg GAE/100 g beads. This study highlighted potential of alginate beads for encapsulating polyphenolic compounds as an innovative for food application. Further study needed to understand physical properties of kombucha beads at different concentration of sodium alginate.

Improving Students' Scientific Literacy through the Development of the EKOPAN Android Application Based on Problem-Based Learning

Mala Mulia*, Endang Susantini, Sifak Indana
State University of Surabaya
**Corresponding author: mala.22017@mhs.unesa.ac.id*

Abstract: Abstract: The integration of Problem-Based Learning (PBL) and advanced technology is pivotal for augmenting science literacy skills among students. This study focuses on the development and evaluation of EKOPAN, an Android-based educational application tailored for ecology topics, leveraging the PBI. approach. The primary objective is to ascertain the validity, practicality, and effectiveness of EKOPAN in enhancing science literacy. The research employed the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) and targeted tenth-grade students at SMA Negeri 1 Krian Sidoarjo. Expert evaluations determined the validity of the EKOPAN application, while its practicality was assessed through implementation tests and student feedback. The effectiveness of the application was measured by analyzing improvements in science literacy skills pre and post-intervention. Quantitative descriptive analysis indicated that EKOPAN achieved an average validity score of 91% (valid category) and a reliability score of 95%. Practicality assessments revealed 100% implementation of teacher and student activities, with a 90% positive response rate from students. Effectiveness was demonstrated with N-Gain through moderate to high increases and t-test result were significant ($p<0.05$) in science literacy skills. Consequently, the EKOPAN application, integrated with PBL, is validated as a practical and effective tool for enhancing science literacy in ecology education.

Doctor’s Competencies in Pretravel Consultation and Traditional Health Modalities For travelers

Made Kurnia Widiastuti Giri
Universitas Pendidikan Ganesha
Corresponding author: kurnia.widiastuti@undiksha.ac.id

Abstract: Travell Health opportunities are popular, with many reported benefits. Doctor's competencies in travel medicine one of each is the pre-travel consultations. Preparing medical equipment for travel is mentioned in the list of competencies as travel health doctor referring to the International Society Of Travel Medicine (ISTM) called as pre-travel consultation on Medical Kit For Travellers. The competence mentioned in its competence list relates to some basic medicines given to tourists related to diseases while travelling. Medical Kit for Traveler is a product brought by tourists which also contains the routine medicines consumed. Medical kit for travelers makes travelers travel safely and comfortably. In order to maintain traveler's Health for travel, several modalities are served in Spa and Integrated Traditional Health clinic.

Expression of Genes Involved in The Biosynthesis of Secondary Metabolites Resulting from Administration of Elicitors

Evy Yulianti*, Ixora sartika Mercuriani, Paramita cahyaningrum Kuswandi, Lili Sugiyarto

Department of Biology Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Yogyakarta, Indonesia

**Corresponding author: [a)]evy_yulianti@uny.ac.id;*

Abstract: The biosynthesis of secondary metabolites in plants and other organisms is an important aspect, especially due to their role in defense against pathogens, adaptation to the environment, and industrial applications in pharmaceuticals and agriculture. Elicitor administration has been known as an effective strategy to increase the production of secondary metabolites through the regulation of genetic expression. This review aims to analyze and summarize current research on the expression of genes involved in the biosynthesis of secondary metabolites after the administration of elicitors. The methods used include literature searches from scientific databases such as PubMed, and Scopus. The results of the review showed that elicitors such as jasmonate, salicylic acid, chitosan, plant hormones, microbes, or proteins that are produced by them can induce the expression of key genes in the biosynthesis pathways of various secondary metabolites, including phenylpropanoids, alkaloids, and terpenoids. In addition to biotic elicitors, increased production of secondary metabolites can also caused by abiotic elicitors such as sound. In addition, the molecular mechanisms behind plant responses to elicitors involve the complexity of the transduction signal network, which regulates the transcription of related genes. The findings of this review provide in-depth insights into the mechanisms of genetic regulation by elicitors and their potential in the development of plant biotechnology for increased production of secondary metabolites

The Ultrasound-Assisted for Isomerization of Alpha-Pinene using TCA/TiO2 Catalyst

N. Wijayanti*[1], G.A Ramadhani[1], S. Priatmoko[1], S. Wahyuni[1], R.A. Lusiana[3]
[1]Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia
[2]Department of Chemistry, Faculty of Sciences and Mathematics, Diponegoro University, Jl. Prof. H. Soedarto, S.H., Tembalang, Semarang 50275, Indonesia
Corresponding author: nanikanang@mail.unnes.ac.id

Abstract: α-Pinene is a compound include in the class of natural monoterpenes, utilized as a fragrance compound, and use in cosmetics. Isomerization reaction use TCA35/TiO2 catalyst and catalyst characterization include crystallinity and morphology analysis with X-Ray Diffraction (XRD) and Scanning Electron Microscope (SEM). Isomerization reaction in the sonicator with 4.5 mL of α-pinene reacted using catalyst masses of 0.1; 0.3; and 0.5 g. The reaction conduct by the variation of the sonicator temperature 55, 67, and 80 °C and variation of reaction time of 30, 60, 90, and 120 minutes. The reaction products of the compounds tested using FT-IR, GC, and GC-MS. The result research gain isomers such as camphene, β-pinene, β-phellandrene, and 3-carene. Increase temperature the sonicator yields increase the concentration of the compound isomers product, whereas the reaction time to increase conversion α-pinena into isomer compound. The ideal condition in study, found to be sonicator temperature of 80°C and 120 minutes, yield conversion of α-pinene 13.05%.

Inhibitory Activity Of Methanol Extract Of The Stem Bark Buhu (*Garuga floribunda* Decne) Against Gram Positive and Gram Negative Bacteria

Netty Ino Ischak
Universitas Negeri Gorontalo
Corresponding author: nettyischak@gmail.com

Abstract: Garuga floribunda.Decne is one of the earliest well known medicinal plants, which used to cure different disease in a human being. It used to fight infections, prevent cancer, antioxidant, antidiabetic, and wound healing. Based on the above important of Garuga floribunda.Decne, this study was conducted to scereening fitochemical and investigate the antibacterial activity of the stem bark garuga floribunda extracts (methanol, and N-hexane fraction) against bacterial strains.The antibacterial activity was tested against gram positive (S. aureus, P. acnes, Bacillus subtilis, and pneumonia) and gram-negative (E. coli,Shigella dysentery, P.aeruginosa, and Acinetobacteria baumanni), bacterial strains by using kirby bauer or agar well diffusion method. The results reveal that garuga floribunda extracts show inhibitory activity againts bacterial strains. The n-hexane fraction showed wide spectrum antibacteria activity (with zones of inhibition between 6.72 mm and 7.70 mm) while the methanol extract showed activity all against the gram positive and gram negative bacteria (zones of inhibition between 14.70 mm and 15.70 mm). The MIC ranged from 1.25 to 2.5 mg/ml and 2.5 to 5 mg/ml and MBC ranged from 2.5 mg/ml and 5 – 10 mg/ml for the methanol and n-hexane respectively. The preliminary phytochemistry of the hexane showed the presence of only tannins, alkaloids and steroid this may explain the activity against all the bacteria. The methanol exract showed the presence of flavonoids, saponins, tannins, alkaloid, steroid and terpenoids. This study justifies the use of this plant in herbal medicine.

Assesment of Sensory Characteristics and Firmness in Stick Products Derived from Yellow Bamboo Shoots

Adnan Engelen[1], Rosdiani Azis[2]
[1]*Department of Food Science and Technology, Faculty of Agriculture, Gorontalo state University, Street of Prof Dr Ing B.J Habibie Moutong,Gorontalo*
[2]*Department of Food Technology, Bosowa University, Makassar, Indonesia*
Corresponding author: [a)]adnanengelen@ung.ac.id ,[b)]rosdianiazis@universitasbosowa.ac.id

Abstract: Bamboo rebung or bamboo shoots are shoots from bamboo stems that grow from the roots. Bamboo shoots can be processed into various products such as vegetable soup, stir-fried bamboo shoots, or spring roll filling. In processing bamboo shoots, various equipment is used such as containers, spoons, blenders, pans and stoves. Meanwhile, for analysis, equipment such as ovens, furnaces, texture analyzers, scales, petri dishes, porcelain dishes, spatulas and desiccators are used. Fried bamboo shoots have a savory taste and crunchy texture. One type of bamboo shoot that is often used in making sticks is yellow bamboo shoots. This research produced data on water content, ash content and texture from three variations of bamboo shoots (P1, P2, P3). The research results show that bamboo shoots can be used as a substitute for flour in making bamboo sticks.

Indonesia's Young Generation Potential Model towards Gold Generation through Environmentally Friendly Economic Independence Mindset

Vania Zulfa*, Nadiroh, Yayoi Kodama, Indriyani Rachman, Shahibah Yuliani, Dian Alfia Purwandari

Universitas Negeri Jakarta

**Corresponding author: vaniazulfa@unj.ac.id*

Abstract: Based on the research results, it shows that the potential for developing young entrepreneurial students is still low, 17.6 of the respondents feel they are an important part of efforts to improve young entrepreneurial skills. The resulting model aims to improve the quality of life of the younger generation as the golden generation in supporting the achievement of Sustainable Development Goals (SDGs). The resulting model is a solution to the problem of lack of encouragement from family and society to strengthen the interest of the younger generation in improving their entrepreneurial skills in the creative industry. The challenges of the demographic bonus and the Industrial Revolution 4.0 era, as well as the Society 5.0 era, as the young millennial generation requires the revival of independence and innovation to become young entrepreneurs. This research will be carried out using the R&D method, using the Twin Track Theory approach (Gender Mainstreaming and Affirmative Action). This is valuable capital for continued guidance by supervising lecturers so that they collaborate with DUDI. After completing their studies, students can take initiative and innovate to become independent entrepreneurs. The resulting development model is an Environmentally Friendly Entrepreneurship Skills Model for Creative Industries for the Young Generation as the Golden Generation.

Biosynthesis of Silver Nanoparticles Using Pineapple and Durian Peel Extracts for Liquid Disinfectant Formulation

Yuszda k. Salimi[1, a)], Akram la Kilo[1, b)], Marcelia Kadir[1, c)], Siti Maisaroh mareteng[1, d)]
[1]*Department of Chemistry, Faculty of Mathematics and Natural Sciences, State University of Gorontalo, Gorontalo 96211, Indonesia.*
Corresponding author: [a)]yuszda.salimi@ung.ac.id;[b)]akram@ung.ac.id ;[c)]marceliakadir03@gmail.com;[d)]sitimareteng@gmail.com

Abstract: This study aims to elucidate the biosynthesis process of silver nanoparticles using pineapple and durian peel extract as bioreductors, determine the size of the nanoparticles formed, and evaluate the activity of silver nanoparticles against Escherichia coli and Staphylococcus aureus bacteria. In this research, AgNO3 solution was reacted with pineapple peel extract and durian peel extract as bioreductors at ratios of 1:1, 1:2, 1:3, 1:4, 1:5, and 1:6. Antibacterial activity testing at a ratio of 1:6 demonstrated that the mixture of active ingredients (pineapple peel extract and durian peel extract) with AgNO3 solution exhibited the highest efficacy in inactivating Staphylococcus aureus and Escherichia coli bacteria. PSA analysis revealed that the diameter of silver nanoparticles synthesized from pineapple peel extract at a ratio of 1:6 was 67.6 nm, while those synthesized from durian peel extract at the same ratio had a diameter of 114.8 nm. These findings indicate that the mixture of pineapple peel extract with AgNO3 can be utilized as an active ingredient in an environmentally friendly liquid disinfectant.

Bacterial Activity of Crude Extract Of Sponge Agelas Sp. From Kurenai Beach, Tomini Bay, Gorontalo

Fernandy M. Djailani [1]*, Asri Silvana Naiu [2], Renita Pratiwi Gagowa[3]
[1] *Lecturer, Faculty of Marine and Fisheries Technology, Universitas Negeri Gorontalo*
[2] *Lecturer, Faculty of Marine and Fisheries Technology, Universitas Negeri Gorontalo*
[3] *Student, Study Program of Fisheries Product Technology*
**Corresponding author: fernandydjailani@ung.ac.id*

Abstract: This research aims to obtain crude extract and antibacterial activity of Agelas sp. sponge extract from Kurenai Beach, Teluk Tomini, Gorontalo. The research methods included sample collection and preparation, sample identification, extraction using the maceration method, sample fractionation, sterilization, preparation of Na culture medium, preparation of test bacteria suspension, preparation of negative and positive controls, antibacterial activity testing, observation, and measurement. This research was designed with 3 treatments, namely n-hexane fraction, ethyl acetate fraction, and methanol fraction with 3 replications using a completely randomized design (CRD) method. Antibacterial data analysis was tested using ANOVA and further tested using Duncan. The results showed that methanol and ethyl acetate fractions had inhibitory activity against E. coli bacteria, while only the methanol fraction was able to inhibit S. aureus bacteria.

Stability of Non-Cholesterol Mayonnaise Emulsion Based on Sunflower Oil (SO) And Virgin Coconut Oil (VCO) During Storage

Suryani Une
Universitas Negeri Gorontalo
Corresponding author : suryani.une@ung.ac.id

Abstract: Mayonnaise is an oil emulsion product with the main ingredients of egg yolk and oil. Thus, it contains high fat. Efforts are made to reduce the fat content of mayonnaise by replacing egg yolks with vegetable creamer, sunflower seed oil, and VCO to discover the stability of the emulsion. This research aims to determine the chemical and sensory properties as well as the stability of a mayonnaise emulsion made from sunflower seed oil with VCO during storage. The research was conducted using a completely randomized design with the rasio factor of sunflower seed oil and VCO (100% sunflower seed oil, 50% sunflower seed oil: 50% VCO, and 100% VCO), then observations were made on day 0, 15, and 30. Each treatment was repeated 3 times. The data were then analyzed using statistical tests (ANOVA). The test parameters include moisture content, fat content, free fatty acids, peroxide value, pH, emulsion stability, and organoleptic. The results show are as follows: the pH value (4,42-4,63), moisture content (14,63 - 15,00%), free fatty acids (0,09 -0.14%), peroxide value (0,87 - 1,27 Meq/kg) and fat (61,45-66,68%). Furthermore, in the organoleptic test, color ranged (4,85-5,92), aroma ranged (3,96-6,12), taste ranged (3,19-6,08) and texture ranged (2,19-5,96). Lastly, the stability of the mayonnaise emulsion in all treatments during storage at room temperature shows stáble results and low temperature storage (2°C). Meanwhile, the 100% sanhower seed oil treatment shows stable results during storage.

1577

Physicochemical, Organoleptic and In-Vitro Digestibility Characteristics of Waxy Corn (Zea mays Ceratina Kulesh) Flakes with Yellow Pumpkin (Cucurbita maxima) Flour Addition

Yoyanda Bait*, Siti Aisa Liputo, Harlin Abudi
Universitas Negeri Gorontalo
**Corresponding author: yoyanda.bait@ung.ac.id*

Abstract: Flakes are one of the cereal foods that are generally used as breakfast because flakes are an efficient and nutritious food product, as well as a quick ready-to-eat. Meal. The purpose of this study was to determine the in vitro digestibility of flakes based on pumpkin flour (*Cucurbita moschatadan*) waxy corn flour (*Zea mays* ceratina kulesh), testing parameters of starch content, starch digestibility, protein digestibility, vitamin A and organoleptic test. The method used was a single-factor Completely Randomized Design (CRD), with 4 treatment formulations P0 = 100g waxy corn flour; 0g pumpkin flour, P1 = 90g waxy corn flour; 10g pumpkin flour, P2 80g waxy corn flour; 20g pumpkin flour, P3 = 70g waxy corn flour; 30g pumpkin flour. This research was repeated 3 times as validation in the research. Data were processed using ANOVA. The result of the analysis of variance showed a significant effect at the level ($p<0.5$) and testing was carried out using the Duncan Multiple Range Test (DMRT). The results showed the value of starch content ranged from 36.31%-45.67%, starch digestibility ranged from 79.48-85.43%, and vitamin A ranged from 0.85%-1279%. Based on the organoleptic test in terms of aroma ranged from 4.97 (rather like)-5.03%, (like) and color ranged from 4.57 which means (rather like)-5.67 (like) in terms of taste ranged from 5.60 (like)-4.43 (rather like), and texture ranged from 4.63 (rather like)-4.97 (rather like).

LADOCK for Simplifying the Drug Virtual Screening Strategy

La Ode Aman[1]*, Widy Susanti Abdulkadir[1], Hamsidar Hasan[1], Mohammad Adam Mustapa[1], Teti Sutriyati Tuloli[1], Ariani Hutuba[1], Mohamad Aprianto Paneo[1], Arfan[2], Aiyi Asnawi[3], Netty Ino Ischak[1]

[1]Department of Pharmacy, Faculty of Sports and Health, State University of Gorontalo, Gorontalo, Indonesia, 96211

[2]Faculty of Pharmacy, Universitas Halu Oleo, Kendari, Indonesia, 93232

[3]Faculty of Pharmacy, Universitas Bhakti Kencana, Bandung, Indonesia, 40614

**Corresponding author) laode_aman@ung.ac.id*

Abstract: Virtual screening and molecular docking are widely used in drug design and discovery. AutoDock is a popular software simulation for molecular docking and virtual screening, but the GUI-based procedures in AutoDockTools (ADT) can be limiting when dealing with hundreds or thousands of ligands during docking simulations. The LADOCK package simplifies the use of ADT and AutoDock in virtual screening. It is a bash script language tool that interfaces with Python-based applications for ligand preparation, grid parameter file preparation, docking parameter file preparation, and analysis of docking results in combination with autogrid4, autodock4, and Open Babel. LADOCK was verified for virtual screening of 122 secondary metabolites of soft corals genus Sinularia as potential CDK4 inhibitors. The results of molecular docking using LADOCK showed that C00023756 and C00040308 had potential as CDK4 inhibitors, with the lowest binding energy being -11.1 and -10.93 kcal per mol, respectively. The LADOCK evaluation showed that the ratio of the lowest binding energy of LADOCK versus the GUI was in the range of 1.0-1.4, indicating the reliability of LADOCK in virtual screening. The ligand overlap visualization also showed that the LADOCK and GUI ligand conformations existed in the same binding pocket environment of CDK4. In conclusion, LADOCK can be used for autodock4-based virtual screening of drug candidates, as demonstrated by its successful application to identify potential anticancer candidates from secondary metabolites of soft corals genus Sinularia targeting CDK4.

Integration of Study and Development of Models for Fulfilling Political Rights and Empowering People with Disabilities Based on Citizenship Education to Realize Civic Equality

Agil Nanggala*, Yeni Yuniarti, Dinie Anggraeni Dewi, S. Nailul Muna Aljamaliah
PGSD Kampus UPI di Cibiru
**Corresponding athor: agilnangggala@upi.edu*

Abstract: Research regarding the integration of studies and development of models for fulfilling political rights and empowering disabled people based on Civics to realize civic equality , aims to overcome stereotypes of ableism , which are discriminatory, thereby making disabled people into second class citizens, including efforts to fulfill political rights and empower disabled people, is needed The role of Civics is to overcome discrimination against people with disabilities, considering that the vision, scientific structure and Civics learning model are comprehensive, relevant and transformative. This research was completed based on a qualitative approach, using literature study methods, gradual data analysis, namely, reduction, display and verification. Research results: 1) Civics is able to overcome stereotypes of ableism, and fulfill political rights and empower people with disabilities, because it can be interpreted as civic education , namely, formal and theoretical Civics learning in the classroom, to provide a holistic, positive and objective understanding of excellence , the potential and life motivation of disabled people, based on transformative citizenship theory , to overcome individual or medical models of disability , then Civics can be interpreted as citizenship education , that is, non-formal and practical civics learning in society, as a humanitarian action, in fulfilling political rights and empowering people with disabilities, based on citizenship empowerment theory, to overcome the social model of disability , this is clear evidence of the integration of disability studies with Civics, to realize civic equality , 2) Developing a model of fulfilling political rights and empowering disabled people based on Civics for civic equality, based on civic traditions Pancasila, as the identity of the Indonesian nation, as academic and social capital to fulfill political rights and empower people with disabilities, and involving cross-sectors, namely, government, academics, community or society, private sector and media, the next stage of realizing the model , namely: 1) completion of academic thinking construction, 2) integrative commitment and cross-sector communication, 3) realization of models or implementation of collaborative programs, 4 evaluation and follow-up, and 5) massive socialization. Verification of research integration studies and development of models for fulfilling political rights and empowering disabled people based on Civics, apart from containing a vision of civic equality for disabled people, is also to strengthen the civic competence of the young generation in an inclusive manner.

Cervical Cancer Prediction Design Using Recurrent Neural Network Algorithm on Deep Learning Method

Ichwan Nul Ichsan
Universitas Pendidikan Indonesia
Corresponding author: Ichwannul.ichsan90@upi.edu

Abstract: Cancer is one of the most dangerous and deadly diseases. Cancer can affect anyone regardless of age and gender. Cervical cancer is cancer that infects the area that connects the uterus with the vagina. Cervical cancer is the second most common cancer in the world, which is 36,633 cases referring to the Global Burden of Cancer Study (Globocan). In detecting cervical cancer, doctors need a long time before they can finally make a diagnosis. In addition, there are other problems, namely the high cost of visual inspection and time consuming. To overcome this problem, researchers proposed Deep Learning methods, especially Recurrent Neural Network (RNN) to predict cervical cancer. It is hoped that the creation of the RNN model can decrease time in diagnosing cervical cancer. as for the method used in this research is Research and Development (R&D), research data obtained from CMI Hospital Bandung as many as 600 data samples with correctly predicted data of 476 and data that failed the prediction of 92 data samples with the accuracy of the RNN model is 83%. The evaluation metrics used to test the training results of the RNN model are Mean Squared Error (MSE) of 0,04, Root mean Squared Error (RMSE) of 0,0016, and Mean Absoluter Error (MAE) is 0,03. graphs of actual data and predicted data prediction of cervical cancer patients, as well as a comparison table of actual data values and predicted data processed by the RNN model.

Virtual Reality Media to Improve the Walking Ability of Children with Cerebral Palsy Diplegia

Riksma Nurahmi Rinalti Akhlan[1], Nita Nitiya Intan Tanbrin[2], Euis Heryati[3], Hendriano Meggy[4]
Universitas Pendidikan Indonesia
Corresponding author: riksma_akhlan@upi.edu [1];nitanitiya@upi.edu [2]; euis_heryati@upi.edu [3]; hendrianomeggy@upi.edu [4]

Abstract: This study explores the influence of the use of virtual reality media in improving the walking ability of children with cerebral palsy diplegia. Children with this condition often face challenges in their daily mobility, which has a significant impact on their quality of life. This study used a quantitative approach with a single-subject research method on three subjects, selected from a population of 50 children with cerebral palsy using purposive random sampling. The research instruments included deeds and observation tests to measure walking ability and response to interventions. The results showed a significant improvement in walking ability after the virtual reality intervention, compared to the before and after phases of the intervention. Data analysis indicated that this technology was effective in providing additional stimulus for the development of motor skills and balance, with a significant improvement in the Gross Motor Function Measure (GMFM) score. While the results are promising, the study highlights the need for further studies to measure the long-term impact and address the challenges of accessibility, cost, and training in the use of these technologies. This research makes an important contribution to the development of more effective and innovative rehabilitation interventions, offering great potential to improve the quality of life of children with cerebral palsy diplegia.

2135

Producing Kombucha Beads by Spherification: Effect of Alginate Concentration and Exposure-Time on Release Behaviour of Polyphenolic Compounds

D. Cakrawati [1*], K. Tresuwan [2], D. L. Rahayu[1], A. Sulastri [4], M.N. Handayani[3], Y. Sugiarti [3], J. Tanesha[3]

[1]Study Program of Food Technology, Faculty of Vocational Education and Technology Universitas Pendidikan Indonesia, Bandung, Indonesia

[2]Department of Applied Microbiology, Institute of Food Research and Product Development,Kasetsart University, Bangkok, Thailand

[3]Study program of Agro-Industry Education Technology, Faculty of technology and Vocational Education, Universitas Pendidikan Indonesia

[4]Study program of Nursing, Faculty of Sport and Health Education and , Universitas Pendidikan Indonesia Bandung, Indonesia

**Corresponding author: dewicakrawati@upi.edu*

Abstract: Fermentation drink, namely kombucha gain interest due to the health benefit. Encapsulate kombucha was an alternative kombucha product to be added to food product conveniently. Thi study was investigated the effect of sodium carbonate concentration and exposure time on the release of bioactive compounds namely total phenolic content, total flavonoid content, and antioxidant capacity. Stability of kombucha beads in simulated gastric juice was also investigated based on viable bacteria. The result shows that concentration of 1-4% sodium alginate produce tear-shape like beads while 5% sodium alginate produce spaghetti-shape like beads. The size of kombucha beads increase as the increasing of sodium alginate. Low pH value of initial kombucha lead to strong gel formed during gelation that resulted in low release of polyphenolic compounds from kombucha beads. The total flavonoid content was range from 0.024 to 0.059 CE/100 g beads. While total phenolic content released from kombucha beads was 0.098 ±0.01 mg GAE/100 g beads. This study highlighted potential of alginate beads for encapsulating polyphenolic compounds as an innovative for food application. Further study needed to understand physical properties of kombucha beads at different concentration of sodium alginate.

2131

Identification of Mdr-Tb Risk Factors in Pulmonary Tuberculosis Patients With HIV At RSP Rotinsulu, West Java

Nur Faizah Romadona[1], Wiwi Sumanti[1], Euis Heryati[1], Mila Anisa[1]
[1]Medicine Departement, Universitas Pendidikan Indonesia
Corresponding author: faizah@upi.edu

Abstract: Drug-resistant tuberculosis (DR-TB) is a case of TB that is resistant to one or more anti-tuberculosis drugs.Coinfection of MDR-TB with HIV, other comorbidities, low CD4 count and poor nutritional status will increase the risk of MDR and worsen treatment outcomes. Patients who have HIV have a 1.42 times higher risk of developing resistant TB The design of this study was cross sectional to examine the characteristics of differences in clinical features of MDR-TB and non-MDR-TB in TB-HIV at RSP Rotinsulu. The subjects of this study were all inpatient and outpatient TB-HIV patients who came to the DOT-TB Polyclinic at RSP Rotinsulu with and without MDR cases. Then, from patients who met the research criteria, medical records were searched to look for risk factors. Bivariate analysis of categorical variables was performed using the chi-square test. Bivariate analysis was used to determine the relationship between each independent variable (history of previous TB treatment, comorbid diseases, nutritional status, CD4 count and lymphocyte count) and the dependent variable (incidence of MDR-TB). If the calculation results show a p value <0.05, then there is a significant correlation between the two variables being linked, meaning the hypothesis is accepted. The results of the study showed that the bivariate test results on four variables all had a significant relationship with the incidence of MDR-TB, namely history (p value 0.007), underweight nutritional status (p value= 0.000), CD4 count (p value 0.000), and lymphocyte count (p value 0.024). One variable, namely comorbid disease, did not have a significant relationship (p value 0.061). Conclusion: The difference between the clinical features of MDR-TB and non-MDR-TB in pulmonary TB with HIV at RSP Rotinsulu is the history of previous TB treatment, nutritional status (underweight), CD4 count, and lymphocyte count, but not comorbid diseases.

Relationship of Pancreatic NLRP3 Inflammasome Gene Expression and HOMA-β in a Rat Model of Type 2 Diabetes Mellitus

Ikbal Gentar Alam
Universitas Pendidikan Indonesia
Corresponding author: ikbalga@upi.edu

Abstract: Background/Aim: Experimental animal studies on pathomechanism of type 2 diabetes mellitus (T2DM) have been reported, however, the relationship between NOD-, LRR-and pyrin domain-containing protein 3 (NLRP3) inflammasome and Homeostasis Model Assessment of Beta-cell function (HOMA- β) was unknown. Accordingly, a correlation between both parameters was assessed. Materials and Methods: Diabetic groups were fed with three different compositions of high-fat diet (HFD), namely 30%, 45% and 60% then injected with Nicotinamide 110 g/kg follow with streptozotocin 45 mg/kg injection after 15 minutes, and compared to a control group after 4 weeks. Results: Administration of HFD/streptozotocin increased the level of fasting blood glucose but reduced the level of HOMA- β in diabetic groups. The coefficient of correlation between NLRP3 inflammasome and HOMA- β was x.xxx (p=0.xxx). In addition, the coefficient of correlation for fasting blood glucose with HOMA- β and NLRP3 was −x.xxx (p=0.xxx) and −0.xxx (p=0.xxx), respectively. Conclusion: The elevation of NLRP3 was weakly correlated with HOMA- β, suggesting there is an intermediate step between both parameters

Incidence of Diabetes Mellitus in Children in West Java

Setyo Wahju Wibowo[1], Wida Purbaningsih[2], Siti Salma Nurhaliza Fitriadi[2]
[1]Faculty of Medicine, Indonesian Education University, Bandung
[2]Faculty of Medicine, Bandung Islamic University, Bandung
Corresponding author: sw_wibowo@upi.edu

Abstract: This late degenerative disease occurs at a younger age, namely in the productive age, and is even thought to occur in children. The age of degenerative patients is getting younger and is associated with hypertension. A doubling of the number of productive age in Indonesia's demographic bonus is very beneficial for development goals if the quality of the productive age is good because it will determine Indonesia's future. Data on the incidence of diabetes in children is needed to prevent complications. The subjects of this research were children diagnosed with diabetes mellitus from 2017 to 2020 at the West Java Referral Hospital, Al Ihsan Hospital. The research data is secondary data from medical records of pediatric patients diagnosed with diabetes mellitus. The research was carried out from June to August 2021 and has received ethical clearance and research permission from Al Ihsan Hospital. This study aims to determine the characteristics of pediatric DM patients. The results of the study showed that there were 61 children diagnosed with DM, consisting of 16 children experiencing Type 1 DM, and 45 children experiencing Type 2 DM. Type 1 Diabetes mostly occurred in the 10-16 year age range, namely 10 children out of 16 children experienced Type 1 DM. 1, while Type 2 DM mostly occurs in the older age range, namely the 17-20 year age range, 33 out of 45 children who experience Type 2 DM. Diabetes mellitus is a degenerative disease, namely a disease caused by premature decline in the function of cells, tissues or organs. The incidence of DM begins to occur frequently in children due to many factors, including unbalanced diet and activity patterns

Analysis of the level of understanding of the Padebuolo Public on the Flood Education Model in Gorontalo City

Fadly Achmad
Universitas Negeri Gorontalo
Corresponding author: fadly@ung.ac.id

Abstract: The purpose of this research is: 1) to provide educating to the public regarding the causes of flooding in Gorontalo City,2) provide public understanding of the causes of flooding in their area, 3) to find out the extent of the public's response to the type of soil in their area which is one of the causes of flooding. The research method is in the form of educating the public in the Padebuolo Village which often experiences flooding in Gorontalo City. Counseling was arranged with the distribution of questionnaires. This questionnaire is to see the extent of people's understanding of the influence of soil conditions and groundwater levels as a cause of flooding and inundation. Counseling on technical maps of soil types received a positive response from the people of Padebuolo Village. This counseling provides an understanding to the public that the clay soil is dominates the Padebuolo village is difficult to water infiltration and is one of the causes of flooding and inundation.

2205

Evaluation of the Quality Characteristics of Raw Water and PDAM Wonosari Unit as Sources of Community Drinking Water

Marike Mahmud
Universitas Negeri Gorontalo
Corresponding author: marikemahmud@yahoo.com

Abstract: Sanitation is specifically discussed in the 6 SDGs goals, including by 2030, achieving universal, adequate, safe and affordable access to drinking water for all and implementing integrated water resource management at all levels. This research aims to evaluate the quality of water before and after processing by PDAM (Local Water Company) Wonosari Unit and examine the effectiveness of PDAM Wonosari Unit water treatment so that it can be used optimally as a source of raw water for community drinking water. The location of this research was in Bongo 2 Village, Wonosari District. There were 2 sampling locations, namely 1 location in the Paguyaman River water before the PDAM intake and the 2nd location in the PDAM reservoir after the processing process. The data required in this research were primary data including physical parameters including temperature, Total Dissolve Solid (TDS), turbidity, and color; Chemical parameters included iron, pH, and manganese. Bacteriological parameters covered total coliform bacteria and escherichia coli. Data collection in the field was carried out 3 times. Secondary data included data on PDAM water users, the population. Chemical parameter samples were analyzed at LPPT UGM. Physical and microbiological samples were tested at the Gorontalo District Health Laboratory. Analysis of river water quality data compared to its suitability based on Government Regulation Number 22 of 2021 attachment VI and for PDAM water compared with PERMENKES No. 2 of 2023. The results of the analysis show that Paguyaman River water meets the requirements as raw drinking water. Evaluation of PDAM water quality, for microbiological parameters, does not meet the requirements because the Wonosari Unit PDAM water treatment system sometimes experiences major problems with the water pump sometimes shutting down so that the disinfection treatment process does not work optimally.

Isolation and Identification of Plastisphere Fungi from Kadilangu and Wanatirta Mangrove

Anna Rakhmawati*, Bernadetta Octavia, Fera Aulia, Syantriadji Eka Putra
State University of Yogyakarta
**Corresponding author: anna_rakhmawati@uny.ac.id*

Abstract: Fungi play multifaceted roles in the plastisphere ecosystem, contributing to plastic degradation, nutrient cycling, and microbial interactions. Understanding the functions and dynamics of fungi in the plastisphere is essential for developing effective strategies to mitigate plastic pollution and manage aquatic ecosystems sustainably. This research aims to isolate and characterize plastisphere fungi from Kadilangu and Wanatirta mangrove, Kulonprogo, Yogyakarta. Fungi were isolated from plastic waste in mangroves. The fungal isolation was carried out by direct plating method. The results of fungal isolation obtained 6 and 8 isolates from Kadilangu and Wanatirta Mangrove, respectively. The fungal identification was done by macroscopic and microscopic observation of fungi. The identification results showed that the fungi belonged to the genus Aspergillus, Ectophoma, Fusarium, Humicola, Rhizoctonia, Sarocladium, and mycelia sterile.

Poly-Herbal Formulation: Publication Trends And Research Hotspots

I Gusti Agung Ayu Kartika[1], Sisca Ucche[2], Agung Endro Nugroho[2]*

[1]Yoga and Health Study Program, Faculty of Brahma Widya, I Gusti Bagus Sugriwa Denpasar State Hindu University, Bali 80239, Indonesia

[2]Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Universitas Gadjah Mada, Yogyakarta 55281, Indonesia

**Corresponding author: Nugroho_ae@ugm.ac.id*

Abstract: The medical and scientific community has demonstrated a growing interest in the use of poly-herbal preparations. Currently, a substantial number of research papers are being published on poly-herbal formulations. This study does a bibliometric analysis of current works on poly-herbal formulation, with a specific focus on nations, institutions, publishers, authors, documents, and keywords. The Scopus database was used to gather bibliographic information from pertinent research and conference articles. A total of 257 publications, published from 1996 to 2024, were chosen. These articles encompassed 1107 authors and 892 keywords. The data were subjected to bibliometric analysis using Vosviewer 1.6.16. India, PSG College of Arts & Science, Research Journal of Pharmacy and Technology, and Vedha Hari from SASTRA University were the most productive countries, institutions, publishers, and authors, respectively. This was illustrated by analyzing bibliographical coupling networks using author information and keyword co-occurrence networks with overlays. The results of our investigation have significant consequences for both the practical and theoretical elements of this subject. Our primary objective is to promote research collaborations by conducting an analysis of the contributions made by countries, institutions, publishers, and writers. In addition, we have identified areas of research that need more exploration, such as the combination of herbal ingredients, the formulation of phytomedicine, the chemical profile of these medicines, and the assessment of their safety and efficacy. These factors are crucial in determining whether phytomedicine can be accepted as a viable therapeutic choice.

Effectiveness of nano-extract gel from Ketapang (*Terminalia catappa*) leaves against acne-causing bacteria

Naila Rahma Octaviya[1], Nita Pujiasih[1], Muhammad Dhiyaulkhaq[1], and Willy Tirza Eden[2]*

[1]*Chemistry Department, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Semarang, Indonesia*

[2]*Pharmaceutical Science Department, Faculty of Medicine, Universitas Negeri Semarang, Semarang, Indonesia*

**Corresponding author: willytirzaeden@mail.unnes.ac.id*

Abstract: Ketapang (*Terminalia catappa*) is among many traditional medicinal plants found in Southeast Asia, including Indonesia. Ketapang has been so common to be used as traditional medicine due to its various benefits, such as medicinal preparation for scabies and leprosy, as well as cure for stomachache and headache. According to previous research, Ketapang leaves extract showed antibacterial properties against *Aeromonas salmonicida*, *Aeromonas hydrophila*, *Escherichia coli* and *Staphylococcus aureus*. Thus, Ketapang leaves can be used as a remedy for skin diseases caused by bacteria, one of which is acne. Acne caused by excess oil gland activity, which is worsened by bacterial infection. This study aims to observe the effectiveness of gel preparation of chitosan loaded Ketapang leaves extract against acne-causing bacteria, *Staphylococcus aureus* and *Escherichia coli*. The effectiveness of gel preparation was measured based on a clear zone formed by the administration of antibacterial compounds diffused in the bacterial growth media. The result showed that the clear zone formed due to the growth inhibition of bacteria upon the application of nanogel preparation of Ketapang extract. The clear zone diameter was concentration dependent with the highest nanogel concentration of 5% to be the most effective against *Staphylococcus aureus* compared to conventional gel preparation of Ketapang extract.

A Bibliometric Approach in Compiling the Recent Research of Curcumin and Its Derivatives Concerning Drug Pharmacokinetics

Herlita Septiacha[1], Ibnu Rahmadiansyah[1], David Fernando[1], Prajona Marbun[1], Rico Aditama[1], Agung Endro Nugroho[1,2*], Arief Rahman Hakim[1,2]

[1]Faculty of Pharmacy, Gadjah Mada University, Yogyakarta, Indonesia.

[2]Department of Pharmacology, Faculty of Pharmacy, Gadjah Mada University, Yogyakarta, Indonesia.

[*]Corresponding author: nugroho_ae@ugm.ac.id

Abstract: Curcumin are widely used polyphenolic compound in traditional medicine. Despite the high potency of curcumin as a drug, its poor bioavailability becomes the biggest challenge in drug development studies of curcumin. A comprehensive study to understand the research trend is essential to provide some information on research productivity, scientific influence, and some research gaps. Bibliometric networks were used to generate and assess every paper related to curcumin's pharmacokinetic and physicochemical properties. Bibliometric networks were utilized to compile and evaluate all literature related to curcumin's pharmacokinetic properties. The bibliometric analysis can be conducted using the R package Bibliometrix and the VOSviewer software. This study aims to map the pharmacokinetic properties of curcumin and its derivatives, thereby complementing its pharmacodynamic aspects. The early research was in vivo studies of curcumin's metabolism profile, which evolved into the innovation of any drug delivery system. The research about curcumin and its derivatives has significantly increased in 2021, over 21 times than in 2009 with the most productive countries being China, India, and the USA. It suggests that any possible collaboration for global cooperation could be conducted to determine how closely the profile of curcumin or its derivatives as potent pharmacological drug candidates

The Effect of NaTPP as a Cross-Linking Agent in The Manufacture of Urea Fertilizer Slow Release Fertilizer (SRF) with Chitosan/NaTPP Matrix Bead

Yosafat Bramantyasena Widyantaka, Sari Edi Cahyaningrum
State University of Surabaya
Corresponding author: yosafat.20034@mhs.unesa.ac.id

Abstract: Urea fertilizer has a high solubility that allows nitrogen in urea fertilizer to not be absorbed optimally, causing low usage efficiency. As a result, the application of urea fertilizer cannot be optimally utilized by plants and results in pollution. Increasing the efficiency of urea fertilizer can be done by making SRF fertilizer. In this study, SRF Bead fertilizer made from Chitosan-NaTPP-Urea was made. The purpose of this study was to determine the physical, chemical characteristics and kinetics of urea release from SRF Bead Chitosan-NaTPP-Urea fertilizer. This research used NaTPP variation with the ratio of 1:1; 2:1: 3:1 with chitosan. FTIR characterization of SRF Bead showed functional groups of O- H, N-H, C=O, C-H, P=O, and P-O-P. SRF Bead encapsulation efficiency has a range of 86-91%. SEM characterization has a round shape and has a porous surface. The swelling power has a range of 131-115%. SRF Bead has good stability at alkaline pH. The SRF Bead release test results were able to reduce the release of urea fertilizer with significant differences from variations using matrix with variation without the use of matrix. The 3:1 NaTPP addition variation is better as shown by the lowest cumulative release value of 61.59%

Otoliths of albino tilapia (*Oreochromis* sp.) larvae: diameter and its correlation with fish age and size

Sitty Ainsyah Habibie[1]*, Djumanto[2], and Rustadi[2]
[1]*Aquatic Resources Management Department, Faculty of Marine and Fisheries Technology, Universitas Negeri Gorontalo, Gorontalo, 96128, Indonesia.*
[2]*Fisheries Department, Faculty of Agriculture, Universitas Gadjah Mada, Yogyakarta, 55281, Indonesia.*
**Corresponding author: ainsyahabibie@ung.ac.id*

Abstract: This study aimed to analyze the relationship between otolith diameter and the age and size of albino tilapia (*Oreochromis* sp.) larvae. Albino tilapia broodstock with a male and female composition of 1:3 was stocked in the spawning pond. Observations of incubated eggs were made every day since stocking. The spawning eggs began to appear on days 6 and 7, then hatched in aquarium tanks. Five larvae were taken every day since hatching from day 1 to day 18, then every two days from day 18 to day 30 for otolith collection. Sagitta otoliths were collected by immersing the fish larvae in a 5.25% NaOCl solution. The otoliths left behind were then glued to a glass object using Buehler cement. Daily increments were observed and counted with a 100-400x magnification microscope. Data recorded were total length, otolith diameter, and number of daily circles. The results showed that the daily increments on the otoliths of albino tilapia (*Oreochromis* sp.) larvae are formed daily and are very clear so that they can be used to determine the age of fish larvae. The otoliths of albino tilapia (*Oreochromis* sp.) larvae were initially circular and developed into irregular ovals with jagged edges as they aged. Otolith diameter increased with the age and total length of fish and showed a positive and strong correlation.

First record distribution of eel worm goby, *Taenioides anguillaris* (Linneaus, 1758) from the Bone River Estuary, Gorontalo City, Indonesia

Femy M. Sahami*, Murwantoko Murwantoko, Rene Charles Kepel, Sitty Ainsyah Habibie

Univesitas Negeri Gorontalo

**Corresponding author: femysahami@ung.ac.id*

Abstract: This research confirmed the first recorded distribution of *Taenioides anguillaris* (Linneaus, 1758) species in the Bone River estuary area of Gorontalo City. It was verified based on the molecular profile using the mitochondrial DNA of the Cytochrome Oxidase I (COI) gene and observations of morphological characteristics. The distributed species of *T. anguillaris* has 50 dorsal-fin rays, 16 pectoral-fin rays, 45 anal fin rays, 6 barbells with a 2-2-2 arrangement pattern, and a postmaxillary-oral papillae row (orp) which is very close to the dorsovertical papillae row (vtd). Therefore, this research provides essential information about the distribution record of this species in the world could be provided, specifically in Gorontalo Indonesia.

Network Pharmacology On Targets And Mechanism Of Hesperetin And Hesperidin In Type 2 Diabetes Mellitus

Fitrawan Hernuza Pribadi*, Agung Endro Nugroho, Yosi Bayu Murti, Bambang Retnoaji
Universitas Gadjah Mada
**Corresponding author: fitrawanhernuza@gmail.com*

Abstract: Citrus peel is widely used in the treatment of some diseases, that consist of several compounds including hesperetin and hesperidin. Reportedly, both compounds exhibited antidiabetic activity in disease animal models, especially for Type 2 Diabetes Mellitus (T2DM). This study aims to determine the potential pharmacological mechanisms of hesperetin and hesperidin therapeutic effect on T2DM by in silico network pharmacology and molecular docking simulations. A predictive network depicting the relationship between hesperetin and hesperidin with T2DM was designed based on information collected from several databases, namely STITCH, Swiss Prediction, SEA, OMIM, TTD, and DisGeNET. Identified overlapping targets related to both hesperetin and hesperidin and T2DM were crossed with information on biological processes (BPs) and molecular/signaling pathways using the ShinyGO and Cytoscape software. Molecular docking using Autodock Vina and visualization with Discovery Studio 2021. Based on protein-protein interaction (PPI) on T2DM, there are some possible targets of hesperetin and hesperidine for antidiabetic activity were mediated by core targets such as SLC5A2, IGF1R, PPARG, ADIPOQ, PTPN1, ALB and SLC5A4. The gene target for hesperetin is PPARγ, while hesperidin targets SLC5A2. These targets can be successfully predicted through molecular docking using AutoDock Vina. Using network pharmacology and molecular docking, this study revealed that hesperetin and hesperidin can effectively prevent T2DM symptoms through vital target genes, that is SLC5A2 (SGLT2) and PPARγ. Network pharmacology provides an efficient, time-saving approach to therapeutic research and the development of new drugs.

Profiling Fatty Acid of Edible Swiftlet's Nest for Potential Antihypertensive, Anti-aging, and Antioxidant by In Silico Molecular Docking

Mohammad Wisnu Wardana[1], Salsa Bella Nasywa Subekti[1], Shabrina Dwi Ardinimia[1], Nur Halimah Putri Nirwana[1], Erma Eka Firnanda[1], Oktavia Nur Rahmatulloh[1], Mutiara Azfa Nabila[1], Ferdiansyah Setiawan[1], Nita Kusumawati[1*], Pirim Setiarso[1], Asrul Bahar[2], Mahanani Tri Asri[3], and Sunu Kuntjoro[3]

[1]*Department of Chemistry, Universitas Negeri Surabaya, Ketintang, Surabaya, 60231, Indonesia*

[2]*Department of Family Welfare Education, Universitas Negeri Surabaya, Ketintang, Surabaya, 60231, Indonesia*

[3]*Department of Biology, Universitas Negeri Surabaya, Ketintang, Surabaya, 60231, Indonesia*

[*]*Corresponding author: nitakusumawati@unesa.ac.id*

Abstract: Edible swiftlet nest (ESN) is a widely used product in the food industry. The aim of this study was to determine the fatty acid profile of ESN and its potential as antihypertensive, anti-aging, and antioxidants using an in silico approach. Fatty acid analysis was performed by gas chromatography-mass spectrometry (GC-MS) method to identify the presence of a compound. Lauric acid, myristic acid, palmitic acid, stearic acid, and also linoleic acid were subjected to advanced molecular docking tests using Autodock 1.5.7 program. The results of binding energy values, binding site interactions, and binding energy value data show that fatty acids in ESN have a better binding affinity value compared to the antioxidant control compound (ascorbic acid) which is -5.29 kcal/mol synergistically. The fatty-acid content in the ESN has the greatest potential as an anti-oxidant because it has the highest binding affinity values. The binding energy and binding site interaction data also show that the binding energy of fatty and ligands is higher than those of the lipid-ligand interaction. Of the three activities, ESN is more potent as an antioxidant than as an inhibitory and antioxidant.

Profiling Fatty Acid Alginate from Acid Pathways for Diabetic Wound Healing Targeting TNF-α, GSK3-β, FFA1

Nita Kusumawati*, Inoki Tabina Pramiswari, Fahlevi Maulana Irfano, Diah Ayu Mandasari, Syerlistya Putri Dahliyanti, Etika Estu Wardani, Luthfiyah Isyrak, Natasya Nur Rahma, Muchamad Sabilah Hanafi, Novi Kartika Indah, Asrul Bahar

Universitas Negeri Surabaya, Ketintang, Surabaya, 60231, Indonesia

Corresponding author: nitakusumawati@unesa.ac.id

Abstract: This research aims to explore the potential of sodium alginate extracted through an acid pathway from brown seaweed for diabetic wound healing and antibacterial activity. The researchers targeted several key proteins involved in antibacterial activity and wound healing, namely TNF-α (7JRA), GSK3-β (1I09), and FFA1 (8T3V). The acid pathway extraction of alginate involves soaking seaweed in an acid solution followed by neutralization and extraction using a base solution. Molecular docking was used to analyze the interactions between oleic acid and palmitic acid in sodium alginate with the target proteins TNF-α (7JRA), GSK3-β (1I09), and FFA1 (8T3V), each with their native ligands VGY301, Crenatoside, and WG1100, respectively. The analysis results showed that the compounds palmitic acid and oleic acid in sodium alginate have higher stability compared to the control compounds and can effectively interact with the target proteins, thereby enhancing inhibition activity that can aid in the wound healing process. Sodium alginate extracted through the acid pathway has great potential as an antibacterial agent in drug formulations for wound healing in diabetic patients, with the potential to reduce infections and accelerate the healing process, although further studies are needed to validate its efficacy in clinical settings.

Formulation and Test of Antibacterial Activity of Hydroxyapatite-Nanosilver-Clove Oil (*Eugenia caryophyllus*) in Toothpaste Preparation against *Streptococcus mutans* Bacteria

Browi Nugroho and Sari Edi Cahyaningrum*
Department of Chemistry, Faculty Mathematics and Natural Science, Universitas Negeri Surabaya, Surabaya, Indonesia
**Corresponding email: saricahyaningrum@unesa.ac.id*

Abstract: Tooth decay is caused by the activity of Streptococcus mutans bacteria. One of the efforts to prevent tooth decay is to use toothpaste containing antibacterial compounds such as hydroxyapatite, nanosilver and clove oil. The purpose of this study was to synthesize and characterize hydroxyapatite-nanosilver-clove oil as an antibacterial agent against dental caries and describe the properties that can be perceived by the five human senses, namely taste, aroma, color, texture of the resulting toothpaste. In this study, physical properties were tested, namely particle size by PSA, dispersion power, adhesion, homogeneity and chemical properties by FTIR in the form of functional groups, pH, and antibacterial activity by plate diffusion method. This study used 2% hydroxyapatite, 10 ppm nanosilver, 1% 2%, 3% and 4% clove oil and toothpaste fillers. The synthesis results in a toothpaste formulation based on nanosilver hydroxyapatite clove oil, as indicated by the FTIR characterization results showing the presence of typical functional groups OH^-, $CO3^{2-}$, $PO4^{3-}$, C-H, C-O, and C=O. The PSA results show that hydroxyapatite-nanosilver-clove oil has a size that is not included in the nanoparticle category (<100 nm). The toothpaste spreadability test produces a smear diameter that meets the paste spreadability requirements (5-7 cm), while the adhesion test produces adhesion that does not meet the ideal requirements (1-6 seconds). The pH measurement produces a toothpaste pH that meets SNI (4.5-10.5). The homogeneity test of the toothpaste has met the requirements according to SNI. The antibacterial activity test shows that the hydroxyapatite-nanosilver-clove oil toothpaste formulation is able to inhibit the growth of S. mutans bacteria with the highest inhibition diameter in the variation of the addition of 4% clove oil concentration, namely 14.99 mm. These results indicate that the addition of clove oil into the formulation of hydroxyapatite-nanosilver-clove oil toothpaste can affect its chemical, physical, and antibacterial activities. The results of statistical analysis of organoleptic testing on 20 non-expert panelists showed that F2 (HAp- AgNPs-Clove oil 2%) was the preferred formula and F4 (HAp-AgNPs-Clove oil 4%) was the less preferred formula.

Kinetic Study of Transformation Eugenol To Vanilin With β-Cyclodextrin Catalysis

Edy Cahyono, Alfiah Yunita Cahyani, Sri Kadarwati
Department of Chemistry Universitas Negeri Semarang
**Corresponding email: edkim@mail.unnes.ac.id*

Abstract: Eugenol is the main component of clove oil which has many activities such as antimicrobial, antioxidant, anti-inflammatory, anti-carcinogen, and antifungal. Eugenol was isolated by reduced pressure fractionation distillation, and the results were analysed with GC and FTIR. The polymer β-cyclodextrin catalyst was prepared by the aromatic substitution method of the cyclodextrin hydroxyl group using NaOH and epichlorohydrin and the results were characterized using FTIR, SEM, and XRD. The transformation was carried out by veryfied the amount of β-CDP catalyst, oxidizing agents H_2O_2 and $NaHCO_3$, and reaction time. The results of the eugenol transformation were analyzed by GC, GCMS, and FTIR. The kinetics of eugenol catalytic transformation with time variations was analyzed by UV-Vis. Based on the results of the GC distillation analysis of clove oil, it showed an increase in the purity of eugenol from 70.74% to an increase of 72.99%.The results of β-cyclodextrin polymerization FTIR analysis, the formation of β-cyclodextrin polymer was indicated by the presence of an ester (C-O-C) group. SEM analysis showedmesoporous surface morphology, while XRD analysis showed amorphous crystals. The results of the transformation of eugenol formed vanillin compounds by GC and GCMS analysis at retention times of 41.635 minutes and eugenol 36.870 minutes. The variety of catalyst selectivity increased with increasing β-CDP. Eugenol transformation was more offective with various oxidizing agents NaHCO 3 . The results of eugenol transformation with FTIR showed the formation of vanillin compounds at 1700 cm -1 as a vanillin carbonyl group. The kinetics analysis of eugenol transformation showed the value of K = 0.0013x and R = 0.9558

The Association of Maternal Factors with The Incidence of Stunting in Toddlers Aged 24-59 Month

Sri Ratna Rahayu*, Salsabila Kinaya Pranindita, and Aufiena Nur Ayu Merzistya[1]
Faculty of Medicine, Semarang University
**Corresponding email: [a)]sriratnarahayu@mail.unnes.ac.id*

Abstract: *Stunting is a condition of failure to achieve physical development as measured by height for age with a Z-score value <-2 SD. Cases of stunting in Grobogan Regency aged 0-60 months in 2021 were 2,838 cases. The purpose of this study was to determine the relationship between maternal age, maternal nutritional status and maternal anemia history with the incidence of stunting in toddlers aged 24-59 months in the Primary Helath Care Gabus 1, Grobogan Regency. The type of research used in this study is analytic observational and case control approach. The sampling technique in this study used purposive sampling method and obtained a sample of 80 toddlers. The results of this study indicate that there is a relationship between maternal age during pregnancy (p=0.008), maternal nutritional status during pregnancy (p=0.000), maternal anemia history during pregnancy (p=0.000), with the incidence of stunting in toddlers aged 24-59 months at Public Health Center Gabus 1 Grobogan Regency. Socialization and cooperation of partners to prospective mothers need to be done to reduce the risk of giving birth to stunting children*

The Correlation Between Personal Hygiene and the Use of Personal Protective Equipment and Dermatitis in Workers at the Surakarta City Temporary Waste Disposal Site

Lely Tri Pangesti[1, a] and Yuni Wijayanti[1, b)]
[1]Faculty of Medicine, Semarang University, Semarang, Indonesia
**Corresponding author: [a)]lelytripangesti@m ail.unnes.ac.id; [b)]yuniwija@mail.unnes.ac.id*

Abstract: Dermatitis is a work-related disease characterized by a reddish rash, itching and hot around the palms, arms and around the feet of workers exposed to chemicals and working conditions. Over the past 30 years, the increase in the prevalence of Atropic Dermatitis (AD) in the world has reached 18% in children and 5% in adults. The cause of the emergence of complaints of dermatitis is poor personal hygiene and low awareness of workers in using personal protective equipment. This study aims to determine the relationship of personal hygiene and the use of personal protective equipment on the complaints of dermatitis. This type of research used observational analytic design with Accidental Sampling. The population was 140 people. Samples were taken using simple random sampling technique. The instruments used in this study were personal hygiene questionnaires, personal protective equipment questionnaires and dermatitis complaints questionnaires. Bivariate analysis used the Chi-Square test. Multivariate analysis used the Logistic Regression test. The results showed 62 complaints of mild dermatitis (53,9%) and 53 of respondents who had moderate dermatitis complaints (46,1%). The results of multivariate analysis showed that the personal hygiene of equipment (p = 0.001) was more influential than personal protective use (p = 0.002)..

Characterizations And Electrical Properties of Membrane Composite Polymer of Polimethyl Metacrylate With Mesogen Reactive RM257

Afrizal[a]*, Yusmaniar[a], Setia Budi[a], Asep Riswoko[b], Teguh Budi Prayitno[c], Karin Khairunnisa Gumilar[a]

[a]Department Chemistry, Faculty of Mathematics and Sciences, Universitas Negeri Jakarta, Jakarta, Indonesia

[b]National Research and Innovation Agency, KST Habibie, South Tangerang, Banten, Indonesia

[c]Department Physics, Faculty of Mathematics and Sciences, Universitas Negeri Jakarta, Jakarta, Indonesia

**corresponding author: email: afrizal@unj.ac.id*

Abstract: Membrane composite polymer of Polymethyl Methacrylate with Mesogen Reactive 257 (PMMA-RM257) has been successfully synthesized. This research report of the characterizations of PMMA-RM257 and electrical properties that composite membrane. Synthesized membrane composite polymer of PMMA-RM257 using methods of UV exposure to polymer solutions. This methods UV radiation plays a role in the formation of new polymers with the addition of a Benzoyl Peroxide (BPO) initiator. Membrane composites were made with RM257 weight percent variations of 20%, 30%, and 40%. Membrane composite polymer PMMA-RM257 was characterized by FTIR that absorption peaks appear at wave numbers 2927 cm-1 indicating the-CH3 functional group, 1722 cm-1 indicating the C=O functional group, 1602 cm-1 indicating the presence of aromatic groups, 1248 cm-1 indicating the C-O-C group, 1060-1144 cm-1 indicating the C-O functional group. Analysis by POM and SEM show textures morphology of PMMA-RM257 shows that an increase in the concentration of RM257 makes the membrane tighter. Analysis crystallinitas by XRD results showed that the composite membrane polymer PMMA-RM257 is semycrsytalline and sharp peaks appear as an indicator of phase crystallity in the PMMA-RM257 membrane. Electrical properties of composite membrane of PMMA-RM257 using an LCR meter shows an increase in capacitance, resistance in sensors with 30% and 40% Rm257 variations showed a decrease. It can be seen that the increasing concentration of RM257 in MMA-RM257 thin films has good electrical properties.

STEM Based Learning: The Use of IV-GLOW media to Enhance Students' Understanding of Global Warming

Rosikhotul Ilmi[a], Mita Anggaryani[b], and Muhammad Satriawan[c]
Physics Education Study Program, Facultu of Mathematics and Science, State University of Surabaya
Corresponding author: [a)]rosikhotulilmi.20015@mhs.unesa.ac.id; [b)] mitaanggaryani@unesa.ac.id; [c)]muhammadsatriawan@unesa.ac.id

Abstract: Technology development is essential in developing learning innovations, especially multimedia-based learning media. The use of learning media can play a role in increasing students' mastery of concepts. A common problem in students is the need for more ability to understand concepts due to boring learning methods and less attractive learning media. So, innovation is needed to develop learning media and more innovative learning methods. This study aims to determine the influence of IV-GLOW (Interactive Video of Global Warming) media use with the Think Pair Share (TPS) type cooperative learning model on students' mastery of concepts. The basis of this study is linked closely to the STEM-based Learning model strategy. This study applied a correlational study method to determine the relationship level between IV-GLOW media use and comprehension of Global Warming concepts. The population is all class X students at SMA Darul Ulum 1 Unggulan Jombang. Sampling uses a purposive sampling technique consisting of two classes, namely X-11 and X-12. Class X-12 is used as a replication class to ensure the research results' consistency. Concept mastery data was obtained through written tests in essays at the beginning and end of learning. The results of the hypothesis test analysis showed that IV-GLOW learning media influenced students' mastery of concepts in understanding global warming material. The results of the study showed that there was an increase in students' mastery of concepts after learning using IV-GLOW media with the medium category.

Sulfide Precursor Variation on th Sulfide Precursor Variation on the Synthesis of ZnS-PEG as Cyanide Detection Sensor e Synthesis of ZnS-PEG as Cyanide Detection Sensor

Sigit priatmoko
Universitas Negeri Semarang
Corresponding author: sigitwarsono65@mail.unnes.ac.id

Abstract: Synthesis of ZnS-PEG has been carried out using $Zn(CH_3COO)_2 \cdot 2H_2O$ as zinc precursor and several sulfide precursor as cyanide detection sensor. The research objective was to determine the effect of sulfide precursor ($Na_2S \cdot 9H_2O$, $(NH_4)_2S$, dan $SC(NH_2)_2$) on the characteristics of ZnS-PEG and its performance as a detector cyanide. ZnS-PEG was obtained from coprecipitation method, in this case that happens precipitation of metal ions (Zn^{2+}) dan sulfide ions (S^{2-}). Optical absorption and wavelength were determined using UV-Vis spectrophotometer. Three ZnS-PEGs showed optical absorption at wavelength 305 – 312 nm. The amount of bandgap energy calculated by the DR-UV spectrophotometer using the Tauc equation obtained values of 2.75 - 2.96 eV. The crystal structure of ZnS-PEG from the results of X-ray diffraction characterization showed a mixture of cubic zinc with a crystal size of 10,66 – 63,11 nm. The use of various sulfide precursors in the synthesis of ZnS-PEG doesn't have a significant effect on its basic properties but does affect the physical properties of these compounds. The synthesized compound is used as a sensor probes for cyanide detection. ZnS-PEG from the precursor $SC(NH_2)_2$ has the highest sensitivity compared to the precursor Na_2S and $(NH_4)_2S$. It's indicated by the strongest luminescence with the highest band edge emission intensity and the lowest detection limit 0,366 mol L-1.

Mapping Economics Education Research: A Bibliometric Review of the Literature in Two Decades and the Trend to Support Science and Technology

Albrian Fiky Prakoso*, Muhammad Abdul Ghofur, Zain Fuadi Muhammad Roziqi Fath, Ardhita Eko Ginanjar, Eka Hendi Andriansyah, and Putri Ulfa Kamalia

Universitas Negeri Surabaya, Surabaya, Indonesia

**Corresponding author: albrianprakoso@unesa.ac.id*

Abstract: This research aims to employ bibliometric methods to explore economics education over the past twenty years. Additionally, it seeks to understand how economics education can progress and achieve both conceptual and practical understanding. The study utilized the Scopus database for literature metadata and analyzed it using Bibliometric software with Bibioshiny tools. The bibliometric process began by identifying 997 articles. After applying specific criteria for filtration, 89 articles were selected for more detailed analysis. This research uncovers significant themes in economics education studied by various related researchers, presenting easily understandable information through figures, tables, and maps. Furthermore, the study analyzes the productivity of articles, journals, authors, and countries involved. It provides insights into crucial research directions concerning the development of economics education. The findings indicate a positive trend in research on economics education. These insights are invaluable for future researchers as they can have practical implications, particularly for educators and policymakers. Thus, this article contributes to the advancement of global economics education curricula across various educational levels.

Synthesis and Anticancer Activity of New Compounds Aroylhydrazone

Imanuel Gauru[1,2,*], Fahimah Martak[1], Mardi Santoso[1], Arif Fadlan[1]

[1]Department of Chemistry, Faculty of Science and Data Analytics, Sepuluh Nopember Institute of Technology, Surabaya, Indonesia
[2]Department of Chemistry, Faculty of Science and Engineering, University of Nusa Cendana, Kupang, Indonesia

[*]Corresponding author: Imanuelgauru14@gmail.com

Abstract: This work describes the syntheses, structural characterization and cytotoxicity assay of new aroylhydrazone derivatives para - benzaldehyde and benzohydrazide. The synthesized compounds were thoroughly characterized by Fourier transform infrared spectroscopy (FTIR), High Resolution Mass Spectrometry (HRMS) and nuclear magnetic resonance (NMR). Furthermore, the in vitro cytotoxicity assessment of 4-hydroxy-benzaldehyde benzoyl hydrazine, 4-methoxybenzylidene benzohydrazine, 4-nitrobenzylidene – 2 – benzoyl hydrazine, 4-methylbenzylidene – 2 – benzoyl hydrazine. We found that 4-methylbenzylidene – 2 – benzoyl hydrazine was carried out against HeLa (cervical) cancer cell lines. The cytotoxic results revealed that the 4-methylbenzylidene – 2 – benzoyl hydrazine exhibited better and selective cytotoxicity against the HeLa cancer cell line as evidenced by the moderate IC50 value of 42,64 µg/mL.

Increasing the Efficiency of Solar Power Generation Systems by Optimizing MPPT Performance Based on Feed-Forward Neural Network with the Levenberg Marquardt Backpropagation Training Algorithm

Riana Defi Mahaji Puteri*, Nur Rohim, Marlinda Fiky Harjanti, Djoko Adi W, and Said Sunardiyo

Electrical Engineering Department, Universitas Negeri Semarang
Sekaran campus, Semarang, Indonesia

**Corresponding author: riana.dmp@mail.unnes.ac.id*

Abstract: Performance of Neural Network Maximum Power Point Tracking (NN MPPT) method with Levenberg Marquardt backpropagation training algorithm for photovoltaic (PV) is investigated in this paper. The correlation between the hidden layer and the activation function towards the achievement of the maximum power point, is investigated and compared. A comparative study between several NN MPPT scenarios was conducted to compare the performance of each scenario based on the efficiency of the generated power. Each NN MPPT scenario uses Vpv and Ipv as input, and Dmpp as output. Scenario 1 uses 1 layer of Feed-Forward Neural Network (FFNN) with logsig activation function, scenario 2 uses 1 layer of FFNN with tantig activation function, scenario 3 uses 2 layers of FFNN with logsig activation function, and scenario 4 uses 2 layers of FFNN with activation function tantig. Although the training results show that scenario 3 has the best mean squared error (MSE) and regression values. However, scenario 1 results in higher power efficiency. The test results show that the NN MPPT scenario 1 model produces a PV power efficiency of 95.02% and a converter power efficiency of 83.68%.

Web Framer-Based Technology for Ecotourism Information System of Bone Bolango Municipality

Sunarty Suly Eraku[1*], Nurlila Masulili[1], Nurdin Mohamad[1], Mohamad Karmin Baruadi[2], and Aang Panji Permana[1]

[1]Department of Earth Science and Technology, Universitas Negeri Gorontalo, Indonesia
[2]Department of Indonesian Language and Literature, Faculty of Letters and Culture, Universitas Negeri Gorontalo, Indonesia

[*]Corresponding author: sunarty.eraku@ung.ac.id

Abstract: This present study aims at mapping the ecotourism of Bone Bolango municipality by employing a web-framer based technology. Primary and secondary data on tourist destinations are collected qualitatively before further analysis using the Web-Framer technology. The result is this Web-Framer technology can increase tourism information accessibility and assists promotion of local tourism. Web-framer technology produces an interactive map, which allows users to explore and to obtain detailed information on each destination, including the location, the description, and available facilities. It is concluded that the Web-framer based technology can contribute to the development of municipality's tourism and provides better experience for tourists.

Keywords: Web-Framer Technology, Ecotourism, Mapping

Effect of Pandan Leaf Extract on Antimicrobial Activities of Composite from Glycerol, Chitosan, and Gelatine

Eli Rohaeti[1*], Isana SYL[1], Dini Rohmawati[1], Sekar Paramitha Rizky Diniati[1], and Azlan Kamari[2]

[1]Department of Chemistry Education, Faculty of Mathematics and Natural Sciences, Yogyakarta State University, Depok Sleman, Indonesia
[2]Department of Chemistry, Universiti Pendidikan Sultan Idris, Faculty of Sciences and Mathematics, Proton City, Tanjung Malim, Perak, Malaysia

[*]Corresponding author: eli_rohaeti@uny.ac.id

Abstract: The need for composite-based antibacterial and antifungal materials is a non-negotiable problem in the current era. The objective in study was to determine the antimicrobial activity characteristics of gelatine, chitosan, and glycerol composites with and without the addition of pandan leaf extract as antimicrobial materials. The composite was made from gelatin, chitosan, glycerol with a composition of 6:2:2.5 (v/v) which was added with 5 variations of pandan leaf extract concentration, 0%, 5%, 10%, 25%, 50% (v/v), respectively. Characterization was carried out including physical properties test, tensile testing, water solubility, FTIR, SEM-EDX, and antimicrobial activity test against Staphylococcus aureus, Escherichia coli, and Aspergillus sp. The characterization results showed that the addition of pandanus leaf extract had no effect on thickness, elongation, and water solubility, but had an effect on tensile strength, Young's modulus, and antimicrobial activity. The thickness test results show that the composite samples have a thickness of <0.25mm in accordance with JIS standards. The results of the tensile strength, Young's modulus, and antimicrobial tests showed a significant difference between the composite samples with the best results in the composite sample with the addition of 25% pandan leaf extract.

Creating Joyful Learning Experiences for Indonesian Migrant Children: Creative and Community-Based Approaches

Purnomo

Universitas Pendidikan Indonesia, Bandung, Indonesia

Corresponding author: purnomo@upi.edu

Abstract: The education of Indonesian children's migrants is frequently confronted with a multitude of challenges, including the necessity to adapt to a new cultural environment and the lack of adequate educational resources. The objective of this study is to explore the potential of creative and community-based approaches in fostering enjoyable learning experiences for Indonesian migrant children. This approach employs the PAIKEM model to facilitate the learning process. The methodology employed was qualitative research, utilizing data collection techniques such as in-depth interviews, participatory observation, and document analysis. The findings of the study indicate that the PAIKEM approach can enhance motivation and foster a sense of community among children of migrant families. Moreover, community involvement in the educational process provides significant emotional and social support for migrant children, facilitating their adaptation to the new environment. The study's findings indicate that creative and community-based approaches not only enrich the learning experiences of child migrants but also strengthen social cohesion and cultural integration within migrant communities.

Prototype of Digital Assessment as a Family Economic Resilience Mapping Analysis Tool

Achmad Hufad, Purnomo*, Deti Nudiati, Nani Sutarni, and Mohamad Hadi Ali Mutamam

Department of Community Education, Faculty of Educational Sciences, Universitas Pendidikan Indonesia, Bandung, Indonesia

**Corresponding author: purnomo@upi.edu*

Abstract: The Local Hero Community is a community empowerment movement that facilitates the utilization of women's potential through digital economic training to enhance family economic resilience. However, at present, no software for social diagnostic analysis exists that can measure household economic resilience, which means that vulnerable, at-risk, and self-sufficient family categories cannot be identified. The necessity of this study lies in the importance of pre- and post-educational measurement tools for female communities participating in digital economic training. This will enable the identification of vulnerable, vulnerable, and independent family categories, facilitating the formulation of follow-up plans. The objective of this study is to describe the design of a digital assessment tool that can be used to map the economic resilience of families. This study employs a mixed-methods approach, integrating qualitative and quantitative techniques. The qualitative methods include interviews, observations, document analysis, and focus group discussions, which are used to gain deeper insights into the empirical realities of family economic resilience. A quantitative approach was employed to identify the economic conditions of the family unit using a self-assessment questionnaire. The results of the study indicate that the Prototype Digital Assessment, designed as a mapping tool for economic resilience, comprises data collection stages, family data input, economic need analysis, economic need identification, economic resilience assessment, program recommendations, and program impact simulations.

Evaluation of the Quality Characteristics of Raw Water and PDAM Wonosari Unit as Sources of Community Drinking Water

Marike Mahmud*, Alqi Fahriansa H. Potale, and Rawiyah Husnan
Faculty of Engineering, Universitas Negeri Gorontalo, Gorontalo Municipality, Indonesia

Corresponding author: marikemahmud@ung.ac.id

Abstract: Sanitation is specifically discussed in the 6 SDGs goals, including by 2030, achieving universal, adequate, safe and affordable access to drinking water for all and implementing integrated water resource management at all levels. This research aims to evaluate the quality of water before and after processing by PDAM (Local Water Company) Wonosari Unit and examine the effectiveness of PDAM Wonosari Unit water treatment so that it can be used optimally as a source of raw water for community drinking water. The location of this research was in Bongo 2 Village, Wonosari District. There were 2 sampling locations, namely 1 location in the Paguyaman River water before the PDAM intake and the 2nd location in the PDAM reservoir after the processing process. The data required in this research were primary data including physical parameters including temperature, Total Dissolve Solid (TDS), turbidity, and color; Chemical parameters included iron, pH, and manganese. Bacteriological parameters covered total coliform bacteria and *Escherichia coli*. Data collection in the field was carried out 3 times. Secondary data included data on PDAM water users, the population. Chemical parameter samples were analyzed at LPPT UGM. Physical and microbiological samples were tested at the Gorontalo District Health Laboratory. Analysis of river water quality data compared to its suitability based on Government Regulation Number 22 of 2021 attachment VI and for PDAM water compared with PERMENKES No. 2 of 2023. The results of the analysis show that Paguyaman River water meets the requirements as raw drinking water. Evaluation of PDAM water quality, for microbiological parameters, does not meet the requirements because the Wonosari Unit PDAM water treatment system sometimes experiences major problems with the water pump sometimes shutting down so that the disinfection treatment process does not work optimally.

Bibliometric Analysis of Publication Trend about *Citrus aurantifolia* as an Antioxidant

Fitrawan Hernuza Pribadi*, Agung Endro Nugroho, Yosi Bayu Murti, and Bambang Retnoaji

Faculty of Pharmacy, Universitas Gadjah Mada, Indonesia

**Corresponding author: fitrawanhernuza@gmail.com*

Abstract: For human health and well-being, the presence of ROS is essential. However, the presence of uncontrolled and excessive reactive oxygen species (ROS) has been associated with the onset of some illnesses. Therefore, using exogenous antioxidants can aid in managing the effects of oxidative stress. Herbal compounds, such as lime (*Citrus aurantifolia*), are commonly utilized as a source of natural antioxidants. However, it is worth noting that only a limited subset of these medications has been subjected to rigorous clinical trials despite the potential efficacy of C. aurantifolia as an antioxidant therapy. This study employs the Scopus database to conduct a bibliometric analysis of the antioxidant properties of various strains of C. aurantifolia. The data was evaluated using the RStudio and VOSviewer applications. Subsequently, 63 papers from 2013 to 2023 were included in the final bibliometric dataset. The Icar-Indian Agricultural Research Institute is well recognized as a highly productive institution with significant global contributions. Khan SA is widely recognized as the most prolific author. The article authored by Brito et al. in 2014 holds substantial influence in the field. These results are performed to provide a broad understanding of *C. aurantifolia* as an antioxidant.

Keywords: Antioxidant, Bibliometric, Citrus aurantifolia, Scopus, RStudio, Vosviewer

Global Research Trends in Citizen Science in Biology Education: A Bibliometric Analysis

Via Aini[1], Topik Hidayat[2], Kusnadi[2]

[1]Science Education, Faculty of Mathematics and Natural Science, Universitas Pendidikan Indonesia

[2]Biology Study Program, Faculty of Mathematics and Natural Science, Universitas Pendidikan Indonesia*

[*]Corresponding author: topikhidayat@upi.edu

Abstract: This study presents a comprehensive bibliometric analysis of global research trends in citizen science for biology education, examining 3,131 articles published in Scopus from 1973 to 2023. The analysis aims to uncover key patterns and developments in this emerging field, focusing on publication volume, citation metrics, leading authors, influential journals, and geographic distribution. Using tools such as VOSviewer and RStudio, the study reveals a significant increase in research activity from 2010 to 2021, followed by a decline in 2022 and 2023. Despite this recent downturn, citizen science projects (CSP) remain highly relevant, with trending keywords including citizen science, environmental monitoring, human, biology, biology education, and biodiversity. Major contributing countries include the United States, the United Kingdom, and Australia, reflecting strong institutional support and funding. Collaboration networks show a trend towards interdisciplinary approaches, integrating educational sciences, environmental studies, and information technology. The findings emphasize the pivotal role of citizen science in enhancing scientific literacy and environmental awareness among students, aligning with Sustainable Development Goal (SDG) 4 on quality education. By engaging students in meaningful scientific inquiry through CSP, educators can promote lifelong learning and empower individuals to address contemporary environmental challenges. This study provides valuable insights for educators, researchers, and policymakers aiming to leverage CSP to enrich biology education and foster sustainable practices. Future research should focus on evaluating the long-term impacts of citizen science initiatives across diverse educational settings, ensuring their continued relevance and effectiveness in addressing local and global issues.

Students' Sustainable Literacy: case study of Study Program Agro-Industry Education Technology

Melly Amalia Tasjiah[1], Yatti Sugiarti[1], and Dewi Cakrawati[2*]

[1]Study Program of Agro-Industry Education Technology, Faculty of Technology and Vocational Education, Universitas Pendidikan Indonesia
[2]Study Program of Food Technology Faculty of technology and Vocational Education, Universitas Pendidikan Indonesia

[*]Corresponding author: dewicakrawati@upi.edu

Abstract: One of the methods to increase students' awareness regarding sustainable development goals was to improve their sustainable literacy. This study aims to investigate students' Sustainability Literacy at Agro-industry Education Technology study program. The research was conducted by descriptive quantitative method. Twenty items of Multiple choices questions based on sulitest indicator was used as the instruments. The samples in this research were 3rd years students of study program Agro-industry Education Technology. Sustainable literacy was divided into three aspects namely environment, social and economy. The results show that overall average score for students' sustainable literacy was 56% categorized as "Fair". Students' sustainable literacy on the aspect of environment shows higher score than that of social and economic aspect. This indicates that students lack understanding that environment aspect was related to both social and economic. This research highlights that learning process can contribute to the students' sustainable literacy. Therefore, implementation of green curriculum along with suitable learning model and media is needed to improve students' sustainable literacy.

The Role of Natural Products in The Treatment of Delayed Onset Muscle Soreness

I Gusti Agung Ayu Kartika[1], Sisca Ucche[2], and Agung Endro Nugroho2[*]
[1]Yoga and Health Study Program, Faculty of Brahma Widya, I Gusti Bagus Sugriwa Denpasar State Hindu University, Bali, Indonesia
[2]Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Universitas Gadjah Mada, Yogyakarta, Indonesia
[*]Corresponding author: nugroho_ae@ugm.ac.id

Abstract: Delayed onset muscle soreness (DOMS) commonly results in muscular pain and discomfort after intense or unaccustomed exercise. Natural products, including herbal remedies and plant extracts, are increasingly studied for their potential to alleviate DOMS symptoms through mechanisms such as anti-inflammatory, antioxidant, and analgesic effects. This narrative review comprehensively examines current literature on the efficacy of natural products in DOMS treatment. The review identifies studies investigating various natural products' impacts on DOMS symptoms, including pain severity, muscle function recovery, and inflammatory markers. Essential natural products studied include curcumin, cherry juice, and *Arnica montana*, which have shown promise in reducing DOMS-related pain and enhancing recovery. Mechanisms of action involve modulation of inflammatory pathways and improving muscle repair mechanisms. Despite promising findings, study methodologies and outcomes necessitate variability in further research to establish standardized protocols and optimize clinical application. This review underscores the potential of natural products as valuable additions to DOMS management strategies, offering athletes and active individuals' alternative options for enhancing recovery and performance.

Keywords: Natural Product, Mechanism, Delayed Onset Muscle Soreness

Basic Immunization Status Coverage, Exclusive Breastfeeding Coverage, and Low Birth Weight Prevalence as Determinant of Stunting Incidence: Ecological Study in Semarang Regency

Anida Salsabila[*] and Irwan Budiono

Faculty of Medicine, Universitas Negeri Semarang

[*]*Corresponding author: anidasalsabila@students.unnes.ac.id*

Abstract: The prevalence of stunting in Semarang Regency did not decrease in 2020 and 2021, with 1 in 17 children having stunting status. This study is a descriptive epidemiological study using an ecological study design with the unit of analysis being all Community Health Centers (Puskesmas) in Semarang Regency. The LISA spatial autocorrelation analysis was used in the univariate analysis to identify the spatial pattern of stunting incidence. Bivariate analysis was conducted using categorical statistical tests (Chi-Square) and numerical tests (Pearson and Spearman Rho). The purpose of this study is to analyze the relationship between the determining factors causing stunting and the prevalence of stunting in Semarang Regency. The results showed a spatial pattern of stunting incidence among Community Health Centers in Semarang Regency. Additionally, the coverage of exclusive breastfeeding and the prevalence of low birth weight showed a significant relationship with the prevalence of stunting.

Exploring Student Acceptance of the Use of ChatGPT Application as a Form of SDGs Implementation in Online Learning Environment

Hermila A.

Universitas Negeri Gorontalo, Gorontalo, Indonesia

**Corresponding author: hermila@ung.ac.id*

Abstract: Technological developments in recent years have brought the world into the digital era. Increasingly sophisticated technology has had a major impact on education by enabling more dynamic and personalized interactions between students and learning technology. The role of technology in education can provide accessibility and learning resources for learners, both of which are indicators of the SDGs on education. A growing number of electronic devices and internet connections have enabled the use of chatbot applications such as ChatGPT in academic environments, including among students. The learning process in secondary schools is often faced with the challenge of difficulty in providing learning materials that suit the individual needs of students. This study used a quantitative approach. The sample taken was 40 students representing each grade 12 SMA N Kabila. Where each class sample taken was 5 people. Data collection using questionnaires and interviews. The research design used is the Technology Acceptance Model (TAM) model. Analysis using Smart-PLS. The indicators studied adopt Davis's TAM Model (1989) which focuses on three indicators Perceived Usefulness, Perceived Ease of use, and acceptance of the System. The results of this study indicate that perceived usefulness does not contribute to the influence on the acceptance of the chatGPT system. Perceived Ease of Use has a significant influence on the acceptance of the chatGPT system by students. the results of interviews with some students are still unfamiliar and have never even used chatGPT. So it is necessary to introduce and guide the use of chatGPT by the rules and regulations. Then most students who have used chatGPT feel worried that the use of chatGPT will make them lazy to think, especially the results of the information provided by chatGPT using too good language sentence order. So it is necessary to guide the rules of using technology to students, especially in terms of writing rules. The use of ChatGPT opens access to flexible learning, then provides learning opportunities for students wherever they are even outside of school hours, and at the same time helps increase students' digital literacy. This is a key indicator in SDGs 4, namely quality education. Thus, schools, especially SMA N Kabila, need to consider the use of chatGPT technology in the learning process not only for students but also for teachers.

Bibliometric Analysis of Green Environmental Research in Higher Education: Trends and Future Directions

Mochamad Bruri Triyono[1], Arif Ainur Rafiq[2], Tinesa Fara Prihandini[1], and Candra Dinata[1]

[1]*Universitas Negeri Yogyakarta, Sleman, Indonesia*
[2]*Politeknik Negeri Cilacap, Cilacap, Indonesia*

[*]*Corresponding author: aar@pnc.ac.id*

Abstract: Higher education institutions (HEIs) play a crucial role in promoting sustainability by integrating eco-friendly practices, embedding sustainability into curricula, and conducting relevant research. This study aims to analyze green environmental research in Indonesian HEIs, identifying key trends, collaboration networks, and future research directions to enhance sustainability initiatives. This research method using bibliometric analysis, collect and analyze data with VOSviewer program. The search results showed that there were 922 documents relevant to the topic "Green Environmental Research in University". The program showed co-authorship, citation, and co-occurrence analysis for the results. From 2003 to 2023, the topic has undergone a drastic increase to be researched. China is at the forefront as the country with the most research on this topic. It was followed by Malaysia and Indonesia. Al-Qasim Green University contributes as the most productive institution in research related to green environment. The analysis shows that aspects such as energy, infrastructure, education, and environmental impact are interrelated. This research provides a view on the development of future research directions, especially for green environment in higher education. The changes and predictions of the trends found also contribute to the determination of more strategic policies in the future.

Optimizing The Quality of Higher Education with Artificial Intelligence

Moh Khoiruddin

Universitas Negeri Semarang, Semarang, Indonesia

Corresponding author: mohkhoiruddin@yahoo.co.id

Abstract: Advanced digital technologies such as artificial intelligence (AI) and analytics have increasing potential for scalable data processing and exploration operations, enabling the production of learning models that quickly adapt and are flexible to changes and needs. However, in reality, the world of higher education up to SAT still does not fully understand and utilize AI tools, even though the many benefits have been generated, to overcome the various academic and non-academic problems it faces. The aim of this research is to help resolve these various problems. The method the author uses is to search for and identify various AI tools that can be used in the development of higher education by searching the internet, opening pages of AI tool providers, surveying related literature published in the last five years, and observing the use of AI tools at a number of universities. The results obtained were 47 (forty seven) AI tools which were tabulated in a complete table with information on the AI tool name, access address, and short description. Apart from that, to find out the experience of implementing these AI tools, a brief review of a number of users of each AI tool is also included. The conclusion is that AI has the potential to transform higher education into higher quality, as it promises to improve teaching and research skills, student learning experiences, administrative tasks, and more. However, attention needs to be paid to key concerns regarding data privacy, job displacement, ethics, and authentic learning due to AI. This requires the responsible, ethical, and fair use of AI in higher education without sacrificing the humanistic perspective or pedagogical values of the institutional environment.

Science Learning Problems in Elementary School: Analysis of Student Science Literacy Skills

Ummu Khairiyah[1], Suryanti[2*], Wahono Widodo[2], and Pance Mariati[3]
[1]Universitas Islam Lamongan, Lamongan, Indonesia
[2]Universitas Negeri Surabaya, Surabaya, Indonesia
[3]Universitas Nahdlatul Ulama Surabaya, Surabaya, Indonesia
[*]Corresponding author: suryanti@unesa.ac.id

Abstract: This study aims to determine the science literacy skills of elementary school students in Lamongan sub-district who have implemented various learning models in science subjects. This research is survey research. Sampling was selected through stratified random sampling technique. The samples were four elementary schools in Lamongan district that have implemented the independent curriculum with a total sample of 108 grade 4 students. Students' science literacy skills were measured using 21 questions consisting of multiple-choice questions, short form, true-false, complex multiple choice, and matching which had previously been declared valid. The analysis was done with descriptive quantitative. The results showed that primary school students were able to explain scientific phenomena with an average score of 48.54; able to evaluate and design investigations with an average score of 45.96; and able to interpret data and evidence scientifically with an average score of 41.29. Overall, it can be concluded that students' science literacy skills in science learning are still very low. Inquiry, collaborative, and constructivist learning models need to be used by teachers in learning science and the need to integrate science literacy skills so that students can solve problems with science concepts

A Bibliometric Study of the Connection Between Systems Thinking and Science Education in Pharmacy

Meiry Akmara Dhina[1], Ida Kaniawati, Ade Gafar, and Lilik Hasanah
Universitas Pendidikan Indonesia, Bandung, Indonesia
[*]Corresponding author: meiryakmara@upi.edu

Abstract: This study addresses the need for pharmacists to develop secure patient care skills. Pharmacists improve patients' health through pharmaceutical services. Systems thinking ensures optimal treatment outcomes by systematically examining all patient needs. This study used bibliometrics to evaluate science education's role in "systems thinking" development. 328 SCOPUS articles were carefully chosen to cover the topic. The study tracked "science education" and "systems thinking" research from 1972 to 2022. VoSviewer and Bibliometric were used to examine publication and citation trends, keywords, significant authors and journals, and research foci. The most-cited journal was the Journal of Chemical Education. "Science education" and "systems thinking" research focused on "System theory," "Systems science," "decision making," "behavioral research," "Learning," "Problem solving," "human experiment," "public health," and "systems analysis." This study sheds light on how science education fosters "systems thinking" and lays the groundwork for future research. This research advances scientific education and guides future research.

Effectiveness of Environmentally Friendly Waste Management Program by Surabaya City Government through Waste Power Plant (PLTSa)

Neny Ayu Nourmanita*, Meirinawati, Eva Hany Fanida, Trenda Aktiva Oktariyanda, Deby Febrian Eprilianto, and Adam Jamal
Universitas Negeri Surabaya, Indonesia
Corresponding author: nenynourmanita@unesa.ac.id

Abstract: Surabaya as one of the major cities in Indonesia has experienced an increase in population from year to year. Surabaya Government since 2005 has made serious efforts to overcome the waste problem. The efforts made are waste handling programs by innovating environmentally friendly waste management through the Waste Power Plant (PLTSa) in Benowo. This effort was carried by the Surabaya Government in collaboration with other parties. The collaboration is done by converting waste into environmentally friendly electrical energy. The purpose of this research is to identify the effectiveness of the implementation of an environmentally friendly waste management program by the Surabaya government through the Waste Power Plant (PLTSa) for nine years operation. The results obtained by the effectiveness of the waste management program through PLTSa, viewed from the aspects of (1) effort, the government and the parties involved have made improvements to the PLTSa infrastructure which is increasingly adequate both in terms of physical infrastructure and in terms of increasing the capacity of the management workforce. (2) Cost Efficiency, it appears that the operation of PLTSa is relatively efficient compared to traditional waste management methods. (3) Results, waste deposited in landfills has decreased by 30% and PLTSa is able to produce 122.04 GWh (gigawatt-hours) of electricity. (4) Cost Effectiveness, the agency's ability to reduce operational costs so that the budget can be allocated to other needs that support the sustainability of the waste management program. (5) Impact, this program has succeeded in reducing soil pollution due to waste accumulation.

Material Waste Characterization and Evaluation: Case Study of Concrete Blocks and Tetrapods Production, for Yogyakarta International Airport Protection Project

Yuli Adiningsih[1] and Suwartanti Nayono[2*]

[1]*Department of Applied Civil Engineering, Faculty of Applied Science, Universitas Negeri Yogyakarta, Indonesia*

[2]*Department of Civil Engineering, Faculty of Engineering, Universitas Negeri Yogyakarta, Indonesia*

[*]*Corresponding author: suwartanti@uny.ac.id*

Abstract: This study aims to analyze the main type of material waste, the source, and the reasons behind material waste generation in the production process of concrete blocks and tetrapods. This research employs a case study approach to assess the current waste management practices at the production site of concrete blocks and tetrapods for Bogowonto river estuary protection, Yogyakarta International Airport project. Key factors examined as waste sources include design and planning, procurement, material handling, worker practices, construction management, leftover material management, site conditions, and external conditions. Questionnaires, deep interviews, and field observation were conducted to obtain the data. Data was handled using a Likert scale to evaluate responses through questionnaire given to the respondents. Respondents were given set of questions or statements and must choose the option that best corresponds with their perception about the statements or questions. Principal results indicate that a significant portion of material waste is due to improper material handling and inadequate planning. By analyzing these contributing factors, the study proposes methods to minimize waste, including better planning with software, improved procurement strategies, better site management, and enhanced training for workers. Major conclusions highlight that implementing systematic waste management strategies can significantly reduce material wastage, leading to cost savings and environmental benefits. The findings offer practical insights for construction managers and policymakers to improve waste management in similar infrastructure projects.

The Effectiveness Study of Interactive Multimedia with Macromedia Flash 8-Assisted Games Instructional Model to the Understanding of the Concepts and Scientific Attitudes of Elementary School Students

Yanti Fitria*, Ummiatul Fitri, Maghfirah Afifah, Zuryanty, and Nelly Astimar
Universitas Negeri Padang, Indonesia
Corresponding author: yanti_fitria@fip.unp.ac.id

Abstract: The goal of this research is to investigate how effective it is to improve elementary school students' understanding of concepts and scientific attitudes through the creation of interactive multimedia supported by the Macromedia Flash 8 application with the instructional game model. This study used a quantitative approach and sampled 25 students from one of the elementary schools in Payakumbuh. The approach includes a pre-test and post-test design with a single group of subjects. The data collected through tests that measure students' understanding of scientific concepts and perspectives before and after interactive multimedia interventions. For analyzed data using pairs of t tests and N-Gain scores to determine any significant improvement. The results of the study showed that the post-test score was better than the pre-test score. The average pre-test score was 59.36, while the post-test score was 74.20. With a p-value < 0.001, the pairs showed a t value of 22.05, which indicates a very significant increase. These interventions had a major and significant impact on students' understanding of scientific concepts and attitudes, as demonstrated by the N-Gain score of 0.65 and the measure of effect (Cohen's d) of 4.41. This study demonstrates that the Macromedia Flash 8 application's interactive multimedia can improve elementary school students' conceptual understanding and scientific attitudes. With this technology, students can choose from a variety of learning styles, making learning more interesting. However, its performance depends heavily on proper instructional design and adequate infrastructure support. Therefore, schools and teachers must work together to ensure successful and sustainable implementation. In the end, this will enable improved education quality and student learning outcomes.

Reducing Frame Weight Through Material Dimension Optimization: A Numerical Simulation Approach for Automatic Patient Beds

Agung Prijo Budijono[1,a)*], Susi Tri Umaroh [2,b)], Wahyu Dwi Kurniawan [3] ,Yuli Panca Asmara [4], Diastian Vinaya Wijanarko [5], Gibran Dzikri Nakhwa Rabbani [6]

[1,2,3,5,6] Universitas Negeri Surabaya, Surabaya, Indonesia

[4] INTI International University, Nilai, Negri Sembilan, Malaysia.

[*]Corresponding author: [a)]agungbudijono@unesa.ac.id ,

[b)]susiumaroh@unesa.ac.id

Abstract: Advancements in science and technology have led to rapid development, particularly in the healthcare sector. These developments include medical equipment and patient needs, such as patient beds designed to ease the workload of nurses. However, many hospital patient beds still use conventional steel materials, which are often too heavy for nurses to move patients easily. This study aims to evaluate the effectiveness of reducing the frame weight by analyzing stress distribution and safety factors in automatic patient bed frames. The approach used is a numerical method based on the Finite Element Method (FEM), with varying dimensions of hollow sections in the bed frames. The material tested is ASTM A36 hollow steel with dimensions of 30 x 30 mm, 25 x 25 mm, and 20 x 20 mm, and a load of 3000 N. Results indicate that the 20 x 20 mm hollow dimension is optimal, with a weight of 2.383 kg, reducing the frame weight by 34.4%. It is recommended to adopt the 20 x 20 mm hollow dimension for patient bed frames to balance weight reduction and structural integrity, enhancing nurse efficiency and patient care.

Dynamic Analysis of Athletes' Punch and Kick Strength Using Digital Sansak

Agung Prijo Budijono [1,a)], Susi Tri Umaroh [2,b)], Muamar Zainul Arif[3], Awang Firmansyah[4], Kritchapol Arsapakdee[5], Muchamad Arif Al Ardha[6]

[1,2,3,4,6] Universitas Negeri Surabaya, Surabaya, Indonesia.
[5]Kasetsart University, Kamphaeng Saen Campus, Thailand

[*]Corresponding author: [a)]agungbudijono@unesa.ac.id
[b)]susiumaroh@unesa.ac.id

Abstract: This research aims to analyze the dynamic strength of athletes' punches and kicks using digital sansak equipped with sensors. The objective is to optimize athlete training in sports that rely on striking power by providing detailed insights into the stress and deformation experienced by the digital sansak. The methodology involves a simulation study where dynamic loads of 150 and 700 psi are applied to the right-left and middle pads of the digital sansak. The results indicate that the stress values on each frame do not exceed their yield strength. Specifically, the lowest stress (0.002 to 0.0641 MPa) was observed on the right-left pad with a 150 psi impact, while the highest stress (0.01 to 0.308 MPa) was found on the middle pad with a 700 psi power punch. Deformation values also varied, with the maximum recorded deformation being 0.00067 mm for the center pad at 700 psi. These findings suggest that the digital sansak is a robust tool for measuring and analyzing the dynamic strength of punches and kicks, offering valuable data for improving athlete training programs. Further research is recommended to enhance the design and application of digital sansak in various sports disciplines.

EVALUATION OF THE IMPLEMENTATION OF WATER CONSERVATION (WAC) BASED ON GREENSHIP NEW BUILDING VERSION 1.2 IN AKSARA MARKET, MEDAN CITY, INDONESIA

Ernesto Silitonga[1, a)], Riando Rumapea[1, b)], Parlaungan Hutagaol[1, c)], Hamidun Batubara[1, d)], Dody Sibuae[2, e)]

[1]*Departement of Civil Engineering, State University of Medan, Indonesia*

[*]*Corresponding author:* [a)] ernestosilitonga@unimed.ac.id ,[b)]riandorumapea@gmail.com ,[c)] ernestosilitonga@unimed.ac.id ,[d)]riandorumapea@gmail.com ,[e)]riandorumapea@gmail.com

Abstract: Sustainable water management is one of the key elements of the Sustainable Development Goals (SDGs). In line with that, Indonesia has also implemented a target of 100 percent access to decent drinking water in Indonesia by 2020-2024 and 15 percent safe water. The increased use of clean water from groundwater causes a lot of negative impacts, so it requires water management efforts to avoid water crises, land degradation, or other impacts. One such effort is to apply the concept of green building with a focus on the aspects of optimal water conservation in building construction. The aim of this study is to analyze the accessibility of the Greenship New Building version 1.2 water conservation aspects to the rebuilding of the Field Character Market by using comparative methods and calculating the size of the investment required as well as the return on investment as recommendations for increased access to the water conservation aspects. The evaluation results obtained 17 points out of 21 points, or 80% of the total maximum points for water conservation aspects. From the assessment results, there is still potential to increase the points gained, namely the WAC Air Feature criterion 3, by utilizing all recycled grey water for the needs of the flushing system and cooling tower.

Designing Educational Tour Packages for Disaster Prone Destinations

Rini Andari[1, b)], Shandra Rama Panji Wulung[1, a)], Audy Putri Kikania[1, c)], Muhammad Anthesa Abdilah[1, d)]

[1]*Universitas Pendidikan Indonesia*

[*]*Corresponding author: [a)] wulung@upi.edu, [b)] riniandari@upi.edu ,[c)] audyputrikikania@upi.edu ,[d)] anthesa@upi.edu*

Abstract: The concepts of disaster education need to be balanced with the high risk of natural disasters in the North Bandung Areas as a tourism destination in order to promote sustainable development. This study aims to develop new forms of educational tourism for disaster-prone areas in order to promote destinations for sustainable tourism. This qualitative study in the North Bandung Areas focused particularly on the region around the Cimahi River. Interviews with stakeholders involved in the growth of tourism in the North Bandung region included representatives from the West Bandung Regency Tourism Office and managers of tourist attractions. While exploring tourist attractions, observations and documentation occur in order to determine their coordinates. To collect secondary data, literature, legal records, and earlier research were consulted. The data was then subjected to a content analysis and a qualitative descriptive analysis. Following an examination, six tourist destinations that are part of the geological diversity were identified and categorised as geotourism. A geotourism analysis has been performed on each tourist attraction that aims to inform visitors about disasters. Finding the coordinates of tourist attractions also helped create a geotourism route with the Cimahi Rivertrek concept. The Tangkubanparahu Volcano's disaster-prone location presents opportunities for the growth of new educational tourism along with issues. For managers of regional, national, and international destinations situated in disaster-prone locations, the introduction of geotourism as an entirely novel form of tourism has implications.

Genetic Engineering of Saccharomyces cerevisiae gsh1 and gex1 gene for increasing Glutathione Production Induced by Galactose

Dewi Mustikaningtyas[1,a)], Aditya Marianti[1,b)], Safira Chairani Dimarti[2,c)], Shahnas Millenia Safitri[1,d)], Maria Andini Oktaviana[1,e)], Lailatul Faris Rosyidah[1,f)]

[1]Biology Study Program, Faculty of Mathematics and Sciences,Universitas Negeri Semarang

[2]Public Health Study Program, Faculty of Medical, Universitas Negeri Semarang

[*]Corresponding author: [a)] dewi_mustikaningtyas@mail.unnes.ac.id , [b)] aditya.marianti.am@mail.unnes.ac.id , [c)] safira.chairani@mail.unnes.ac.id , [d)] shahnassafitri@students.unnes.ac.id , [e)] mariaandini27@students.unnes.ac.id

Abstract: Glutathione is made up of the three essential amino acids cysteine, glutamic acid, and glycine. Promising prospects to enhance GSH production can be realized by applying genetic engineering with Saccharomyces cerevisiae. The method involves the strategic integration of the gsh1 and gex1 genes, achieved via the pESC-TRP plasmid insertion. This study aimed to accomplish two main objectives: firstly, the analysis of Gsh1 and Gex1 protein detection results; and secondly, the assessment of GSH1 enzyme activity in S. cerevisiae W303-1b. The employed methodologies encompassed two distinct approaches: (1) The SDS-PAGE method facilitated the qualitative analysis of Gsh1 and Gex1 proteins in transformant strains; (2) The ELISA reader method was employed to evaluate GSH1 enzyme activity in both transformant and wild-type strains. The outcomes exhibited distinct profiles: the Gsh1 protein featured a molecular weight of 58 kDa, while the Gex1 protein displayed a molecular weight of 68.9 kDa. Notably, the transformant strain stimulated by galactose induction exhibited the highest GSH1 enzyme activity, as evident from the glutathione production levels reaching 104.478 mg/L. This heightened glutathione yield in the transformant strain was attributed to the successful insertion of the gsh1 and gex1 genes, effectively realizing their overexpression mechanism within the cellular.

CHARACTERISTICS OF HIV/AIDS PATIENTS IN NATIONAL HEALTH INSURANCE PARTICIPANTS IN FIRST-LEVEL HEALTH FACILITIES

Fitri Indrawati[1*], Rizqi Habiibah Rahmah[1]
[1]*Faculty of Medicine, Semarang State University, Indonesia*
[*]*Corresponding author:* fitri_indrawati@mail.unnes.ac.id

Abstract: The biggest public health problem in the world today is AIDS. This disease occurs in almost all countries in the world, including Indonesia. Even though the number of HIV/AIDS cases in Indonesia varies, data on HIV/AIDS cases in Indonesia is increasing from year to year. Age, gender, and marital status can be risk factors for transmitting HIV infection. The research aims to describe the characteristics of HIV/AIDS patients among NHI (National Health Insurance) participants in Indonesia. This research uses descriptive quantitative methods using secondary data from BPJS Health Sample Data for 2015-2021. The variables studied included participant characteristics (gender, age, marital status). The research results showed that age 18-45 years, male gender, and married marital status had the highest frequency of participants diagnosed with HIV/AIDS.

Characterization and molecular identification of isolate ES9.1 from breeding site of Aedes aegypti larvae as a biosurfactant-producing bacteria

Abstract: Bacillus is a genus of bacteria that can live in a variety of environments, so it has the ability to produce a variety of active metabolites, one of which is biosurfactants. Biosurfactants are amphipathic compounds that can reduce surface tension and form emulsion layers. The bacteria used in this study is Bacillus sp. ES9.1 which has been successfully isolated from the sediment of Aedes aegypti larvae. This study aims to characterize Bacillus sp. ES9.1 isolates macroscopically, microscopically through Gram staining and endospores, and identification of species names with the 16S rRNA gene, as well as to determine its potential in producing biosurfactant compounds. The results of macroscopic characteristics show that Bacillus sp. ES9.1 isolate has an irregular shape with a large size of about 3.2 cm, with flat elevations and undulate edges, and a whitish beige color. Microscopic characteristics of Bacillus sp. ES9.1 show long rod-shaped cells and are included in Gram positive, and have endospores located subterminally. The 16S rRNA gene detection results of Bacillus sp. ES9.1 isolates have 99.71% similarity with B. velezensis strain CBMB205 with a DNA band size of 1.393 bp. Isolate B. velezensis ES9.1 has a close relationship with B. siamensis KCTC 13613 and B. amyloliquefaciens strain MPA 1034. B. velezensis ES9.1 isolate was positive to produce biosurfactant with beta hemolysis type. The ability of B. velezensis ES9.1 isolate to produce biosurfactant can be developed and applied in various fields, such as agriculture, health, cosmetics, industry, and as a bioremediator agent in polluted environments.

A Physics-Based STEAM-Driven Approach to Sustainable Agriculture: Optimizing Hydroponic Systems with Solar Panels and Nutrient Detectors

Rizqy Hidayatullah[1,a)], Yuslikha Al Mudhotin[1,b)], Fitria Salsabilla[1,c)], Nadi Suprapto[1,d)], Eko Hariyono[1,e)] Putri Lintang Utami[1,f)]

[1]*Department of Physics, Faculty of Mathematics and Natural Science, Universitas Negeri Surabaya, Indonesia*

[*]*Corresponding author:* [a)]rizqy.22093@mhs.unesa.ac.id , [b)]yuslikha.22066@mhs.unesa.ac.id, [c)]fitria.22068@mhs.unesa.ac.id , [d)] nadisuprapto@unesa.ac.id , [e)]ekohariyono@unesa.ac.id , [f)]putrilintang.21012@mhs.unesa.ac.id

Abstract: Hydroponics is a plant cultivation method that uses water media with dissolved nutrients. It is one of the solutions for farming on limited land. One system widely used in hydroponic farming is the Nutrient Film Technique (NFT) model. Solar panels provide an ideal solution by utilizing abundant solar energy to run sensors and other monitoring systems. Based on the problems or challenges commonly faced in this NFT model hydroponic system, a solar panel-powered hydroponic system design equipped with a nutrient control sensor was developed. The research method is designing and developing solar-powered hydroponics with a nutrient control system. The nutrient sensor is the TDS Meter, assisted by Arduino IDE software. The PPM level needed for lettuce plants is 560-840 PPM. When the plant nutrients are >560 PPM, the buzzer will sound; when the plant nutrients are following what is needed, the buzzer will turn off, and if the plant nutrients exceed the maximum limit, the buzzer will sound louder than the first situation. On the TDS meter sensor side, a sensor is obtained following the concentration of nutrients given to plants as measured using PPM (Parts Per Million) units on the TDS sensor.

The Developing Character Education on Local Wisdom "Tut Wuri Handayani" in Physics

Abstract: Character education is an important concept in developing individuals to become quality and ethical human beings. Character education in physics learning plays a central role in forming students not only as competent scientists, but also as individuals who have superior and responsible personalities. In this context, Tut Wuri Handayani's local wisdom is an important foundation for designing a learning approach that is holistic and rooted in local cultural values. Therefore, this article was written with the aim of building character education in the learning process in the field of physics. This research uses a literature review method, where the literature review method collects data from reviewing articles and journals online. Then, from the journals or online articles, those that are relevant to the title of this scientific article are selected and the contents of the journal or article are reviewed. From the results of data collection in this article, it can be concluded that with the term Tut Wuri Handayani, the teacher's role in the teaching and learning process is emphasized. Where, teachers have the role of bridging parents and students to monitor student progress in the learning process. Therefore, it is very important to shape the character, morals and ethics of students in learning physics through the various tasks given.

Physics Learning Innovation Using Project Based Learning Model Assisted with Augmented Reality to Improve Creativity and Critical Thinking Ability in the Era of Society 5.0

Achmad Lutfi Ardiansyah[1,a)], Nurul Muawiyah[1,b)], Nadi Suprapto[1,c)], Nurita Apridiana Lestari[1,d)], Hasan Nuurul Hidaayatullaah[1,e)]

[1]*Faculty of Mathematics and Natural Science, State University of Surabaya, 60231 Surabaya, Indonesia*

[*]*Corresponding author:* [a)] achmad.22059@mhs.unesa.ac.id ,[b)] nurul.22097@mhs.unesa.ac.id ,[c)] nadisuprapto@unesa.ac.id ,[d)] nuritalestari@unesa.ac.id ,[e)] hasannuurulh@gmail.com

Abstract: Physics education is a basic education that is universal but often becomes a scourge for students. Complicated concepts and formulas are often an obstacle in learning physics in class. Efforts continue to be made to make it easier for students to receive material, one of which is changing the learning model to be project-based. Project Based Learning continues to be developed as an alternative for students to easily understand physics. Not only that, PjBL provides a valuable experience by providing project tasks that can train students' soft skills. With the rapid development of the times, the need for cyber networks is very helpful for humans. By combining the PjBL learning model with Augmented Reality (AR) is considered capable and innovative in learning physics. The system is not limited to space and time so that it can be accessed wherever and whenever students are. This study aims to analyze the use of Augmented Reality in learning Physics with the Project Based Learning model. Through the application of the AR-assisted Project Based Learning model that we use the method through literature review from several articles, we can conclude that there are many positive and interesting impressions from students, teachers, and various other groups. AR gives us an idea that science and technology can always work together in making new useful innovations. With the help of AR, students will be involved in interesting relevant projects which are certainly still connected to physics learning. Even AR has an effect on students to gain high motivation when learning. In the future, AR can be further developed to help learning in the classroom both for other subjects or outside of it.

FUSAN: A physics-based STEAM Innovation in Sustainable Fish Detection with Ultrasonic Sensors and Automatic Nets

Fina Ferlinda, Shofiya Nur Abida, Nurul Muawiyah, Nadi Suprapto*, Eko Hariyono, Hasan Nuurul Hidaayatullaah, Putri Lintang Utami
Universitas Negeri Surabaya, Surabaya, Indonesia
**Corresponding author: nadisuprapto@unesa.ac.id*

Abstract: This research created an innovative tool called FUSAN (Fish Detection with Ultrasonic Sensors and Automatic Nets) aimed at helping fishermen detect and catch fish efficiently. This tool was developed in response to the problem of declining fishing due to climate change and detrimental human activities. FUSAN uses an HC-SR04 ultrasonic sensor connected to an Arduino Uno and an ultrasonic sensor to detect the presence of fish below the water surface. When a fish is detected, it is indicated by an illuminated buzzer, the net switch can be activated so that the net is attracted to the surface. The test method was carried out in a simulated environment utilizing a bathup, where the success of fish detection and automatic net operation was evaluated. The research results show that FUSAN is effective in detecting fish and helps increase fishing efficiency. It is hoped that this tool can be a sustainable solution for fishermen in facing complex environmental and economic challenges in the future.

Physic-Chemical Characterization and Microstructure of Improved Soil by Soybean Crude Urease Calcite Precipitation: A Review

Pradyta Galuh Oktafiani[1, a)], Abdul Malik[2], Elviana[3)], Heriansyah Putra[4)], Erizal[5)]
[1,2,3] *Department of Aplied Civil Engineering, Yogyakarta State University, Yogyakarta 55281, Indonesia*
[4,5] *Department of Civil and Environmental Engineering, IPB University, Bogor 16680, Indonesia.*
[*]*Corresponding author:* [a)]*pradytagaluh@uny.ac.id*

Abstract: The strength of soil depends on its physical and mechanical properties. Before construction is carried out, the soil is first given treatment according to its soil characteristics. In some soils that have low-strength characteristics, soil improvement is required. This soil improvement aims to increase the strength of soil mechanical properties. A soil with a small shear strength and cohesion value is necessary to improve the bond of soil grains. One way that can be done is by adding additional materials that will form calcite in the soil so as to increase soil strength. The method is called Enzyme-Induced Calcite Precipitation or EICP. There is a similar method that replaces enzymes that are still relatively expensive by using materials that are more easily found and economical, namely with soybean biocatalysts or the method we call Soybean Crude Urease Calcite Precipitation or SCU-CP. The soybean itself was initially used because of its potential as a biocatalyst, which has an enzyme reaction rate of up to 104 U/g. The present study aims to re-examine the behavior of soybean crude urease calcite precipitation, and its reaction mechanism based on the detailed physic-chemical and micro-analytical investigation. High urea hydrolysis will result in high calcite formation as well because the more urea is broken down, the more calcite is formed. Another influencing factor is the bio-catalyst solution; if the solution has a large concentration of organic substances, it will form less calcite because these organic substances inhibit the formation of calcite and bonds between ions.

Integrating Technology in Physics Learning: Innovation in Physics Education in the Society 5.0

Tasya Setya Nia Wati, Anisya' Destiara Pangesti, Nadi Suprapto*, Nurita Apridiana Lestari, and Hasan Nuurul Hidaayatullaah

Universitas Negeri Surabaya, Surabaya, Indonesia

**Corresponding author: nadisuprapto@unesa.ac.id*

Abstract: The paper entitled Integrating technology in Physics Learning: Innovation in Physics Education in the Society 5.0 Era was created to analyze why technology must be applied in physics learning in the Society 5.0 era, to analyze what forms of technological innovation in physics education are. This paper was created by means of a literature review where we collected journals related to the paper topic. After the relevant journals had been collected, we carried out an evaluation of these journals to determine their relevance to the research topic. After the journals are selected, a synthesis of the relevant journals is then carried out to find findings or conclusions related to innovation in physics education. From the synthesis results, the review results were written in the form of this article. Physics education is faced with a great challenge to integrate technology in learning, especially in the era of Society 5.0 which is dominated by information technology and artificial intelligence. This article reviews innovative strategies in integrating technology in physics learning, with a focus on improving students' concept understanding. Physics teachers are required to change their roles from information deliverers to learning facilitators, using various technological tools such as simulations, interactive multimedia, and online platforms. Technology-based learning not only allows students to visualize complex physics concepts, but also encourages active learning, collaboration, and the development of 4C skills (Communication, Collaboration, Critical Thinking, Creativity). the integration of technology in physics learning is not only a necessity, but also a key step to prepare future generations to face challenges and opportunities in an increasingly connected and technologically sophisticated world.

ICT in Science Education based-on Virtual Reality to Improve Pre-Service Teacher Teaching Skills in Junior High School

Cecep Kustandi[1, a)], Aan Wasan[2,b)], Durotul Yatimah[3,c)]

[1]*Department of Educational Technology Study Program, Universitas Negeri Jakarta, Jakarta, Indonesia*
[2]*Department of Recreational Sports, Universitas Negeri Jakarta, Jakarta, Indonesia*
[3]*Department of Public Education, Universitas Negeri Jakarta, Jakarta, Indonesia*

[*]*Corresponding author:* [a)] cecep_kustandi@unj.ac.id , [b)]aanwasan@unj.ac.id ,[c)]durotulyatimah-pls@unj.ac.id

Abstract: Today's educational institutions must be ready to face the growing technological advances. Universities that have education study programmes have challenges in developing ICT as a learning process given to students who will become pre-service teachers. This research aims to develop virtual reality-based ICT to improve the teaching skills of pre-service teachers in science education. This research method uses the Borg and Gall development model, namely the Steps of Systems Approach Model of Education Research and Development. The results of this study showed that 83.75% of the average pre-service teacher rated well the virtual reality developed. Thus, this virtual reality product is considered suitable for use. Thus, this study has implications for pre-service teachers in improving their pedagogic and professional competence in schools.

Syntesis of Nanosized MOF-253 and Its Purification by Methanol Soxhlet Extraction and Its Photoluminescence Properties after Eu^{3+} Modification

Arif Rahman[1,4*], Aep Patah[2*], Dikhi Firmansyah[3], Djulia Onggo[2]

[1] Student of Program Pascasarjana Kimia, Gd. Kimia Baru, Bandung, Indonesia

[2] KK Kimia Fisik dan Anorganik Kimia ITB, Gd. Kimia Baru, Bandung, Indonesia

[3] KK Kimia Organik, Kimia ITB, Gd. Kimia Baru, Bandung, Indonesia

[4]Department of Chemistry, Faculty of Science and Mathematics, Universitas Negeri Jakarta, Indonesia

[*]Corresponding author: arifrahman@unj.ac.id

Abstract: Metal-organic frameworks (MOF) are a new class of materials resulting from the arrangement of metal ions and linker ligands to form 3D structures that offer broad application potential. MOF 253 [Al(OH)(BPyDC); BPyDC = 2,2′-bipyridine-5,5′-dicarboxylate] nanometer-sized with a flat, elongated, and sharp sheet morphology has been successfully synthesized using the solvothermal technique. Observation of the FTIR spectroscopy of the synthesized MOF 253 provides information on the bond formation of the carboxylate group in the BPyDC ligand with the Al3+ central ion. Meanwhile, measurements using X-ray diffraction confirmed the formation of the MOF 253 structure from the precursor, amorphous phase, and the remaining BPyDC ligand reactants. Therefore, the soxhlet extraction technique with methanol solvent was used to extract the remaining BPyDC ligand from the reaction, and X-ray diffraction measurements of MOF 253 confirmed the results after soxhlet extraction. MOF 253 is produced with high purity and is ready to be used for further applications in photoluminescence applications.

STEM-Based Learning: The Use of IV-GLOW Media to Enhance Students' Understanding of Global Warming

Rosikhotul Ilmi
Universitas Negeri Surabaya, Surabaya, Indonesia
Corresponding author: rosikhotulilmi.20015@mhs.unesa.ac.id

Abstract: Technology development is essential in developing learning innovations, especially multimedia-based learning media. The use of learning media can play a role in increasing students' mastery of concepts. A common problem in students is the need for more ability to understand concepts due to boring learning methods and less attractive learning media. So,innovation is needed to develop learning media and more innovative learning methods. This study aims to determine the influence of IV-GLOW (Interactive Video of Global Warming) media use with the Think Pair Share (TPS) type cooperative learning model on students' mastery of concepts. The basis of this study is linked closely to the STEM-based Learning model strategy. This study applied a correlational study method to determine the relationship level between IV-GLOW media use and comprehension of Global Warming concepts. This study uses a quasi-experimental design type with One-Group Pretest-Posttest Design. The population is all class X students at SMA Darul Ulum 1 Unggulan Jombang. Sampling uses a purposive sampling technique consisting of two classes, namely X-11 and X-12. Class X-12 is used as a replication class to ensure the research results' consistency. Concept mastery data was obtained through written tests in essays at the beginning and end of learning. The results of the hypothesis test analysis showed that IV-GLOW learning media influenced students' mastery of concepts in understanding global warming material. The results of the study showed that there was an increase in students' mastery of concepts after learning using IV-GLOW media with the medium category.

Innovation of Antiseptic Floor Cleaning from Squeezed Orange Peel Waste eco-enzyme (Citrus X sinensis L.) and Pineapple (Ananas comosus L.) towards Indonesia Zero Waste

Shelma Ainun Narita[1)], Shofia Nur Kumalasari[1)], Amelia Sherina Widya Permata[2)], Nafisatuz Zakiyah[1)], Zuhaira Shafnahriyah[1)], Yoga Mahendra Ramanda Putra[1)], Andika Pramudya Wardana[1, a)]

[1]Chemistry, Surabaya State University, Jl. Ketintang, Surabaya, 60231, Indonesia
[2] Physics, Surabaya State University, Jl. Ketintang, Surabaya, 60231, Indonesia
[*]Corresponding author: andikawardana@unesa.ac.id

Abstract: Potential of organic waste in the public has not been properly utilized and even of it is still thrown away. Waste that is thrown into the environment can be a bad problem, even the waste tends to still have the potential to be used. Organic waste is waste that comes from household waste that can be processed into eco-enzyme. eco-enzyme itself is one of the implementations of 3R (Reduce, Reuse, Recycle) waste processing by utilizing the enzyme content from organic waste. Organic waste processing is carried out by utilizing organic waste such as food scraps, leaves, fruit peels and others which can reduce the accumulation of waste. There are various ways to process organic waste, including being used as compost, eco-enzyme, etc. In this study, the use of squeezed orange peel and pineapple waste from fruit juice traders will be processed into eco-enzyme and produce antiseptic floor cleaning liquid. This floor cleaning liquid product will be market at a more affordable price because it uses environmentally friendly materials. In addition, this eco-enzyme-based floor cleaner can reduce the use of chemicals.

Green Synthesis Photocatalyst TiO_2 Nanoparticles Using Leaf Extract (Averrhoa Blimbi L.) to Degradate Methylene Blue Dyes

Dina Kartika Maharani* and Firstania Diah Cahyani Putri
Universitas Negeri Surabaya, Surabaya, Indonesia
**Corresponding author: maharanidinakartika@gmail.com*

Abstract: TiO2 nanoparticles were successfully synthesized using starfruit leaf extract (Averrhoa blimbli L.) as a stabilizer or capping agent. The aim of this research is to characterize TiO_2 nanoparticles and investigate their application as a photocatalyst. Characterization was carried out using Fourier-Transform Infrared Spectroscopy (FT-IR), X-Ray Diffraction (XRD), Particle Size Analyzer (PSA). The XRD pattern obtained by the formation of the anatase TiO_2 phase in TiO_2 nanoparticles showed high crystallinity with a crystal size of 66.07 nm and a crystallinity level of 99.08%. FTIR characterization results show the presence of OH-, Ti-OH stretching, and Ti-O groups. The PSA results show that TiO^2 nanoparticles have an average size of 4 nm which is included in the nanoparticle category (1-100 nm). The photodegradation test for methylene blue dye showed that the optimum time was 120 minutes with a degradation percentage of 97.24%, the optimum mass result was 50 mg with a degradation percentage of 96.66%, and the optimum concentration of the dye obtained was 3 ppm at 98.03%.

The Relationship between Water Quality and Proper Sanitation to the Incidence of Diarrhea among Children Under Five in Surabaya City 2019-2022

Nastiti Aryudaningrum[1a)], Qatrunnada Naqiyyah Khusmitha[1b)], Meylani Zakaria[1c)]
[1]*Faculty of Medicine, Universitas Negeri Surabaya, Indonesia*
[*]*Corresponding author:* [a)] nastitiaryudaningrum@unesa.ac.id
,[b)]qatrunnadakhusmitha@unesa.ac.id ,[c)]meylanizakaria@unesa.ac.id

Abstract: Diarrhea is when the stool becomes more fluid, and the frequency of bowel movements increases. Diarrhea is caused by bacterial, viral, and parasitic infections, especially rotavirus and Escherichia Coli bacteria. Sustainable Development Goal 6 (SDG-6) aims to achieve universal and equitable access to all drinking water, sanitation and hygiene by 2030. This study aims to analyze the relationship between water quality and access to proper sanitation and the incidence of diarrhea in Surabaya City children under five years of age in 2019-2022. Method: This type of research is analytically observational with a cross-sectional study design. The data used in this study are secondary data obtained from the Surabaya City Health Profile Report 2019-2022 and Surabaya City Water Quality Index data 2019-2022. The data analysis used was descriptive, ANOVA, correlation, and regression analysis. Result: The water quality index in Surabaya in 2019-2024 is in the medium category. The average number of cases of diarrhea in children under five in Surabaya from 2019 to 2022 was 1140.5, 1130.6, 1132.4, and 1140.9 cases. Conclusion: Water quality, which can affect sanitation, is one of the contributors to the incidence of diarrhea in Surabaya. However, several other factors cause diarrhea in toddlers, such as diarrhea pathogens (viruses, bacteria, and protozoa), WASH, nutritional status, education and parental age. Keywords: Water Quality Index; Sanitation; Diarrhea in children under five.

Characterization Analysis of Active Compounds in Essential Oils as Mosquito Repellents Agents

Mohammad Adam Mustapa [1], Widy Susanti Abdulkadir[2], La Ode Aman [3], Hamsidar Hasan [4] , Muhamad Taupik [5], A. Mu'thi Andy Suryadi [6], Andi Makkulawu[7],Mohamad Aprianto Paneo [8]

[1]Department of Biological Pharmacy, Faculty of Sports and Health, Gorontalo State University, Gorontalo 96211, Indonesia; mohmustapa@ung.ac.id
[2]Department of Pharmacology, Faculty of Sports and Health, Gorontalo State University, Gorontalo 96211, Indonesia; widi@ung.ac.id
[3]Department of Pharmaceutical Analysis and Medicinal Chemistry, Faculty of Sports and Health, Gorontalo State University, Gorontalo 96211, Indonesia; laode_aman@ung.ac.id
[4]Department of Biological Pharmacy, Faculty of Sports and Health, Gorontalo State University, Gorontalo 96211, Indonesia; hamsidar.hasan@ung.ac.id
[5]Department of Pharmaceutical Analysis and Medicinal Chemistry, Faculty of Sports and Health, Gorontalo State University, Gorontalo 96211, Indonesia; muhtaupik@ung.ac.id
[6]Department of Pharmaceutical Analysis and Medicinal Chemistry, Faculty of Sports and Health, Gorontalo State University, Gorontalo 96211, Indonesia; a.muthi@ung.ac.id
[7]Department of Community Pharmacy, Faculty of Sports and Health, Gorontalo State University, Gorontalo 96211, Gorontalo 96211, Indonesia; Kulawu9877@ung.ac.id
[8]Department of Pharmaceutical, Faculty of Sports and Health, Gorontalo State University, Gorontalo 96211, Indonesia; apriyanto07@ung.ac.id
[*]Corresponding author: mohmustapa@ung.ac.id

Abstract: This research serves as the basis for developing a repellent activity test based on essential oil against Aedes aegypti mosquitoes. The method used for essential oil isolation is steam distillation. Aedes aegypti mosquitoes free from viruses were used as test animals by applying 10% essential oil to the volunteer's arm. Analysis of essential oil activity and aroma components was conducted using GC-MS method. Based on the results, the yield of essential oil from 5000 g of samples of patchouli, lemongrass, and citronella was 2.2%, 0.9%, and 1.4%, respectively. The activity test showed that the average repellent power of 10% essential oil, patchouli, lemongrass, and citronella was 95.2%, 71.4%, and 71.4%, respectively. Patchouli exhibited the best average repellent power. Meanwhile, aroma activity showed that the average repellent power of patchouli essential oil was 96%. From the GC-MS analysis, nine aroma components of patchouli essential oil were identified, with the highest concentrations being patchouli alcohol (42.7%), Azulene, 1,2,3,5,6,7,8,8a-octahydro- 1,4-dimethyl-7-(1-methylethenyl)-, [1S-(1α,7α,8aβ)] (10.8%), α-guaiene (9.22%), and seychellene (8.19%). The main components of lemongrass were 14.61% 3,5,5-Trimethylhexanol, 15.94% citronellal, 23.22% α-Terpineol, and the main components of citronella were neral 24.6%, citral 18.7%, geranyl acetate 12.4%, geranial 12.3%, and 7.5% limonene. It can be concluded that the chemical compounds contained in patchouli, citronella, and lemongrass herbs have the potential to become environmentally friendly repellents in controlling and preventing Aedes aegypti mosquitoes.

Development 4-Tier Diagnostic Fluid Static Test (4T-DFST) to Identify Profile Student's Conception

O Saputra[1*], Hermanto I M[4], Safitri A I[1], Putra H T[1], Nadzirin A[1], Rosmiati[2], and Lusiyanti D[3]

[1*]*Physics Education on study program, Universitas Negeri Surabaya, Surabaya*
[2]*PGSD on study program, Universitas Negeri Surabaya, Surabaya*
[3]*Mathematic on study program, Universitas Tadulako, Palu*
[4]*Physics Education on study program, Universitas Negeri Gorontalo, Gorontalo*
[*]*Corresponding author: okasaputra@unesa.ac.id*

Abstract: Conceptions held by students sometimes have differences with physicists, so teachers need to carry out detection in planning learning to minimize existing differences in conceptions. This study aimed to develop a 4-Tier Diagnostic Fluid Static Test (4T-DFST) instrument and identify students' conceptual profiles on static fluid material. This type of research is Research and Development (R&D) with the ADDIE model (Analyze, Design, Development, Implementation, and Evaluation). In general, the four-tier diagnostic test format consists of four levels. Based on the validity and reliability tests, the instruments' results were valid and reliable. The validity and reliability results obtained based on calculations are 0.60 and 0.79. Based on the results of expert validation and calculations that have been carried out, the 4T-DFST that has been developed is feasible to implement. This research is updated, namely developing a 4-Tier Diagnostic Test instrument focusing on static fluid material. This is because, in previous research, the developed 4-Tier instrument only focused on mechanics material and only briefly discussed static fluid material.

Protein profile of indigenous Pseudomonas aeruginosa isolated from Sukolilo river and its copper accumulation-biosorption

Wahyu Irawati[1,a)], Andreas Valiant Suhartono[2,b)], Reinhard Pinontoan[2,c)], Triwibowo Yuwono[3,d)]

[1]Department of Biology Education, Faculty of Education, Universitas Pelita Harapan, Tangerang 15811, Indonesia
[2]Department of Biology, Faculty of Science and Technology, Universitas Pelita Harapan, Tangerang 15811, Indonesia
[3]Department of Agricultural Microbiology, Faculty of Agriculture, Universitas Gadjah Mada, Special Region of Yogyakarta 55281, Indonesia
[*]Corresponding author: [a)] wahyu.irawati@uph.com ,[b)] andreas.suhartono18@gmail.com ,[c)] reinhard.pinontoan@uph.edu ,[d)] triwibowo_y@faperta.ugm.ac.id

Abstract: Pseudomonas aeruginosa D2 is a copper-resistant bacterium isolated from Sukolilo river in Indonesia. Copper-resistant bacteria are known to accumulate copper inside the cell to adapt to copper-contaminated environment. Periplasmic and membrane proteins, for example CusA, CopB, and other proteins related to a family of Cop and Cus protein are known for regulating copper by accumulation and biosorption. The purpose of this research was to investigate the accumulation and biosorption abilities of Pseudomonas aeruginosa D2 and to conduct a protein profiling to identify specific proteins involved in copper stress response. The results showed that the Minimum Inhibitory Concentration (MIC) of Pseudomonas aeruginosa D2 was 12 mM CuSO4, and it exhibited the longest lag phase of around 20 hours. However, it demonstrated a low Colony Forming Unit (CFU) count due to the high toxicity associated with 12 mM CuSO4. The bacterium accumulated copper up to a level of 262.25 mg/g cell dry weight and exhibited a biosorption ability of up to 69.42% when supplemented with 6 mM CuSO4. The protein profiles showed three interesting putative proteins, suggesting the presence of CusA, Copper Amine Oxidase (CAO), and CopB.

Potential of Carica Dieng (Carica Pubescens) Seed Extract as Bioreductor in the Synthesis of Copper Nanoparticles

Suyatno Sutoyo[1a)], Andika Pramudya Wardana[1b)], Leny Yuanita[1c)], Fifin Setiani[1d)]
[1]Department of Chemistry, Faculty of Mathematics and Natural Sciences, Jl. Kampus Unesa Ketintang, State University of Surabaya, Surabaya, Indonesia
[*]Corresponding author: [a)] suyatno@unesa.ac.id
[b)]andikawardana@unesa.ac.id,[c)]lenyyuanita@unesa.ac.id ,[d)]ffnsetiani@gmail.com

Abstract: Copper nanoparticles (CuNPs) can be synthesized using bioreductor from plant extracts containing phenolic compounds. This research aims to study the potential of Carica Dieng (Carica pubescens) seed extract as a bioreductor for the synthesis of copper nanoparticles. CuNPs was synthesized by reducing copper (II) sulfate solution with water extract from *C. pubescens* seeds, using a volume ratio of 1:3 at pH 10. Characterization of CuNPs was carried out using a UV-Vis spectrophotometer, FTIR spectrophotometer, and Particle Size Analyzer (PSA). The results showed that the synthesized copper nanoparticles had a maximum UV-Vis absorption wavelength of 535 nm. The IR spectrum showed the presence of OH groups (3278.4 cm-1), carbonyl (1651.4 cm-1), aromatic C=C (1541.0 cm-1) and Cu2O (616.4 cm-1). The PSA measurement results showed an average particle size of 14.49 nm with a Poly Dispersity Index (PDI) value of 0.1943.

Stroke prevalence among isolated systolic hypertension subjects in Indonesia

Defi Pamelasari[1] , Mahalul Azam[1]* , Arulita Ika Fibriana[1] ,Arief Rahadian[1] , Muhamad Zakki Saefurrohim[2] , Syed Mohamed Aljunid[3]

[1]Department of Public Health, Faculty of Sports Science, Universitas Negeri Semarang, Semarang, Indonesia

[2]Master Program in Public Health, Post Graduate Program, Universitas Negeri Semarang, Semarang, Indonesia

[3]Department of Health Policy and Management, Faculty of Public Health, Kuwait University, Kuwait

[*]Corresponding author: mahalul.azam@mail.unnes.ac.id

Abstract: Hypertension is one of the major risk factors for stroke. Isolated systolic hypertension (ISH) is a common subtype of hypertension in the elderly. Yet, studies of stroke risk factors in subjects with ISH in Indonesia are limited. This cross-sectional survey was conducted using RISKESDAS 2018 database. We used subject criteria of those aged ≥55 years who had a systolic blood pressure ≥140 mmHg and diastolic <90 mmHg. All study variables were measured using household and individual questionnaires. The data were analyzed using the chi-square test and Fisher's test. We found that out of 3159 subjects with ISH, 8.3% had been diagnose with stroke, the risk factors that had a significant relationship with the prevalence of stroke ($p<0.005$) were gender (prevalence ratio (PR): 1,790; 1,420-2,256), smoking habits (PR: 1,645; 1,291-2,096), physical and mental stress (PR: 2,080; 1,618-2,673), residential area (PR: 1,720; 1,331-2,222), and education level (PR: 0.656; 0.515-0.835). Prevalence of stroke among ISH in Indonesia was 8.3%. Female smoking habits, mental and physical stress, living in an urban area, and low-level education were associated with the incidence of stroke in subjects with ISH in Indonesia

Enhancing 21st Century Skills with Numeracy Literacy in Physics Learning: Findings and Bibliometric Analysis

Titin Sunarti[1, a)] , Wasis[2, a)], Mukhayyarotin Niswati Rodliyatul Jauhariyah[3, a)], Abu Zainudin[4, a)], Fajriatul Mufarriha Sunni[5, a)], Irgy Redityo Dawana[6, a)], and Ladika Zuhrotul Wardi[7, a)]

[1]*Faculty of Mathematics and Natural Science, State University of Surabaya, 60231 Surabaya, Indonesia*

[*]*Corresponding author: titinsunarti@unesa.ac.id*

Abstract: Educational reform and current pedagogical strategies emphasize the importance of enhancing numeracy literacy to prepare students for the challenges posed by modern scientific and technological advancements in the 21st century. This research aims to explore the trends in the use of numeracy literacy in physics education through bibliometric analysis in an effort to improve 21st-century skills. The literature review and Meta-Analyses (PRISMA) method was used in this study, combined with bibliometric analysis using the Scopus database. The findings show that research on numeracy literacy in physics learning has increased significantly over the last 10 years. The most common document type is conference papers, with the majority of sources coming from conference proceedings, and the most publications contributed by Indonesia. The results of this study provide a broad overview of the importance of integrating numeracy literacy into physics education. The mapping results also show that the integration of numeracy literacy in physics education contributes to the enhancement of 21st-century skills, as numeracy literacy is closely related to 21st-century competencies. Future research opportunities highlight numeracy literacy for various fields of science and its implementation in improving 21st-century skills.

Synthesis and Characterization of ZnO/rGO Nanocomposites from Palm Shell Waste as Photocatalyst Materials for Degradation Methylene Blue

Poppy Anggara Kasih[1)], Nuhaa Faaizatunnisa[2)], Munasir[1,a)]

[1]Departement of Physics, Faculty of Mathematics and Natural Sciences, Surabaya State University (Unesa), Surabaya 60231, Indonesia
[2]Department of Chemistry, Faculty of Science and Data Analytics, Institut Teknologi Sepuluh Nopember (ITS),
Surabaya 60111, Indonesia
[*]Corresponding author: munasir.physics@unesa.ac.id

Abstract: Clean water and adequate sanitation are fundamental human needs (SDGs-6). Semiconductors such as ZnO nanoparticles have become a highly developing research topic due to their broad applications. One of their applications is as a photocatalyst for the treatment of textile waste. The addition of activated carbon derived from palm shell can enhance the efficiency of photocatalysis, facilitate more efficient electron transfer, and increase the number of charges available for the oxidation reaction of toxic dyes in textile waste. Therefore, this research aims to analyze the characteristics of ZnO/rGO nanocomposites synthesized through the in-situ hydrothermal method, and (2) analyze the percentage degradation value of methylene blue dye in the photocatalytic activity achieved by ZnO/rGO under UV light. ZnO/rGO nanocomposites were synthesized using the in-situ hydrothermal method by utilizing palm shell waste as a precursor for graphene oxide (GO. The research results showed that in the ZnO/rGO nanocomposites, no rGO peak was observed in the XRD results due to the disruption of rGO stacking with the insertion of ZnO nanoparticles. The nanocomposites had a hexagonal wurtzite crystal structure, an average grain size of 89.63 nm, the mass variation of the nanocomposites influenced the photodegradation of the dye. It was found that a 5% mass variation of ZnO/rGO had a degradation percentage of 98%, while a 10% mass variation had a degradation percentage of 99% after 60 minutes of UV irradiation.

Potential of Carica Papaya Leaves as a Reducing Agent in Green Synthesis of TiO2 NPs and Performance of TiO2 NPs to Methylene Blue Degradation

Dilla Amalia[1, a)], Nugrahani Primary Putri [1, b)], Diah Hari Kusumawati [1, c)], Evi Suaebah [1, d)]

[1]*Departement of Physics, Faculty of Mathematics and Nature Science, Universitas Negeri Surabaya, 60231 Surabaya, Indonesia*

[*]*Corresponding author: [a)]dilla.21053@mhs.unesa.ac.id ,[b)]nugrahaniprimary@unesa.ac.id ,[c)]diahkusumawati@unesa.ac.id ,[d)]evisuaebah@unesa.ac.id*

Abstract: The potential of TiO_2 in photocatalysis has been widely explored due to its stable nature and high efficiency in pollutant degradation. TiO_2 is known to have a suitable band gap for UV absorption, making it ideal for photocatalytic applications. In this study, green synthesis of anatase TiO_2 NPs was carried out using Carica papaya L. extract as a reducing agent. XRD characterization confirmed that the resulting TiO_2 had an anatase phase with an average crystallite size of 16.46 nm. The UV-Vis spectrum showed a plasmon peak at 314 nm and a band gap energy (Eg) of 2.78 eV. Photocatalysis under UV light revealed that TiO_2 nanoparticles effectively degraded methylene blue (MB), with the degradation efficiency increasing with increasing catalyst dosage. Adding 10 mg and 100 mg of TiO_2 NPs resulted in methylene blue degradation efficiencies of 82.58% and 85.97%, respectively. The results of this study indicate that TiO_2 NPs synthesized via the green synthesis method not only enhance the progress in green photocatalyst technology but also offer significant potential in environmental applications.

Isolation, Characterization, and Evaluation of Xanthone Derivatives from Garcinia mangostana Twigs as Receptor Tyrosine Kinase Inhibitors

Fera Kurniadewi[1*], Amadita Shafa Aqilah[1], Irma Ratna Kartika[1], Muktiningsih Nurjayadi[1], Elvira Hermawati[2], Ade Danova[2]

[1] Chemistry Study Program, Universitas Negeri Jakarta, Jakarta, 13220, Indonesia
[2]Organic Chemistry Division, Institut Teknologi Bandung, Bandung, 40116, Indonesia

[*]Corresponding author: fera@unj.ac.id

Abstract: In this study, three xanthone derivatives, α-mangostin (1), β-mangostin (2), and 2,8-diisoprenyl-1,3-dihydroxy-6,7-dimethoxyxanthone (3), were extracted from the ethyl acetate fraction of twigs of Garcinia mangostana. The structures of these compounds were confirmed using UV, IR, NMR, and MS analyses. The inhibitory effects of compounds 1-3 were tested on several receptor tyrosine kinases, including EGFR (Epidermal Growth Factor Receptor), HER2 (Human Epidermal Growth Factor Receptor 2), HER4, IGFR (Insulin-like Growth Factor Receptor), InsR (Insulin Receptor), KDR (Kinase insert Domain Receptor), PDGFRα (Platelet-Derived Growth Factor Receptor-α), and PDGFRβ (Platelet-Derived Growth Factor Receptor-β). The findings revealed that compounds 1-3 had no activity against HER2, KDR, PDGFRα, and PDGFRβ. Compound 1 exhibited weak activity with 12% inhibition against InsR, while compound 2 demonstrated moderate activity with 29% inhibition against EGFR.

Fabrication PANI Thin Films As Active Materials For Acetone Sensors

Erfina Nur Rahayu[1, a)], Eva Tri Agustina[1, b)], Nazella Marva Ardani[1, c)], Laili Arin Ramadhani[1, d)], Nugrahani Primary Putri[1, e)]

[1]Department of Physics, Faculty of Mathematics and Nature Science, Universitas Negeri Surabaya, 60231 Surabaya, Indonesia

[*]Corresponding author: [a)]erfinanur.21051@mhs.unesa.ac.id , [b)]eva.22062@mhs.unesa.ac.id , [c)]nazellamarva.210222@mhs.unesa.ac.id , [d)]lailiarin.21017@mhs.unesa.ac.id , [e)]nugrahaniprimary@unesa.ac.id

Abstract: Polyaniline (PANI) is a conductive polymer that can be used as an essential sensor material because of its good sensitivity and response time, ease of synthesis, and adjustable electrical conductivity. This study aimed to determine the optimal material for detecting acetone gas. Synthesis was carried out using the electrodeposition method at a scan rate of 10 mV/s and 10 cycles on the ITO surface. This PANI thin film was then characterized using Fourier Transform InfraRed (FTIR) to determine the functional groups and bonds formed and the Four Point Probe (FPP) test to evaluate the performance of the PANI thin film as an acetone gas sensor. Based on the study, the response time, recovery time, and sensitivity increased with increasing exposure to acetone gas. Sensing the PANI thin film to acetone gas was optimal at a gas level of 10 ppm with a response time of 84 seconds and a sensitivity of 8.9%.

Implementation of Virtual Laboratory in Debate Based on Inquiry Learning (DBOIL) Model to Improve Scientific Argumentation Skills of Pre-Service Science Teachers

Ahmad Fauzi Hendratmoko[1, a)], Madlazim[2, b)], Wahono Widodo[1, c)], Sapti Puspitarini[1, d)], and Dyah Astriani[1, e)]

[1]Department of Science Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Surabaya, Surabaya, Indonesia
[2]Department of Physics, Faculty of Mathematics and Natural Sciences, Universitas Negeri Surabaya, Surabaya, Indonesia
[*]Corresponding author: [a)]ahmadhendratmoko@unesa.ac.id ,[b)]madlazim@unesa.ac.id ,[c)]wahonowidodo@unesa.ac.id ,[d)]saptipuspitarini@unesa.ac.id , [e)]dyahastriani@unesa.ac.id

Abstract: Scientific argumentation is one of the skills needed and needs to be improved in pre-service science teachers. Debate Based on Inquiry Learning (DBOIL) is an innovative learning model developed to facilitate and teach scientific argumentation skills to pre-service science teachers. The implementation of the DBOIL model integrated with the use of virtual laboratories can be a breakthrough in improving scientific argumentation skills. This study aims to describe the impact of virtual laboratories in implementing the DBOIL model on improving the scientific argumentation skills of pre-service science teachers. This was done through a one-group pretest-posttest design on 28 pre-service science teachers at a state university in Indonesia. The improvement of scientific argumentation skills was analyzed using the normalized change (c) equation and strengthened by statistical testing through the paired t-test. The results of the study showed that the use of virtual laboratories in DBOIL model-based learning was proven to improve the scientific argumentation skills of pre-service science teachers. The increase was in the medium category, with an average normalized change (c) score of 0.58 and a significant difference between the pretest and posttest results. Inquiry activities facilitated by virtual laboratories impact increasing the achievement of claims, evidence, and reasoning indicators. On the other hand, debating the results of the inquiry can increase the achievement of counterclaim and rebuttal indicators. Overall, the use of virtual laboratories offers an alternative strategy for improving the scientific argumentation skills of pre-service science teachers based on the DBOIL model.

Exploring Secondary Science Teachers' Comprehension of the Understanding by Design Strategy in Developing STEM-based Curricula

Muhamad Arif Mahdiannur*, Martini, Dyah Astriani, Beni Setiawan, and Ahmad Qosyim

Universitas Negeri Surabaya, Surabaya, Indonesia

**Corresponding author: muhamadmahdiannur@unesa.ac.id*

Abstract: Awareness of the importance of STEM education has led to many student activities and projects being embedded or integrated into primary and secondary education curricula. The awareness of STEM education is based on the need for knowledge workers in STEM industries. Teachers themselves play a very vital role in establishing STEM-based curricula in schools. The Merdeka Curriculum is accompanied by policy changes to further support STEM education at schools by introducing Understanding by Design strategies. This study measures the extent of secondary school science teachers' understanding of the UbD strategy and STEM education using a small-scale survey. This research involved 47 science teachers who were members of the secondary science teacher union in one regency of East Java Province, Indonesia. This study was conducted in May–June 2024. In general, there was an average of 77.53% of misunderstanding among science teachers about UbD strategies and STEM education. The majority of teachers' understanding of the context of UbD, the purpose of UbD, the basic principles of UbD, the technical components in UbD, the stages in UbD, and STEM education in schools is still low and not comprehensive. Structured education and training are needed for science teachers on UbD strategies and STEM education, as well as the transformation of prospective teacher education to integrate STEM so that they are more literate in STEM and can carry out their role as curriculum developers.

Ability of Technological Pedagogical and Content Knowledge of Teachers: Case Study of Chemistry Teachers in Gresik District

Suyatno Sutoyo
Universitas Negeri Surabaya, Surabaya, Indonesia
Corresponding author: suyatno@unesa.ac.id

Abstract: The teacher's ability to integrate technology in the learning process is very necessary in the era of the industrial revolution. The aim of research is to describe the profile of chemistry teacher's TPACK (Technological Pedagogical and Content Knowledge) abilities. The type of research used was survey research with the research target being 15 chemistry teachers who taught at Senior High Schools in Gresik Regency, East Java, Indonesia. Data on chemistry teacher's TPACK abilities was collected using an instrument in the form of a TPACK questionnaire which contains seven indicators (TK, CK, PK, PCK, TCK, TPK, and TPACK). The research data was analyzed descriptively quantitatively. The results of the research showed that the average TPACK ability score for Gresik chemistry teachers was 80.30 in the high category. The chemistry teachers who had TPACK abilities in the low, medium, high and very high categories were 1 person (6.67%), 1 person (6.67%), 9 people (60.00%), and 4 people (26.67%), respectively.

Profile of Agro-tourism Based Bojonegoro Local Wisdom through Starfruit Cultivation to Support Food Security and SDGs-15

Alfina Damayanti[1a], Pramita Yakub[1b], Yuni Sri Rahayu[1c]
[1]Graduate Program of Biology Education, Universitas Negeri Surabaya, Surabaya, Indonesia.
[*]Corresponding author: [a)]alfina.19040@mhs.unesa.ac.id ,[b)] pramitayakup@unesa.ac.id,[c)]yunirahayu@unesa.ac.id

Abstract: The Sustainable Development Goals place a strong emphasis on the necessity of appropriately and sustainably managing the environment, which calls for cooperation in order to preserve and enhance the natural resources for the benefit of future generations. Ngringinrejo Village is located on the banks of the Bengawan Solo River, making it prone to flooding during the rainy season, causing environmental, food and economic problems due to crop failure. This research was conducted to find out how community efforts are carried out and passed on to the younger generation in managing and preserving star fruit plants so that they become the local potential of the community. This research uses qualitative descriptive methods in data collection and analysis. Based on the results of data collection, it is known that the successful development of natural potential carried out by the community by cultivating star fruit for generations is the result of studies and analysis conducted by the community. The star fruit crop in Ngringinrejo Village is a crop that is suitable in all weather conditions, in this case it is suitable for the two seasons in Indonesia, namely the rainy season and the dry season. In fact, Bojonegoro Regency is one of the regencies known for its extreme weather, where during the rainy season there will be flooding in several areas, and during the dry season there are also droughts in many areas. This proves that the community's understanding of the management of natural conditions is one of the important things that can be maintained and sustainable until now.

Etnophysics Analysis of Traditional Games Bekel as Potential Physics Learning Media

Luthfiyaul Laila [1], Alfi Nurlailiyah [2], Misbah [3], Setyo Admoko [1], Nadi Suprapto [1], and Utama Alan Deta [1]

[1]Physics Education, Universitas Negeri Surabaya, Surabaya, Indonesia.
[2]SMA Negeri 1 Waru, Sidoarjo, Indonesia.
[3]Physics Education, Universitas Lambung Mangkurat, Banjarmasin, Indonesia.
[*]Corresponding author: utamadeta@unesa.ac.id

Abstract: Bekel has Ethnoscience aspect that become an interest in efforts to understand the depth of local knowledge contained in traditional games. This study aimed dynamics of Traditional Bekel Games through the lens of Etnophysics, shedding light on the hidden scientific principles embedded within cultural traditions. The bekel game has a physics concept that can be studie. This study used descriptive qualitative method with ethnographic and used an interviews with people who play for Bekel.. The Bekel game emphasizes the importance of managing momentum, the law of conservation of energy, and the coefficient of restitution in controlling the bounce of a ball. The law of conservation of energy converts potential energy into kinetic energy, with the efficiency of this conversion dependent on the coefficient of restitution. The law of conservation of momentum ensures the total momentum remains constant without external force. Understanding these factors helps optimize game strategies, maintain rhythm, and improve defense performance. The bekel game can be use in physics learning, a new and interesting approach is needed to motivate students to better understand physics concepts.

Elements, Compounds and Mixtures: Student Perceptions of H5P-based Interactive Multimedia

Ernita Vika Aulia[1, b)] Wahono Widodo[1, a)] Dhita Ayu Permata Sari[1, c)] Laily Rosdiana[1, d)] Dyah Permata Sari[1, e)]

[1]*Department of Science Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Surabaya, Surabaya, Indonesia*

[*]*Corresponding author:* [a)] wahonowidodo@unesa.ac.id , [b)] ernitaaulia@unesa.ac.id , [c)] dhitasari@unesa.ac.id , [d)] lailyrosdiana@unesa.ac.id , [e)] dyahsari@unesa.ac.id

Abstract: Interactive multimedia is a combination of several elements such as text, images, sound, animation, and video delivered via a computer or other electronic device with interactive control provided to the user. The interactive multimedia used in this research was created using the HTML 5 Package (H5P) which is integrated with the learning management system owned by the research subjects. This research aims to analyzed students' perspectives on H5P-based interactive multimedia on the topics of elements, compounds and mixtures. This research was conducted at a state university in Surabaya with research subjects totaling 32 prospective science teacher students. The research design used is descriptive research to describe students' perspectives on H5P-based interactive multimedia. Data collection in this research used a student response questionnaire instrument. The data analysis technique used is a semantic differential scale consisting of 4 scores. The research results showed that every aspect of H5P-based interactive multimedia assessment received a percentage of 90.11% with very good criteria. Based on these results, it can be concluded that H5P-based interactive multimedia gets a positive response from students and is very good for use as a learning medium in general chemistry courses.

Cases and Solutions in Protection Natural Resources: Student Data-Driven Analysis

Winarsih[1,a)] , Muhamad Arif Mahdiannur[2,b)] , Chintya Eka Nur Fadilla[3,c)] , Intan Erli Fauzia[4,d] , Khoridatul Anisah[5,e)] , Naila Zahrotun Nisa'[6,f)] ,Nabila Khoirunnisa[7,g)] , Tsani Zakiatul Fikriah[8,h)] , and Nila Firdausy Nuzula[9,i)]

[1] Biology, Surabaya State University,
[3]Undergraduate Mathematics Education, Surabaya State University,
[4]Undergraduate Mathematics Education, Surabaya State University,
[5]Undergraduate Mathematics Education, Surabaya State University,
[6] Undergraduate Mathematics Education, Surabaya State University,
[7]Undergraduate Mathematics Education, Surabaya State University,
[8]S1 Mathematics Education, Surabaya State University,
[9]S1 Mathematics Education,Surabaya State University

[*]Corresponding author: [a)] winarsih@unesa.ac.id , [b)] muhamadmahdiannur@unesa.ac.id , [c)] chintya23239@mhs.unesa.ac.id , [d)] intan.23016@mhs.unesa.ac.id , [e)] khoridatul.23015@mhs.unesa.ac.id , [f)] naila.23140@mhs.unesa.ac.id , [g)] nabila.23141@mhs.unesa.ac.id , [h)]tsani.23143@mhs.unesa.ac.id , [i)]nila.23215@mhs.unesa.ac.id

Abstract: This article aims to evaluate the views and suggestions proposed by students regarding natural resource protection issues. The research approach was conducted through a questionnaire survey of 2023C Mathematics Education students, with the results analyzed using descriptive statistical techniques. The results of this article show that most students have a good understanding of the importance of protecting natural resources and can identify key challenges such as watershed destruction, species extinction, and illegal timber trade. Frequently proposed solutions include more intensive implementation of environmental education, tightening of regulations and laws, and the use of green technologies.This article concludes that university students have an important role in social change, and can play an active role in addressing natural resource protection issues through innovation and advocacy. In addition, this study suggests the need for cooperation between universities, government, and industry to implement effective solutions to protect natural resources.

Classification of Local Wisdom Diversity as an Effort to Strengthen the Identity of Various Regions

Winarsih
Universitas Negeri Surabaya, Surabaya, Indonesia
Corresponding author: winarsih@unesa.ac.id

Abstract: Local wisdom is the knowledge and expertise possessed by the people of a particular area. This includes values, traditions, culture and norms that are an important part of regional identity. Local wisdom is often passed down from generation to generation, playing a key role in maintaining and preserving the cultural identity of a community. This research aims to (1) determine the form of local wisdom, (2) the values of local wisdom, (3) describe the function of local wisdom, as regional identity. This type of research is qualitative research. The research instruments are observation, interview guidelines, and researchers as key instruments. The data source for this research is the result of analysis from mathematics education students' class 2023 C. In the current context of globalization, it is important to maintain and promote local wisdom to prevent cultural homogenization and preserve the diversity of regional identities

Question Qualification in the Context of Natural Resources for Learning and Conservation of Diversity Biological

Winarsih[a)], Muhamad Arif Mahdiannur[b)],Marcellia Widjaya Saputri[c)], Dzatul Istighfari[d)], Ifana Putri Adelia[e)], Yasmin Halwa Sima[f)], Hendra Dwi Kurniawan[g)], Sherly Kususma Ayu[h)], Rizka Sholehah Putri[i)]

Department of Mathematics Education, Surabaya State University, East Java, Indonesia

**Corresponding author: [a)]winarsih@unesa.ac.id , [b)]muhamadmahdiannur@unesa.ac.id ,[c)]marcellia.23145@mhs.unesa.ac.id , [d)]dzatul.23138@mhs.unesa.ac.id , [e)]ifana.23069@mhs.unesa.ac.id , [f)]yasmin.23305@mhs.unesa.ac.id , [g)]hendra.23286@mhs.unesa.ac.id , [h)]sherly.23144@mhs.unesa.ac.id , [i)]rizka.23310@mhs.unesa.ac.id*

Abstract: The aim of this research is to provide a classification and understanding of the levels of natural resource conservation questions. By using a qualitative approach method, which is a method of research that emphasizes analysis or descriptiveness, with a focus on observing phenomena and related meanings. In the qualitative method, researchers meet with sources from diverse backgrounds to collect in-depth and detailed information. The data collection process involved in-depth interviews, observations, and document analysis, which took longer to complete. The main aim of qualitative methods is to explain in detail the phenomena that occur in society by collecting detailed and complete data. This method is often used and implemented by a group of researchers in the social sciences, including education. Divided into several groups, namely Hots (Higher Order Thinking Skills), Mots (Medium Order Thinking Skills) and Lots (Lower Order Thinking Skills). From the analysis of the classification of all resource conservation questions, it shows that the Most question group (measuring intermediate thinking abilities, such as remembering, following directions, and analyzing) is more dominant than other groups such as Most and Lost. Based on this question, it can be explained that biodiversity contains various species such as plants, animals and microorganisms around us which have an important role in maintaining the balance of ecosystems that rely on renewable natural resources.

Question Qualification in the Context of Natural Resources For Learning and Conservation of Diversity

Winarsih [a] ,Muhamad Arif Mahdiannur [b] ,Marcellia Widjaya Saputri [c] , Dzatul Istighfari d)Ifana Putri Adelia [e] ,Yasmin Halwa Sima [f], Hendra Dwi Kurniawan [g] ,Sherly Kususma Ayu [h], Rizka Sholehah Putri [i]

Department of Mathematics Education, Surabaya State University, East Java, Indonesia

**Corresponding author:* [a]winarsih@unesa.ac.id ,[b]muhamadmahdiannur@unesa.ac.id ,[c]marcellia.23145@mhs.unesa.ac.id ,[d]dzatul.23138@mhs.unesa.ac.id ,[e]ifana.23069@mhs.unesa.ac.id ,[f]yasmin.23305@mhs.unesa.ac.id ,[g]hendra.23286@mhs.unesa.ac.id ,[h]sherly.23144@mhs.unesa.ac.id ,[i]rizka.23310@mhs.unesa.ac.id

Abstract: The aim of this research is to provide a classification and understanding of the levels of natural resource conservation questions. By using a qualitative approach method, which is a method of research that emphasizes analysis or descriptiveness, with a focus on observing phenomena and related meanings. In the qualitative method, researchers meet with sources from diverse backgrounds to collect in-depth and detailed information. The data collection process involved in-depth interviews, observations, and document analysis, which took longer to complete. The main aim of qualitative methods is to explain in detail the phenomena that occur in society by collecting detailed and complete data. This method is often used and implemented by a group of researchers in the social sciences, including education. Divided into several groups, namely Hots (Higher Order Thinking Skills), Mots (Medium Order Thinking Skills) and Lots (Lower Order Thinking Skills). From the analysis of the classification of all resource conservation questions, it shows that the Most question group (measuring intermediate thinking abilities, such as remembering, following directions, and analyzing) is more dominant than other groups such as Most and Lost.Based on this question, it can be explained that biodiversity contains various species such as plants, animals and microorganisms around us which have an important role in maintaining the balance of ecosystems that rely on renewable natural resources.

Student Science Literacy Profile of Middle School

Naufal Syafa Aflah Dewangga[1], Binar Kurnia Prahani[1*], Eko Hariyono[1], Irgy Redityo Dawana[1], and Hanandita Veda Saphira[2]

[1]Faculty of Mathematics and Natural Science, State University of Surabaya, 60231 Surabaya, Indonesia
[2]Faculty of the Arts, Social Sciences and Humanities, University of Wollongong, 2522 New South Wales, Australia.
[*]Corresponding author: binarprahani@unesa.ac.id

Abstract: Education in the 21st century faces complex challenges in shaping a generation with extensive knowledge and strong character. This research uses a type of preliminary research that implements analysis techniques in the form of descriptive research design (DPD) analysis but does not use hypothesis tests. This study aims to determine the initial ability profile of science literacy skills of junior high school students on Earth Structure and Disaster Mitigation material. The subjects of this study were. The subjects of this study were 102 students of grade VIII of junior high school. Science literacy indicators used are PISA 2023 indicators consisting of 5 indicators. The results showed that the science literacy skills of junior high school students on the material of Earth Structure and Disaster Mitigation still need to be improved due to several factors. caused by several factors. The indicator with the lowest level of science literacy is "evaluate scientific information critically," while the indicator with the highest score is "explain phenomena scientifically." Findings from surveys and tests with science literacy indicators show that this ability can be improved through appropriate learning. The research also found that the use of media and technology in learning at school is still not maximally utilized. The researcher provided input in applying more varied learning methods to reach all students and involving students in providing input regarding learning methods that learners find most effective and enjoyable. By taking these steps, it is expected that the quality of science learning, especially on the material of earth structure and disaster mitigation, can be improved so as to strengthen students' science literacy.

Effect of Mycorrhizae on the Distribution Pattern of Na+ and Cl- in Plant Grown on Saline Soil

Yuni Sri Rahayu[1a], Yuliani[1b], Sari Kusuma Dewi[1c], K.E.M. Elkahlout[2d]
[1]Biology Study Program, Faculty of Mathematics and Natural Sciences, Universitas Negeri Surabaya, Surabaya, Indonesia.
[2]Biology Department, The Islamic University of Gaza, Palestine
[*]Corresponding author: [a)] yunirahayu@unesa.ac.id ,[b)] yuliani@unesa.ac.id ,[c)] saridewi@unesa.ac.id ,[d)] kelkahlout@iugaza.edu.ps

Abstract: Saline soil has a high salt content with a pH between 7.3 – 8.5. These conditions contribute to a decrease of plant growth, yield quality, and metabolic disorders related to salt (Na+ and/or Cl-) toxicity. Although the saline soil is the potential to be used due to the huge area in Indonesia. A series of experimental studies have been conducted to describe the effect of mycorrhizae on the distribution pattern of Na+ and Cl- in plant grown on saline soil, including the growth parameters and phosphate uptake in two different plants (legume as a tripartite symbiotic plant and non-legume plants). The data were analyzed statistically by T-test. The results showed that mycorrhizae fungi increased significantly the growth parameters and P uptake, but the Na+ concentration decreased significantly in the shoot. Interestingly the Na+ concentration in the root was higher than the one in the shoot in both of the tested plants. These finding revealed that mycorrhizal plant were able to screen the toxicity amount of Na+ that could be passed to the shoot both in tripartite symbiotic plant or non-tripartite symbiotic plant. Although the mycorrhizal plant could not decrease the Cl- concentrations in the shoot.

Literature Review of Slingshot Games and Its Potential Application in Learning Physics

Heni Aryani, Alfi Nurlailiyah, Nurita Apridiana Lestari, Arie Realita, Budi Jatmiko, Utama Alan Deta*

Universitas Negeri Surabaya, Surabaya, Indonesia

**Corresponding author: utamadeta@unesa.ac.id*

Abstract: This research is a literature review regarding slingshots. This research aims to examine the slingshot in increasing understanding of physics concepts, especially in the context of Hooke's Law of Elasticity. The author conducted a literature review study regarding the traditional game of slingshot in several countries based on a search for articles indexed by Scopus and then processed using VOSviewer. Based on the matrix analysis of the results of the literature review study conducted by the author of the Scopus article above, the slingshot game in six countries does not explain the use of slingshots. The results of the review show that the relationship between the use of catapults in launching aircraft, the application of catapults in biomechanics, principles on animals, experiments on animals, and fundamentals involving the same physical principles such as spring force, potential energy, and kinetics. This research also reveals that only a few articles still discuss learning-related topics. It is hoped that readers will increase their knowledge and motivation in learning about slingshots. For the next author, it is possible to develop catapults into innovative learning at the high school level.

Study of Chemical and Physical Soil Properties of Coal Mining Soil: an Alternative as Plant Growth Media

Y.S. Rahayu[1*], Yuliani[1], M.T. Asri[1], S. K. Dewi[1], H. Al-Najar[2]

[1] Biology Study Program, Faculty of Mathematics and Natural Sciences, Universitas Negeri Surabaya, Surabaya, Indonesia

[2] Civil and Environmental Engineering Departmenty, Islamic University of Gaza, P.O. Box 157, Gaza Palestine

[*]Corresponding author: yunirahayu@unesa.ac.id

Abstract: East Kalimantan has a wide coal mining area where not all of the coal mining companies carry out soil reclamation before it is abandoned. This study aimed to examine the soil's chemical and physical properties in the coal mining area in order to enhance the nutrition level in the soil used as a plant growth media. The study used an exploratory research method by determining the five samples existing at each of the three former coal mining sites with a high representation value located in East Penajam Paser District, East Kalimantan Province, Indonesia. The obtained data were analyzed descriptively using theoretical and empirical approaches. The results showed that the improvement of the structure and texture of the soil at the former locations of the coal mining was necessary to be carried out before being used as a plant growth media. The improvements included balancing soil conditions that allowed the soil porosity to be looser to let the roots grow better and experience aerobic respiration. Moreover, efforts to maximize the role and effectiveness of multi-symbiotic endophytic soil microorganisms must be undertaken. The study also found that high levels of C in the soil indicated high organic matter, of which the process had not been completely finished. The study recommends further research to examine the soil texture and structure properties and the use of bio-remediator vegetation in relation to multi-symbiotic microorganisms as the key to advancing soil properties in the former coal mining sites.

Biology Students Perspective on Spatial Augmented Creative Problem Solving Learning Model Integrated with Blended Learning to Train Spatial Thinking

Ahmad Bashri[1, a)], Endang Susantini[2, b)], Sari Kusuma Dewi[3,c)], Firdatus Sukma Fitri Shiyamsyah[4, d)], Muhammad Zahrudin Afnan[4, e)]

[1]Doctoral Program in Science Education, Faculty of Mathematics and Natural Sciences, State University of Surabaya

[2]Biology Educational Study Program, Faculty of Mathematics and Natural Sciences, State University of Surabaya

[3]Biology Study Program, Faculty of Mathematics and Natural Sciences, State University of Surabaya

[4]Biological Education Master Program, Faculty of Mathematics and Natural Sciences,State University of Surabaya

[*]Corresponding author: [a)]ahmadbashri@unesa.ac.id ,[b)]endangsusantini@unesa.ac.id ,[c)]saridewi@unesa.ac.id ,[d)]firdatus.22007@mhs.unesa.ac.id ,[e)]muhammadzahrudin.19001@mhs.unesa.ac.id

Abstract: 21st century education requires students to have superior competence in various skills, one of which is spatial thinking. This study aims to evaluate biology students' perspectives on applying the Spatial Augmented Creative Problem Solving (SACPS) learning model integrated with blended learning to develop spatial thinking skills. The SACPS model combines a creative learning approach with augmented reality technology in the context of blended learning. This study used a survey method with a questionnaire distributed to 29 biology education students at Surabaya State University. The analysis showed that students responded positively to this learning model, with an average percentage of satisfaction reaching 90%. The results of the indicators of spatial thinking skills, Spatial Perception, Spatial Orientation, Spatial Relationships, Spatial Orientation, and Spatial Visualization. These results indicate that technology integration in blended learning with the SACPS model is efficacious in improving spatial thinking skills and is well-received by students. Using innovative learning methods is vital to strengthen essential spatial thinking skills in biology education for provision in 21st century education.

Effect of Mycorrhizae on the Distribution Pattern of Na+ and Cl- in Plant Grown on Saline Soil

Yuni Sri Rahayu[1 a)], Yuliani[1 b)], Sari Kusuma Dewi[1 c)], K.E.M. Elkahlout[2 d)]
[1]*Biology Study Programme, Faculty of Mathematics and Natural Sciences, Universitas Negeri Surabaya, Surabaya, Indonesia.*
[2] *Biology Department, The Islamic University of Gaza, Palestine*
[*]*Corresponding author:* [a)] yunirahayu@unesa.ac.id ,[b)] yuliani@unesa.ac.id ,[c)] saridewi@unesa.ac.id ,[d)] kelkahlout@iugaza.edu.ps

Abstract: Saline soil has a high salt content with a pH between 7.3 – 8.5. These conditions contribute to a decrease of plant growth, yield quality, and metabolic disorders related to salt (Na+ and/or Cl-) toxicity. Although the saline soil is the potential to be used due to the huge area in Indonesia. A series of experimental studies have been conducted to describe the effect of mycorrhizae on the distribution pattern of Na+ and Cl- in plant grown on saline soil, including the growth parameters and phosphate uptake in two different plants (legume as a tripartite symbiotic plant and non-legume plants). The data were analyzed statistically by T-test. The results showed that mycorrhizae fungi increased significantly the growth parameters and P uptake, but the Na+ concentration decreased significantly in the shoot. Interestingly the Na+ concentration in the root was higher than the one in the shoot in both of the tested plants. These finding revealed that mycorrhizal plant were able to screen the toxicity amount of Na+ that could be passed to the shoot both in tripartite symbiotic plant or non-tripartite symbiotic plant. Although the mycorrhizal plant could not decrease the Cl- concentrations in the shoot.

Profile of Students' Physics Problem Solving Skills in Supporting SDGs

Irgy Redityo Dawana[1, a)], Binar Kurnia Prahani[2, a)], Eko Hariyono[3, a)] , Naufal Syafa Aflah Dewangga[4, a)], Hanandita Veda Saphira[5, a)]

[1]*Faculty of Mathematics and Natural Science, State University of Surabaya, 60231 Surabaya, Indonesia*

[2]*Faculty of the Arts, Social Sciences and Humanities, University of Wollongong, 2522 New South Wales, Australia*

[*]*Corresponding author: binarprahani@unesa.ac.id*

Abstract: Learning requires innovative methods to improve 21st century skills, especially PSS. This study aims to determine the PSS profile of physics students and recommendations for learning innovations in high school to comply with SDGs 4 "Quality Education". The method used in this research is a preliminary study with qualitative descriptive analysis. The research instrument used was the PSS test. The results showed that PSS still needs to be practiced. Of the 121 students studied, 95 students were in the low category, 26 students were in the medium category, and only 1 student was in the high category. Although students have understood the problems given, they are still lacking in providing answers and re-evaluating answers, due to the lack of habits in solving problems independently. In addition, the utilization of technology in learning at school must also be improved. Therefore, intensive practice and the use of effective learning models are required. In addition, the importance of technology integration in education to improve PSS and motivate students in the learning process. Thus, students' PSS is expected to be improved through appropriate learning approaches and the use of relevant technology, such as AR interactive media. This research not only aims to improve students' skills, but also supports the achievement of SDGs by providing inclusive and quality education for all students.

To What Extend Scientific Literacy Test Should be as a Tool to Support Quality Education?

Aris Rudi Purnomo, Elok Sudibyo, Beni Setiawan, Dhita Ayu Permata Sari, Mohammad Budiyanto, Wahyu Budi Sabtiawan, and Fikky Dian Roqobih
Universitas negeri Surabaya, Surabaya, Indonesia
**Corresponding author: arispurnomo@unesa.ac.id*

Abstract: This study examines the quality of literacy questions developed by pre-service science teachers in Teacher Professional Education Programs (TPEP) in the context of the broader issue of improving the quality of education. The following aspects should be given particular attention: cognitive level, context, concepts, and construction. The questions were of the multiple-choice variety and addressed a range of scientific topics, including biology, physics, and chemistry. The data were obtained from the documents downloaded from the Learning Management System (LMS). The instrument consisted of a rubric with a Likert scale, ranging from 1 to 5, for the assessment of question quality. While the questions were evaluated using a rubric, content analysis was also employed to ascertain the scope, and references utilized in the construction of literacy questions. The findings indicate that while many pre-service teachers demonstrate a solid understanding of scientific concepts, there is considerable variation in the depth and complexity of the questions they formulate. Based on the analysis of the science literacy test documents, it can be concluded that the questions made are in line with the context, concept and construction of the test. This is shown that in those aspects, the percentage exceeds 75% in the good category. However, in the cognitive aspect, the assessment of science literacy is still struggling at the C2 to C3 level, which is more than 75%. Meanwhile, the C4 level has not yet reached a high percentage with a less varied type of question, which is only in the form of asking conclusion. Therefore, the literacy test questions created need to be increased in complexity and difficulty level of cognition to be used as a good measuring tool in supporting the goal of sustainable development, namely quality education.

Affinity of TiO_2 Nanoparticles Mass from Tulungagung Ilmenite Sand on the Degradation of Microplastic of Polyethylene under UV Irradiation

Lydia Rohmawati
Universitas Negeri Surabaya, Surabaya, Indonesia
Corresponding author: lydiarohmawati@unesa.ac.id

Abstract: Lack of public awareness and concern regarding the problem of plastic waste can impact the environment and living creatures in the waters because, over a long time, plastic will decompose into microplastic particles. Polyethylene is one microplastic type most commonly found in plastic beverage packaging. For this reason, it is necessary to handle microplastic waste, so this research aims to produce TiO_2 nanoparticles that can degrade microplastics through photocatalytic activity under UV irradiation. This material can be extracted from Tulungagung Ilmenite sand using the leaching method, the results of which are applied photo catalytically using ultra sonification and followed by UV irradiation for 4 hours, then characterized by FTIR, SEM and calculating the degradation percentage using the gravimetric method. The analysis results show a new cluster in the formation of hydroxyl, carbonyl, and carbon-hydrogen groups. In addition, the rate of microplastic degradation increased along with the increase in catalyst mass, where 0.0015 mg of catalyst gave the highest degradation value, namely 77% after 4 hours. In this way, the synthesized TiO2 nanoparticles can be used as a candidate for a material that can minimize the problem of microplastic waste in water.

Wordwall as a Formative Assessment to Improve Students Concept Understanding

Tutut Nurita*, Sapti Puspitarini, Adlina Nafis Nurina, Attaqotul Ula, Naura Maheshi, Ruruh Susilowati

[1] *Department of Science, Faculty of Mathematics and Natural Sciences, Universitas Negeri Surabaya, Surabaya 60231, Indonesia.*

[*] *Corresponding author: tututnurita@unesa.ac.id*

Abstract: This study aims to describe wordwall as a formative assessment on light refraction material to improve students' concept understanding. This type of research is descriptive quantitative using research subjects as many as 30 students. The instrument used is a multiple-choice object test as a formative assessment on the wordwall to measure students' concept understanding ability on material that discusses the refraction of light from a dense medium to a dense medium and material that discusses the refraction of light from dense to dense. The results of this study indicate that students better understand the material of light refraction from dense to tenuous, this can be seen on average showing a result of 88.1 on the formative assessment of light refraction material from tight to tenuous while on the material of light refraction from tenuous to tight medium shows lower results of 79.0.

A Preliminary Design: Culture-Based Student's Worksheet for SDGS Awareness in Indonesia Context

Beni Setiawan*, Fasih Bintang Ilhami, Ahmad Fauzi Hendratmoko, Wahyu Budi Sabtiawan, Ahmad Qosyim, and Aris Rudi Purnomo
Universitas Negeri Surabaya, Surabaya, Indonesia
**Corresponding author: benisetiawan@unesa.ac.id*

Abstract: The implementation of the independent curriculum that is adjusted to the goals of higher education, there is a need for ethnoscience learning tools that focus more on the integration of Sustainable Development Goals (SDGs) that are more concrete through the Place & Culture-Based Education (PCBE) approach with the Project Based Learning model. PCBE can explore various local wisdoms that can be integrated into science learning and provide benefits for students with authentic, contextual, and meaningful learning by exploring, transforming, and explaining various local wisdoms, cultures, local potentials, and experiences from the community. Therefore, the local wisdom of each region can be used as a target for the reconstruction of local wisdom as a form of recognition with the PCBE approach through the reduction and implementation process in science learning. The research design was developed in accordance with the stages proposed by Plomp and Nieveen. The model development stages comprised three phases: preliminary research, prototyping, and assessment. The result of this research are four worksheets with local wisdom context and sustainability, such as worksheet 1, Orientation Worksheet, provides students with an initial overview of activities oriented towards culture or tradition and worksheet 2, Literature-based Exploration Worksheet, provides an opportunity for students to explore and learn more about the chosen culture or tradition. Worksheet 3, Field Exploration for the 5th to 7th meeting; Field Exploration provides an opportunity for students to explore and learn more about the chosen culture or tradition. The last worksheet is done through a study of the chosen culture or tradition based on field studies. This worksheet also serves as initial capital for students before experimentation. The conclusion of this research is the worksheet provide initial information as well as re-explore students' prior knowledge and the study of the chosen culture or tradition based on literature studies. This worksheet also serves as initial capital for students before field observations. To address this requirement, student worksheets are essential as supportive media

Validity in Model Development Engineering Design Process Blended Learning (E-Bl) to Improve the Critical Thinking Skills of Prospective Science Teachers

An Nuril Maulida Fauziah*, Wasis, Wahono Widodo, and Mochammad Zumar Firdaus Ermawan

Universitas negeri Surabaya, Surabaya, Indonesia

**Corresponding author: annurilfauziah@unesa.ac.id*

Abstract: The younger generation needs to master knowledge, professional and technical skills, and continue to improve themselves through continuous learning to knowledge workers. One of the things that can encourage innovation in the national knowledge system is critical thinking skills which can be taught through innovative learning models such as inquiry. However, in reality, students' critical thinking skills are still low. To overcome this, learning with an engineering design approach (Engineering Design Process/EDP) and technology can improve critical thinking skills. The EDP approach is combined with inquiry learning and blended learning models, which is called EDP Blended Learning (E-BL). The aim of this research is to describe the validity of the E-BL model which has been developed to improve the critical thinking skills of prospective science teachers.

Developing a Cutting-Edge Assessment Instrument for Measuring High School Students' Understanding of Newton's Law

Edi Istiyono[1)], Irvany Nurita Pebriana[2)], Supahar[3)], Pujianto[4)], Bayu Setiaji[5)]

[1),3)] Graduate School Universitas Negeri Yogyakarta
[2),4),5)] Faculty of Mathematics and Natural Sciences Universitas Negeri Yogyakarta

[*]Corresponding author: [a)] your@emailaddress.xxx , [b)] anotherauthor@thisaddress.yyy

Abstract: This study examines the development and feasibility of an innovative assessment tool designed to measure cognitive understanding of Newton's Law among high school students. The research involved adapting the Wilson Model and the Oriondo and Antonio Model, with subsequent stages of test design, trials, and assembly. Expert judgments ensured the instrument's validity, which was tested on two groups of students: a limited group of 15 and a broader group of 36. The instrument's validity and reliability were rigorously evaluated using Aiken's V formula and KR-20, respectively. Item difficulty and discrimination were also analysed. The findings reveal several key insights. Firstly, a robust formative assessment tool was created using the Edpuzzle platform, which proved both valid and highly reliable. Secondly, the tool effectively measures high school students' cognitive learning outcomes on Newton's Law, earning an "excellent" rating for its applicability. Students demonstrated exceptional mastery of the basic cognitive aspects (C1 and C2) of Newton's Law, while showing adequate understanding of the more complex aspects (C3 and C4), indicating a solid overall grasp of the material. These results underscore the potential of this assessment tool in enhancing educational outcomes by providing precise measurements of student comprehension in physics.