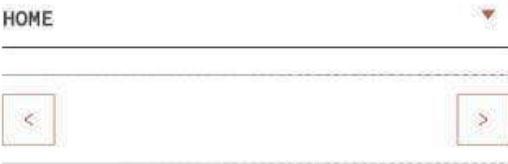


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Proceedings of the 3rd International Conference on Biology, Science and Education (IcoBioSE 2021)



Welcome to the 3rd International Conference on Biology, Science and Education (IcoBioSE 2021). The main objective of this conference is to provide an international platform for researchers, academicians as well as industrial professionals from all over the world to present their research results in biology and education and other related fields. This conference also provides opportunities for the delegates to exchange new ideas and application experiences, to establish research relations and to find partners for future collaboration.

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Proceedings of the 3rd International Conference on Biology, Science and Education (IcoBioSE 2021)


PREFACE

Conference name: Proceedings of the
3rd International Conference on Biology,
Science and Education (IcoBioSE 2021)
Date: 27 October 2021
Location: Padang, Indonesia (Offline)
Website:
<http://icobiose.fmipa.unp.ac.id/icobiose3/i>

On behalf of the steering committee, I would like to thank each one of you for joining the 3rd International Conference on Biology, Science and Education (IcoBioSE). This international conference was organized by the Department of Biology, Faculty of Mathematics and Natural Sciences at Universitas Negeri Padang. The main objective of this conference is to provide an international platform for researchers, academicians as well as industrial professionals from all over the world to present their research results in biology and education and other related fields. This conference also provides opportunities for the delegates to exchange new ideas and application experiences, to establish research relations and to find partners for future collaboration. I would like to express my sincere appreciation to all the participants, financial sponsors, exhibitors, supporting organizations and all the committee members who have made IcoBioSE 3rd successful. This year theme "Biological science and education challenges for empowering smart and sustainable society" is driven by the rapid improvement of biology and educational research in digital era, which is required for constructing life-long skills of both academic and non-academics citizen. The best strategy to reach this goal is information exchange through publications. With this strong support, we are sure IcoBioSE will be beneficial to all the participants, and you enjoy Padang. We also would like to express our special thanks to all staff from Atlantis Press for their great support to IcoBioSE 3rd. We are looking forward to meeting you in the next IcoBioSE.


With best wishes,

Fitri Arsih
Chair of IcoBioSe 2021

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The Urgency of Higher Order Thinking Skills (HOTS) Base on Development of Biology Assessment Instruments for Class XI Students of SMA/MA

Sa'diatul Fuadiyah, Ganda Hijrah Selaras, Defrian Melta, Dini Rahmi

A curriculum, or educational program, produces high quality education. The 2013 curriculum, which places a strong emphasis on students' reasoning skills and uses assessment as a yardstick for curricular achievement, is the one that is now being used in Indonesia. In essence, an evaluation makes use of...

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Validity of Project Learning Model Based on STEMS to Improve Creativity in the 21st Century

Suci Fajrina, Lufri Lufri, Yuni Ahda, Heffi Alberida

This twenty-first-century education demands a appropriate learning strategy to attain the required skills, focusing on equipping students with creativity. The One of the innovative techniques that can increase students' creativity is the STEMS-based project learning paradigm. This research advances a...

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Analysis of Digital Book Integrated Local Culture as the Internalization of Character Education During Pandemic

Fitri Arsih, Heffi Alberida, Yosi Laila Rahmi, Nisrina Zakia Khalel

Digital books are one of the learning media that provide innovation in distance learning during the pandemic because they can be accessed easily. The digital book experience that is equipped with pictures, audio and video makes learning more interesting. Based on the results of the study it is known...

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Implementation of Online and Independent Learning for Prospective Teacher Students

F. Yanti, Lufri Lufri, Yuni Ahda, Festiyed Festiyed

Education-related information technology is still developing and provides improvements to the learning process, such as strategies for teaching knowledge to students and new forms of learning media. Students and teachers alike need to be more adept at using the internet and new technology. Using computer...

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A Study Investigation Students' STEM Literacy in Biology Learning

Yosi Laila Rahmi, Media Wati Kaban

STEM literacy is the capacity to recognize, use, and integrate ideas from science, technology, engineering, and mathematics in order to comprehend a difficult issue and come up with novel solutions. This study intends to assess students' STEM literacy as it relates to biology instruction. Descriptive...

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Development of Species-Specific *Cichla* Species eDNA Primer for Rapid Alien Invasive Species (AIS) Monitoring

Nurul Fizatul Nabilah Osman, Adibah Abu Bakar, Ramizah Abdull Rahman, Syazwan Saidin, Intan Faraha A. Ghani, Amirrudin Ahmad

Locally known as top predator fishes, peacock bass or cichlids are invasive in Malaysia's freshwater ecosystem. Due to the nature of these fish, which involves hiding beneath the water's surface, detection probability for these species are often poor, especially when utilizing the traditional capture-survey...

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Optimization of DNA Isolation on Meat-Based Food Samples Using Phenol-Chloroform Method for the Development of Halal Detection Using In-House Method Analysis

Indah Mardhotillah, Afifatul Achyar, Moralita Chatri, Dwi Hilda Putri, Yuni Ahda

About 85% of Indonesia's population is Moslem. Every Moslem is ordered to eat halal and good food. PCR is the most widely used molecular biology technique for authentication tests, through target DNA analysis, including the detection of pork-derived DNA in food products. DNA isolation is an important...

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Effect of *Triticum aestivum* L. Wheat Grass Juice Planted with Various Media on the Hemoglobin of Anemic Male Mice (*Mus musculus* L.)

M. Des, Elsa Yuniarti, Atradinal Atradinal

Indonesia frequently experiences the health issue of anemia. This occurs when there are insufficient levels of hemoglobin in the blood, which is caused by lack of iron, which is necessary for the synthesis of hemoglobin. Wheat grass is one of the iron-rich foods that can be consumed as an alternative...

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Specific Thermophilic Bacterial Xylanase Enzyme Activity Using Rice Straw as Substrate and Its Possibility as an Eco-friendly Fabric Bleach

Irdawati Irdawati, Zul Hidayati, Linda Advinda, Makes Fifendy, Salvia Salvia

Extracellular enzyme xylanase has a wide range of industrial uses. The xylanase enzymes made by thermophilic bacteria can hydrolyze xylan into xylose and xylooligosaccharides. Rice straw, for example, is a natural carbon source that can be utilized to create xylan carbon sources. One of xylanase's uses...

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Students' Metacognitive Skill Level of Biology Education Study Program

Helendra Helendra, Lufri Lufri, Elizar Elizar

Students require metacognitive skills to be able to learn autonomously and deliberately plan, monitor, and assess their learning process in order to get the most out of their learning experiences. For lecturers to design effective learning tactics, it is critical to understand the level of students'...

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A Comparison of Biology Pre-service Teacher Learning Achievement Using Offline and Online Method in Biology Learning Evaluation Course

Rahmawati Darussyamsu, Lufri Lufri, Yuni Ahda, Heffi Alberida, Rahmadhani Fitri, Ganda Hijrah Selaras, Helendra Helendra, Zulyusri Zulyusri, Fatma Rahmadhani, Ilmi Zajuli Ichsan, Henita Rahmayanti, Ali Amran

Biology learning evaluation course is a compulsory subject for undergraduate biology education students because it prepares students to design learning assessments when they become teachers later. Regularly, offline learning used discussion and problem-solving methods face-to-face. However, with the...

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Relationships Between Students' Grade IX Natural Science Learning Outcomes and Naturalist, Linguistic, and Interpersonal Intelligence

Rahmadhani Fitri, Ganda Hijrah Selaras, Kiki Mulyani

Intelligence is one of the elements that affects how well students learn. In the field of education, intelligence is still primarily characterized in terms of IQ. Actually, there are more types of intelligence outside those that may be determined just by academic performance. Multiple Intelligences is...

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The Effectiveness Crude Extract of *Cinnamomum Zeylanicum* to the Level of GSH in Mouse Liver

Yuni Ahda, Siska Alicia Farma, Yusni Atifah, Jon Efendi

Cinnamomum zeylanicum is an antioxidant-rich plant, according to numerous research. In this investigation, glutathione (GSH) levels in mouse liver will be compared to those of a crude extract of *Cinnamomum zeylanicum* (*Mus musculus* L.). This research project is an experiment. For a period of four weeks,...

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Transitioning Face-to-Face Learning to Online Learning: Describe the Problems Faced by High School Teachers

Relsas Yogica, Gita Noveri Eza, Dini Rahmi, Yuyu Monlinia

The widespread impact of the coronavirus or COVID pandemic since 2019 has down to classrooms where face-to-face learning happens are held between teachers and students, in terms of delivering learning information. Mostly, face-to-face learning is replaced by virtual learning, by relying on information...

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Improving Implementation of Kurikulum 2013 Teacher Perspective in West Sumatra, Indonesia

Lufri Lufri, Relsas Yogica, Ristiono Ristiono

The government continues to strive improve the quality of education from time to time. One form of this effort is to change the school curriculum. Currently, the curriculum used in schools is Kurikulum 2013. This change becomes basis for improving implementation the previous curriculum. However, at school,...

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Cardiac Histopathology of Male Mice (*Mus musculus L.*) Given Maximum Physical Exercise and Gambir Catechin (*Uncaria gambir Roxb.*)

Elsa Yuniarti, M. Des, Desi Fitria, Pamela Mayorita

Physical exercise is an activity carried out to maintain body health and fitness. However, optimal physical exercise will harm the body because it produces free radicals that can damage cells and body tissues. Gambir is a plant whose main component is catechin which functions as an antioxidant. Antioxidants...

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The Effect of Differences in Sugar Concentration on The Amount Of Sauerkaut Lactic Acid Bacteria from Cabbage (*Brassica oleracea L.*)

Resti Fevria, Vauzia, Nur Afifah, Linda Advinda, Sisca Alicia Farma, Edwin

Lactic acid bacteria are probiotic bacteria that have an important role in preventing and curing various diseases. Affects the content of lactic acid bacteria produced, this is because sugar is a carbon source that is used as an energy source for lactic acid bacteria. This study was conducted from April...

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The Effect of Eco-Enzyme Spraying on Chlorophyll Content of Hydroponic Spinach (*Amaranthus sp.*)

Resti Fevria, Vauzia Vauzia, Siska Alicia Farma, Edwin Edwin

The green pigment chlorophyll gives a plant's leaves and stems their color. The process of photosynthesis depends heavily on chlorophyll, which also contains significant amounts of antioxidant, anti-inflammatory, and wound-healing compounds. Many green vegetables, including spinach, contain chlorophyll....

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Assessing Anuran Diversity Using Leaf Litter Plot in a Tourism Object in Sumatera Barat, Indonesia

Fitra Arya Dwi Nugraha, Ahmad Muammar Kadafi, Rijal Satria

The wildlife monitoring survey is urgently conducted because they are currently facing many factors that may drive to extinction. The effective way in monitoring survey method is limitedly studied for tropical sumatran amphibian. The goal of the study is to examine the efficacy of plot technique in documenting...

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Hypoxic Swimming Exercise Increases Catalase Enzyme Activity in Trained Swimmers

Siska Alicia Farma, Syahrastani, Habibullah Novichandra

Swimming is a carried out activity, out excessively causes the body's level of free radicals to rise. If the produced free radicals are not addressed, they will be harmful to the body. The body produces antioxidants in the form of the enzyme catalase as one of its defenses against free radicals. An enzyme...

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The Effectiveness of *Carica Papaya* Linn. LEAF Extract with the Contact Poison Method for Controlling Subterranean Termites *Coptotermes sp.* (Isoptera: Rhinotermitidae)

Zulyusri Zulyusri, Rosi Fitri Ramadhani, Desyanti Desyanti

The study to find out the effectiveness of *Carica papaya* leaf extract using contact poison on the termite *Coptotermes sp.*, one of the most harmful types of termite, mortality was conducted. This research using an experimental research with Completely Randomized Design (CRD) in seven extract treatments...

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Identification of Students' Learning Difficulties During the Covid-19 Pandemic to Improvement of 21st Century Skills in College

Rahmi Septia Sari, Lufri Lufri, Darmansyah Darmansyah, Yuni Ahda, Ali Amran, Elizar Elizar

Millions of students have been impacted, not least in Indonesia, by the temporary closure of educational institutions in an effort to stop the Covid-19 pandemic from spreading over the globe. The interruption of the learning process between students and lecturers as well as the cancellation of learning...

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Indonesian Student Preparedness Living in the Pandemic

Trisna Amelia, Bony Irawan, Erda Muhartati, Azza Nuzullah Putri

Entering the second year of the Covid 19 pandemic, it has become clear that preparedness to live and adapt to the pandemic situation is key to survival and filled life. High school students are among the high-risk demographic group of the pandemic in Indonesia, which saw their age group excluded from...

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The Effect of Administration of Honey on Maximal Physical Activity in Malondialdehyd (Mda) Levels of Male Mice (*Mus musculus* L.)

Pudia M. Indika, Randi Kurniawan, Ridho Bahtra, Elsa Yuniarti

Maximum physical activity creates an imbalance between the production of free radicals and the body's antioxidant defense system known as oxidative stress. Maximum physical activity increases the need for oxygen, which leads to an increase in reactive oxygen species (ROS) and free radical products. Thus...

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Effect of Gamma-Ray Irradiation on Vetiver Grass (*Vetiveria Zizanioides* (L.) Nash.) in Vitro Shoots Growth and Multiplication

Wahyu Widoretno, Miftahur Rohmah, Serafinah Indriyani

The vetiver plant, *Vetiveria zizanioides* (L.) Nash, yields vetiver oil, which is a fixative for perfumes. It is vital to create improved vetiver plants by in vitro mutagenesis because the low quality of vetiver in Indonesia causes vetiver oil productivity to decline year after year. This study sought...

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Analysis of Critical Thinking, Creativity, Communication, and Collaboration Skills (4C) for Junior High School Students

Isnaini Isnaini, Atmazaki Atmazaki, Yuni Ahda, Lufri Lufri, Elizar Elizar, Ali Amran, Nidya Fitri, Afriwes Afriwes, Alfadila Hasan

The location of this research was conducted at SMPN 02 Koto Baru. This research uses descriptive quantitative research. The population in this study were students of SMPN 02 Koto Baru, and the sampling technique was using all populations was 32 students. The data collection technique is done through...

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Rice Plant Growth Enhancement and Bacterial Leaf Blight Control by the Rhizobacterial Consortium

Haliatur Rahma, Winarto Winarto, Sri Mulyani, Nila Kristina

Bacterial leaf blight (BLB) in rice plants is brought on by the bacterium *Xanthomonas oryzae* pv. *oryzae* (Xoo). Rhizobacteria are a group of plant root microorganisms that have a beneficial effect on plants. The rhizobacteria A consortium is a collection of friendly microorganisms that can prevent the...

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Characterization of Bacterial Cellulose Composite–Gardenia Leaf Extract (*Gardenia Jassminoides* J. Ellis) with Addition of Crosslinker

Muhammad Iqbal, Ananda Putra, Ali Amran, Elsa Yuniarti

Bacterial cellulose (BC) can be applied in various fields such as biomedical, separation membranes, artificial blood vessels, and substrates for cartilage tissue engineering. BC still has low mechanical properties, so a bacterial cellulose composite was formed with Gardenia Leaf Extract (BC-GLE) to obtain...

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Effect of Ecoenzyme Addition on Vitamin C Levels of Spinach (*Amaranthus* Sp.) Cultivate Hydroponically

Resti Fevria, Vauzia Vauzia, Siska Alicia Farma, Edwin Edwin

One of the vitamins that the body needs is vitamin C since it plays a crucial role as an antioxidant that can shield the molecules that the body needs. Vegetables that are green, like spinach, contain vitamin C. Both hydroponically and non-hydroponically, spinach can be grown. According to a study, spinach...

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Diversity of Amphibians Using a Transect Method Implemented in Three Different Habitat

Mira Idora, Rijal Satria, Fitra Arya Dwi Nugraha

This study was conducted in three different habitat types consisting of (1) forest, (2) rivers, and (3) paddy fields. We used transect lines with a length of 50 m with a distance of 1 m right and left. The number of transects in each habitat was 10. We found 148 individuals with 13 species belonging...

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Density and Diversity of Herpetofauna Using a Transect Method Implemented in a Coconut Plantation (*Cocos nucifera* L.)

Ridwan Syarif, Rijal Satria, Fitra Arya Dwi Nugraha, Irma Leilani Eka Putri

Plantation openings are to blame for Indonesia's highest rates of forest loss. The goal of this study was to use the transect approach in Simbur Naik Village,

Muara Sabak Timur District, Tanjung Jabung Timur Regency, "Jambi Province" to determine the diversity and density of herpetofauna in a coconut...

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Primers and Probes Design of Multiplex qPCR For Food Authentication Detection

Moralita Chatri, Dwi Hilda Putri, Dezi Handayani, Afifatul Achyar

Indonesia continues to confront difficulties and barriers in obtaining halal certification because some irresponsible individuals continue to adulterate halal food by combining it with pork or fanged animals in order to increase their profits. Therefore, it is necessary for Halal Examining Institutions...

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Profile of the Sustainable Reserve Food Garden (SRFG) Program in Pacitan Regency, East Java

Titik Wijayanti, Endang Arisoesilaningih, Yayuk Yuliaty, Amin Setyo Leksono

The aims of this study is to describe the profile of the Sustainable Reserve Food Garden (SRFG) program in term of organization, capital, activities, and sustainability, and to analyze the relationship between organizational and capital aspects to the activities and sustainability of the SRFG program...

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Effect of Permethrin Concentration as Curtain Dyeing Material in Control of *Aedes aegypti* L

Gustina Indriati, Makes Fifendy, Ristiono Ristiono

Indonesia is dealing with a public health issue called Dengue Hemorrhagic Fever (DHF), which is spread by the *Aedes aegypti* mosquito. To manage the *Aedes aegypti* mosquito, the primary carrier of DHF (Dengue Hemorrhagic Fever), many measures have been taken, including fumigation using malathion for adult...

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Vitamin C Levels and Ph Values in Various Types of Ginger Infused Water

Rika Sepriani, D. Deswandi, Hilmainur Syampurma, Siska Alicia Farma, Abdul Razak

Infused water is a drink produced by infusing water with bits of spices or fruits, allowing the flavor of the spices or fruits to be absorbed into the water. This study aimed to find out how much vitamin C is in various varieties of ginger-infused water and what the pH levels are. Red ginger (*Alpinia*...

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Primer Design and Optimization of PCR Methods for Detecting Mixed Rat Meat in Food Samples

Masnaini Masnaini, Afifatul Achyar, Moralita Chatri, Dwi Hilda Putri, Yuni Irdawati

Food safety is very important to support the halal tourism program. One of the problems faced by Muslim consumers is the possibility of mixing non-halal meat such as rats in meat-based food products. Molecularly we can detect the presence of rat meat in meat-based products using the PCR technique. It...

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Isolation and Total Lactic Acid Bacteria from Sauerkraut with the Addition of Chili (*Capsicum Annum* L.)

Resti Fevria, Vauzia Vauzia, Olivia Agustin, Dwi Hilda Putri, Irdawati Irdawati, Dezy Handayani, Edwin Edwin

Sauerkraut (suerkhol) is the result of lactic acid fermentation of chopped white cabbage with a length of about 20 cm and a width of 2 mm to 5 mm. Based on research that has been done successfully isolated 17 lactic acid bacteria isolates from Sauerkaraut. Chili has a unique taste and contains alkaloid...

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Resti Fevria, Vauzia Vauzia, Siska Alicia Farma, Reki Kardiman, Edwin Edwin

The green pigment chlorophyll gives a plant's leaves and stems their color. In addition to being crucial to the process of photosynthesis, chlorophyll is also

rich in antioxidant, anti-inflammatory, and wound-healing compounds. Many green vegetables, especially lettuce, contain chlorophyll. Lots...

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Absorption of Copper Metal Ions Using the Immobilized *Langsat* (*Lansium domesticum*)

Desy Kurniawati, Feby Yulianti, Budhi Oktavia, Trisna Kumala Sari

High community activity can cause water pollution by heavy metals that are very dangerous for living things. Copper (Cu) is one of the heavy metals that has a very detrimental effect on biotic components, copper is toxic to all plants at a solution concentration above 0.1 ppm. Biosorption is the absorption...

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Antiviral Potential of Ethanol Extracts of Andalas Endophytic Bacterial Isolate B. J.T.A 2.1 Fermentation Products

Dwi Hilda Putri, Azwir Anhar, Irdawati, Mades Fidendy, Nurhasnah

The most prevalent infectious disease in tropical and subtropical regions is dengue, which is brought on by the dengue virus (DENV) and endemic illnesses. There is currently no antiviral medication specifically for dengue illness. It is understood that viral load and illness severity are correlated....

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Phytochemical Characterization of Bioactive Compounds on Ethanol Extracts Fermentation Products of Isolate BJDTA21 Endophytic Bacterial Andalas

Azzahrah Khairunnisa Mardhiyah, Dwi Hilda Putri, Violita Violita, Azwir Anhar, Abdul Hafids, Armita Sofani, Try Susanti

The West Sumatra, Indonesia, mascot plant is called Andalas (*Morus macroura* Miq.). This plant belongs to the Moraceae family, which has a long history of being used medicinally. The goal of this study was to evaluate the Andalas ethanol extract's potential to prevent the growth of pathogenic microorganisms....

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Spatial Distribution of Coffee-Based Agroforestry Lands in the Buffer Area of Bromo Tengger Semeru National Park (BTSNP)

Hasan Zayadi, Luchman Hakim, Sudarto, Jati Batoro

Indonesia is a country that has high biodiversity. Deforestation in some areas causes habitat loss, damage/degradation, and fragmentation, which leads to a decline in biodiversity. A landscape-based approach is needed to address these problems. This approach seeks to facilitate multiple interests in...

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Morphology and Anatomy of Stomata of *Plagiobryoides cellularis* in Galunggung Mount Tourist Area Tasikmalaya

Zihan Ayu Anggraeni, Diana Hernawati, Rinaldi Rizal Putra

Plagiobryoides cellularis is a part of mosses that has stomata. Furthermore, *P. cellularis* has different characteristics compared to the other mosses. These facts prove that some Bryophytes have stomata. But unlike other land plants, Bryophyte stomata are located in a capsule. To understand the characteristic...

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Blended Learning Research Trends in Biology Education: A Systematic Review of Literature from 2016 to 2022

Heru Setiawan, Hertien Koosbandiah Surtikanti, Riandi

The problems of face-to-face meetings in Biology classrooms are the lack of flexibility and materials that cannot be accessed anytime and anywhere. Therefore, it needs to be combined with online learning or called blended learning. The purpose of this review is to describe the implementation of online...

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Identification of Mercury and Cyanide Degrading Bacteria in Sekotong People's Mining

Suhadi, S. Zubaidah, Sueb, R. Farahilda, M. Syamsussabri, A. N. Rochmah

The people's gold mining in West Lombok district, especially in the Sekotor sub-district, reached 1497 glondong units and 570 (38%) was disposed into the river. If the situation continued, problems would arise in the environment. This study aimed to determine the microorganisms found in gold mining...

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The Effect of Green Planning Design on Pedestrian Way at Jln. Kyai Tapa, Grogol Petamburan, West Jakarta

Reza Fauzi, Nur Intan Simangunsong

Urban areas have a variety of activities both indoors and outdoors. Green open space is one of the means to support urban community activities. Green open space is one of the essential factors for the urban environment, and pedestrian paths are one of the areas that can become green open spaces for urban...

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Differences in Leaf Functional Traits of *Canarium vulgare* Leenh. Between Two Growth Stages: Mature vs. Seedling

Febrina Artauli Siahaan

This comparative study aimed to understand the life strategies adopted by the tropical tree species: *Canarium vulgare* Leenh by measuring functional leaf traits in two different developmental stages. This study found that there was a noticeable increase in Leaf Mass per Area (LMA), Leaf Dry Matter Content...

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Varietal Identification of Liberica Coffee in Kepulauan Meranti Riau using RAPD Marker: A Preliminary Study

Ninik Nihayatul Wahibah, Rizka Prathama Putri, Atria Martina, Arini Arini, Yasir Sidiq

Identity of plant variety is essential for crop production system. Two liberica coffee varieties, Lim 1 and Lim 2, have been cultivated in Kepulauan Meranti where peat lands area predominantly found. In addition to their adaptability to peat lands, the two varieties also were reported resistant against...

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The Implementation of WE-ARe Learning Model toward the Critical Thinking of Pre-service Biology Teachers

Astuti Muh.Amin, Fitriyah Karmila, Zainal A. Laode, Noor Hujjatusnaini, Romi Adiansyah, Sukardi Abbas

By implementing a learning model that cultivates 21st-century skills, students' critical thinking skills can be enhanced. One of the alternative learning models that can be used to accommodate this is the WE-ARe learning model. This study is quasi-experimental, with a pretest-post-test control group...

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Nutritional Control of Bell Peppers Growth with a Hydroponic System Using the Singh's Fuzzy Time Series Method

A. I. Harsapranata, E. Sedyono, H. D. Purnomo

Research into Hydroponic technology is currently very interesting, especially with the increasingly narrow land area that can be utilized in agriculture. Hydroponic technology helps in the development of cultivated plants with limited land, even with limited sunlight. In this study, the authors conducted...

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Functional and Species Diversity of Butterflies in Relationship to Vegetation Cover of Kiarapayung Biodiversity Park, West Java, Indonesia

W. Asfiya, R. P. Narakusumo, A. Winara, D. Dwibadra, Darmawan, Sarino, Y. Budiasih, A. Ruswandi, D. A. Samsudin, D. Peggie, A. D. Sutadian, H. Gunawan

Anthropogenic disturbances due to increasing industrialization, human population, and urbanization are reducing biodiversity worldwide. Over the past decades, Indonesia has invested significant effort in reforestation to compensate for the loss of forest resources, such as through Biodiversity Park (Taman...

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Effect of Honey Extender for Spermatozoa Dilution on Fertility and hatchability of Javaen Barb Fish (*Systomus orphoides*)

Sri Hilia, Abinawanto, Astari Dwiranti, Anom Bowolaksono, Fadhillah, Retn
Lestari, Anang Kritanto

Javaen barb fish (*Systomus orphoides*) population was declined due to overfishing and environmental changes. Cultivation efforts have been made, but the high sperm concentration causes a decrease in fertility. Honey extender is used to dilute sperm, maintain buffer balance, and provide nutrition for sperm....

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Natural Compounds, Pharmacological Activities, and Conservation of *Eria* (Orchidaceae)

S. Nurfadilah

Eria is one of the most important medicinal orchid genera. The present study aimed to summarise natural compounds, pharmacological activities, and conservation of *Eria* to reveal the potential of the genus as bioresources for natural product-based medicines and to highlight the importance of conservation...

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New Report from Sebelas Maret Avifauna to Support Green Campus Program

D. P. Sari, J. Wahyudi, A. Primahesa, Y. R. Siwie

The last report on bird identification on the UNS was in 2015 with the results of 50 bird species, while the development and reforestation processes proceeded

rapidly after that. Avifauna is a collection of birds that inhabit a certain localities, the wealth and abundance of which is the basis for further...

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Fish Biodiversity Monitoring in Singkarak Lake, West Sumatra: Comparison of Fish Detections Using Environmental DNA and Conventional Methods

D. I. Roesma, D. H. Tjong, Syaifullah, Nofrita, M. N. Janra, F. D. L. Prawira, V. M. Salis, D. R. Aidil

Singkarak lake is the largest lake in West Sumatra that is experiencing a decline in fish species. The main factors are constructing hydroelectric power plants, degradation, overfishing, and invasive species. Therefore, a reliable non-invasive survey method is needed to detect fish species. A monitoring...

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The Influence of Mung Bean And Ginger Extracts Combination on Blood Glucose Levels of Type-2 Diabetes Mellitus Rats Model

Shanti Listyawati, Elisa Herawati, Tetri Widiyani

Mung bean (*Vigna radiata*) is a nutrient-rich food with a low glycemic index, which is generally served in the form of drinks with various flavors. This study aims to examine the effectiveness of mung bean combined with a ginger (*Zingiber officinale*) extract which contains anti-inflammatory ingredients...

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Effect of Gamal Leaves Extract (*Gliricidia sepium*) on Growth Rate and Feed Conversion Ratio of Bileh Fish (*Rasbora* sp.)

Zulfadhli, Radhi Fadhilah, Dedi Jusadi, Yushinta Fujaya, Farzan Ikhsan, Burhanis

This study aimed to determine the effect of adding gamal leaf extract in artificial feed on the growth rate and feed conversion ratio of bileh fish (*Rasbora* sp.). The method used in this research is the experimental method, with Completely Randomized Design experimental design. There were four treatments...

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The Effect of Cooperative Learning Model Type Think Pairhare (TPS) on the Students' Cognitive at Class X SMAN 1 Suliki

Asti Febrina

This type of research is quasi-experimental. The design that will be used in this study is the randomized posttest only control group. The experimental group was subjected to treatment. The sample in this study used two sample groups, namely experimental class students and control class students who...

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Stem Education and Research-Based Learning Activities on Taste Roasted in Coffee

Ika Priantari, Suratno Suratno, Dwi Wahyuni, Dafik Dafik

Society Era 5.0 is a society that can solve various challenges and social problems by utilizing various innovations from the Industrial Revolution Era 4.0. To be able to face the society era 5.0, students have to be equipped with 21st century skills and basic literacy skills (data literacy, technological...

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Stability of Production of Active Antibiotic Compounds by Andalas Endophyte Bacteria (*Morus Macroura* Miq.) at Several Subculture Frequency

Dwi Hilda Putri, Iffa Sakina Haq, Dezi Handayani, Violita, Nurhasnah, Irdawati

To maintain the viability of bacteria during the development and utilization process, it is necessary to rejuvenate the bacteria through a subculture process. It is interesting to know whether the activity of the antibiotic compounds and the genetic stability of Andalas endophytic bacteria will remain...

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Primers Design and PCR Optimization for Developing *Salmonella* Sp. Detection Method on Refillable Drinking Water Sample

Oswal Yuselman, Dwi Hilda Putri, Yuni Ahda, Afifatul Achyar

One of the parameters of drinking water quality is not contaminated by coliform bacteria such as *Salmonella* sp. This bacteria can infect humans through oral routes causing infection of the gastrointestinal tract (Salmonellosis). Generally, analysis testing of coliform bacteria in water can be done using...

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Optimization of Multiplex PCR for Detection of Rat Meat-Contaminated Beef-Based Food Product

Afifatul Achyar, Moralita Chatri, Lisna Khairiyah S

Food safety is an important point in consuming food, in order to produce good health for the community. But lately there were many foods circulating in the community that are no longer guaranteed to be safe, namely the existence of counterfeiting and mixing beef with other meats such as rat meat. Rat...

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In Silico PCR Study Amplifying Mitochondrial *ND5* Gene to Detect Food Adulteration

Moralita Chatri, Afifatul Achyar, Dwi Hilda Putri, Dezi Handayani

The design of the primers affects the PCR's specificity. A mitochondrial gene called Cyt-b is frequently used in PCR to detect the presence of pork, but because the sequence is nearly identical to that of bovine Cyt-b, false positive results frequently occur in lab tests. Therefore, the purpose...

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The Effect of Various Agitation Speeds on Lipid Production from Fungal BR 2.2 Isolate

Adriana Tita Suryawati, Miftahul Ilmi

Biodiesel is an alternative energy that can be sourced from oleaginous microbes to form of single-cell oil. BR 2.2 isolate is classified as oleaginous organisms because of their ability to accumulate lipids for 28.44% of the total dry biomass. The speed of agitation in the lipid production process is...

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The Combination Effect of Auxin and Cytokinin on Callus Induction of Patchouli (*Pogostemon Cablin* Benth.) from Leaf Explants

Rut Normasari, Estri Laras Arumingtyas, Rurini Retnowati, Wahyu Widoretno

Patchouli, also known as *Pogostemon cablin* Benth., is a plant that yields patchouli oil, a crucial essential oil used in the perfume industry. Stem cuttings are the conventional method of vegetative propagation for patchouli plants. Tissue culture techniques offer alternative approaches for vegetative...

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Determination of Vitamin A and Mineral Levels (Zinc and Selenium) in Asam Kandis Fruit Peel Extract (*Garcinia Cowa Roxb*)

Prima Minerva, Elsa Yuniarti, Ringga Novelni

Traditional medicine has historically employed the West Sumatran herb *Garcinia cowa* Roxb, often known as asam kandis. Flavonoids are one of many phytochemicals found in the rind of asam kandis. Since the rind of *G. cowa* has been shown to have antioxidant action, it is frequently utilized as a medicinal...

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Optimization of Multiplex PCR for Detection of Pork-Contaminated Beef-Based Food Product

Moralita Chatri, Afifatul Achyar, Cahay Kamila Putri

The development of globalization affects Indonesia, especially science and technology in the field of food biotechnology. Molecular analysis method, namely Polymerase Chain Reaction (PCR) can be used to detect the food authentication. One of the modifications developed from the conventional PCR method...

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Level of Knowledge and Behavior of Students in Maintaining Reproductive Health

Nurul Huda, Didik Priyandoko, K. Mimin Nurdjani

This study aims to determine the level of knowledge and behavior of students on reproductive health. This research is quantitative research. The sample consisted of 30 students (XI IPA SMA). The instruments used in this study include a need assessment to find out things that have been/have not been studied....

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Self-regulated Learning and Metacognitive Ability in Neuroscience

Vica Dian Aprelia Resti, Siti Romlah Noer Hodijah, Mudmainah Vitasari

Online learning makes great demands, including in terms of self-regulated learning. Self-regulated learning in terms of using learning resources to find solutions to learning problems in terms of concept discovery and problem-solving of their own learning patterns. This is related to the concept of self-knowledge...

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Grogol Petamburan, West Jakarta

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Keywords

Landscape Design; Comfort; Pedestrians

Abstract

Urban areas have a variety of activities both indoors and outdoors. Green open space is one of the means to support urban community activities. Green open space is one of the essential factors for the urban environment, and pedestrian paths are one of the areas that can become green open spaces for urban areas. In addition to being a means of accessibility for the community, pedestrian paths can also be an identity for urban areas. The purpose of this study is to identify how an appropriate and suitable landscape design will affect users and the surrounding environment and look for factors that can influence the utilization of pedestrian paths to solve problems that arise so that the use of pedestrian paths can run optimally. The problem encountered at the research location is the lack of precise green arrangement on the pedestrian path, causing the influence of the existing green layout design to be not optimal for pedestrian activities. The proper arrangement of plants, in addition to adding comfort to the user, will also increase the aesthetic value of an area. This study uses the quantitative method to test specific theories by examining the relationship between variables obtained from survey results and data collection. Green Planning Design, using plant species, and pedestrian activities are the aspects studied in this study. The success of green open space is strongly influenced by the landscape design applied to the area, from the spatial arrangement to the arrangement of the supporting elements used on the pedestrian path.

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The Effect of Green Planning Design on Pedestrian Way at Jln. Kyai Tapa, Grogol Petamburan, West Jakarta

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Abstract. Urban areas have a variety of activities both indoors and outdoors. Green open space is one of the means to support urban community activities. Green open space is one of the essential factors for the urban environment, and pedestrian paths are one of the areas that can become green open spaces for urban areas. In addition to being a means of accessibility for the community, pedestrian paths can also be an identity for urban areas. The purpose of this study is to identify how an appropriate and suitable landscape design will affect users and the surrounding environment and look for factors that can influence the utilization of pedestrian paths to solve problems that arise so that the use of pedestrian paths can run optimally. The problem encountered at the research location is the lack of precise green arrangement on the pedestrian path, causing the influence of the existing green layout design to be not optimal for pedestrian activities. The proper arrangement of plants, in addition to adding comfort to the user, will also increase the aesthetic value of an area. This study uses the quantitative method to test specific theories by examining the relationship between variables obtained from survey results and data collection. Green Planning Design, using plant species, and pedestrian activities are the aspects studied in this study. The success of green open space is strongly influenced by the landscape design applied to the area, from the spatial arrangement to the arrangement of the supporting elements used on the pedestrian path.

Keywords: Landscape Design · Comfort · Pedestrians

1 Introduction

Green open space can be met through the availability of urban forests, green open space, and reforestation in residential or office yards. Furthermore, green open space helps socialize and exercise, improving the quality of the residential environment (Winandari, 2015). Pedestrian paths can be a place that accommodates community activities and can also function as linear green open spaces that become spaces for interaction and become the identity of urban areas. Good pedestrian paths should be able to be passed or accessed by all levels of society, including people with special needs.

The pedestrian area on Jln. Kyai Tapa Grogol is an active pedestrian path because it is located in an urban area (Commercial and Offices), so sometimes the pedestrian path in this area is quite crowded. Therefore, arranging a suitable landscape to support activities on the pedestrian path is necessary. The main activity on the pedestrian path is walking; therefore, the main activity must be raised and equipped with other aspects of activities so that it will create an integration of existing activities.

The general problem is that the existing facilities or supporting elements have not functioned optimally, so pedestrian activities as the primary users have not been accommodated optimally. The phenomenon that often occurs is the misuse of the function of space or facilities by informal and other activities. Therefore, the proper arrangement of the pedestrian path by maximizing the primary function of the pedestrian path as a walking area will significantly affect the main activities on the pedestrian path.

The pedestrian path is a means of accessibility or connecting one area to another. It is necessary to consider the proper arrangement so that the main activities in the area take place well and are comfortable for its users.

2 Problem Formulation

- a. What is the current landscape design on Jln. Kyai Tapa, Grogol, West Jakarta, has it met the criteria for landscape design?
- b. Is the arrangement of existing facilities and supporting elements functioning optimally for pedestrian activities?
- c. What is a good landscape design for pedestrian paths in an urban environment?

3 Purpose

- a. Evaluating the existing landscape design on the Jln. Kyai Tapa, Grogol, West Jakarta
- b. Identify patterns and selection of materials, facilities, or supporting elements in the pedestrian path Jln. Kyai Tapa, Grogol, West Jakarta
- c. Identifying the existing green pattern on the Jalan Pedestrian Jln. Kyai Tapa, Grogol, West Jakarta

4 Literature Review

4.1 General Concept of Pedestrian Paths

Sidewalks or pedestrian paths are located side by side with vehicle traffic lanes, which are used explicitly by pedestrians. For pedestrian safety, this sidewalk must be separated from the vehicle traffic lane by a physical structure in the form of a roadblock. Whether or not sidewalks are provided depends on the volume of pedestrians and the traffic volume of the road users, the width of the sidewalks used generally ranges from 1.5 to 3.0 m (Sukoco, 2002). The Flow of vehicles where the relationship between volume, speed, and density is the same. The volume and density of the pedestrian flow increases, from what was originally a free flow to a more crowded condition, so that the speed and movement ahead of other pedestrians decreases. The level of service can be used to determine the

level of comfort on the highway, and it can also be used for pedestrian facilities. With the concept of service level, the comfort factor is the ability to choose a walking speed where pedestrians will walk faster, avoiding conflicts with others related to pedestrian density and volume.

4.2 Criteria Pedestrian

The pedestrian path physically is an architectural form that has a specific shape and provides benefits as space. From the theory of form, space, and architectural arrangement proposed by Ching (1979), form (building architecture) is composed of visual characteristics of its shape, which can be described as follows:

- a. Form is the result of a specific configuration of the surfaces and sides of a form, which is the main characteristic of a constructive form.
- b. Dimensions, regarding width, length, and height, where these dimensions also determine proportions.
- c. Color is a pattern of intensity and tone on the surface of a form. Color is the most striking attribute that distinguishes a form from its environment. Color also affects the visual weight of a form.

4.3 The Pedestrian Zone

The pedestrian zone consists of several parts, namely the front zone of the building, the use zone for pedestrians, the plant/furniture zone, and the roadside zone (The Guidelines for Provision and Utilization of Infrastructure and Facilities for Pedestrians in Urban Dept. PU, 2012 - Pedoman Penyediaan dan Pemanfaatan Prasarana dan Sarana Ruang Pejalan Kaki di Perkotaan Dept.PU, 2012).

4.4 Pedestrians

According to Amos Rapoport (1977), based on the speed, the walking mode has the advantage of being low speed, so it is advantageous because it can observe the surrounding environment and objects in detail and is quickly aware of the surrounding environment.

4.5 Circulation and Parking

The urban circulation includes the available road infrastructure, the shape of the urban structure, public service facilities, and the level of vehicle density in the urban area. Circulation flow can be interpreted as a “rope” that binds the spaces of a building or a series of indoor and outdoor spaces to be interconnected, as expressed by Francis DK Ching, 1993.

4.6 Elements Landscape

Elements Landscape are everything in the form of objects, sounds, colors, and atmospheres that make up the landscape, both natural and artificial. (Procedures for Road Landscape Engineering Planning, No: 033/T/Bm/1996 March 1996, Ministry of Public Works, Directorate General of Highways.

4.7 The Planting Path

The planting path is a path for placing plants and other landscape elements within the Road Owned Area (Daerah Milik Jalan - DAMIJA) or in the Road Monitoring Area (Daerah Pengawasan Jalan DAWASJA). Often called the green line because of the dominance of landscape elements and plants that are generally green. (Procedures for Road Landscape Engineering Planning, No: 033/T/Bm/1996 March 1996, Ministry of Public Works, Directorate General of Highways - Tata Cara Perencanaan Teknik Lansekap Jalan, No: 033/T/Bm/1996 Maret 1996, Departemen Pekerjaan Umum Direktorat Jenderal Bina Marga).

4.8 Elements of Pedestrian Paths

According to Rubenstein (1992), elements of pedestrian paths include:

1. Paving is a flat pavement or expanse (Echols, JM, 1983). In this case, paying attention to the scale of the pattern, color, texture, and absorption of running water are essential.
2. Lamps are used as lighting at night. Several types of lights are elements of supporting urban design (Chearra, 1978).
3. Signs, elements intended for providing an identity, information, or prohibition.
4. Sculptures, elements intended to provide an identity, information, or prohibition, or attract attention (vocal points), are usually located in the middle or front of the plaza.
5. Bollards are elements for being barriers between pedestrian paths and vehicle lanes. They are usually used in conjunction with laying lamps.
6. Bench, to provide a rest area when tired of walking and give pedestrians time to enjoy the atmosphere of the surrounding environment.
7. The shade plants, for covering and conditioning pedestrian paths. According to Rustam Hakim (1987), the criteria for plants needed for pedestrian paths are resistance to the effects of air and weather and also the dense leaf mass.
8. The kiosks' existence can liven up the atmosphere on the pedestrian path so that it is not monotonous. Especially kiosks for buying and selling activities, if at any time pedestrians are needed.
9. Trash cans should be placed on pedestrian paths to keep them clean.
10. Halte, Harris and Dinnes (1988) stated that the requirement for a bus stop is to have freedom of sight towards arrival, both standing and sitting at the stop, and the bus stop zone must be part of the pedestrian access network. According to 1993 Minister of Transportation Decree no. 65 of 1993 bus stop facilities should be built close to pedestrian crossing facilities.

4.9 Transition Area

The transition area is expected to be a facility for pedestrians where after they rest, they can continue their journey back on foot (Irawati & Utami, 2013).

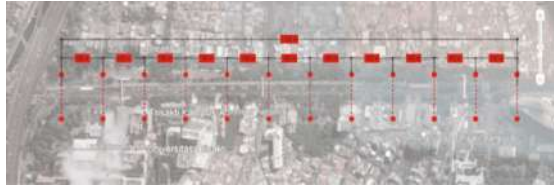


Fig. 1. Research Locations

5 Research Methods

5.1 Time and Place of Research

The research was conducted on Jln. Kyai Tapa, Grogol, West Jakarta. The area is quite busy with activities because it is in the middle of the city with several buildings, such as campuses, shopping centers, hotels, and terminals. Furthermore, the area is not far from the residential area, so the pedestrian path on Jln. Kyai Tapa, Grogol, West Jakarta, is a pedestrian path that is quite busy with activities (Fig. 1).

5.2 Methods of Analysis

In this research, the method used is a quantitative method. Quantitative research is a method used to test certain theories by examining the relationship between variables. These variables will be measured so that the data collected and consists of numbers can be analysed based on statistical procedures. (Cresswell, 2012).

- Data processing is done by processing the results of survey activities, interviews along with various kinds of information and data obtained during field surveys
- Examination of survey and interview data is carried out by comparing, identifying with data and information obtained from literature studies.

The variables determined in this study include: 1) Functional variables where each facility is on the pedestrian path that affects pedestrian comfort. 2) User comfort is closely related to the arrangement of the green layout and facilities located on the pedestrian path, whether the existing facilities and arrangements have given and have a positive effect on users.

5.3 Data Collection Method

The primary data collection method was conducted by field observation, and secondary data collection was carried out via the internet or other literature. Data analysis using descriptive statistical analysis method is used to analyze the data that has been collected by describing or describing the data.

6 Discussion

6.1 Overview

This research was conducted on a pedestrian path on Jln. Kyai Tapa, Grogol, West Jakarta. Specifically on the pedestrian path on the side of the Trisakti Campus Jln. Kyai Tapa, Grogol from the Reform Monument (12 May) to the Police Office near Roxy Mall. The discussion in this research is carried out on the pedestrian path, which will be divided into two parts; the pedestrian path arrangement and the pedestrian path is green arrangement. The activities on the pedestrian path Jln Kyai Tapa, Grogol are relatively active. This existence is in an urban area between office buildings, hotels, campuses, and terminals, especially during and after work.

6.2 Pedestrian Path Arrangement

According to the Guidelines for Building Construction Materials and Civil Engineering, (Pedestrian Facility Technical Planning, Ministry of PUPR 2018). The general principles of pedestrian facility planning must at least meet the following rules:

- a) Fulfilling aspects of system integration, from environmental management, transportation systems, and inter-regional accessibility;
- b) Fulfilling aspects of continuity, namely connecting the place of origin to the destination and vice versa;
- c) Meet the safety, security, and comfort aspects;
- d) Fulfilling the accessibility aspect, the planned facilities must be accessible to all users, including users with various physical limitations.

In points C and D, it can be concluded that comfort and usability must be accessible to all users. Therefore the arrangement of the pedestrian path will affect user convenience. Without a proper arrangement, the function of the pedestrian path will not be optimal due to disturbances or problems that arise if the arrangement of the pedestrian path is not appropriate and follows the conditions or circumstances of the existing location (Fig. 2).

The picture above shows the existing condition of the pedestrian path on the campus side of Jln. Kyai Tapa, Grogol Petamburan, West Jakarta. The green layout in the pedestrian area looks not optimal; visually, it can be seen that there are a lot of empty



Fig. 2. Existing Condition of Pedestrian Paths.

spaces that can be filled by greening. Besides, the current plant arrangement is also not good because the functions of these plants are not optimal.

6.3 The Green Arrangement for Pedestrian Paths

Murdaningsih (2010) states that plants or vegetation on the road must meet efficiency, comfort, and safety aspects as well as an attractive appearance for the smooth circulation of road users. Vegetation has several functions for open spaces that can be used as a reference in determining and organizing the vegetation or green needs of open spaces.

Choosing the type of plant will be maximized if it is adjusted to the function that will appear according to the conditions and character of the site. Plants or vegetation on pedestrian paths generally serve as barriers, directions, safety, and shade.

According to Rustam Hakim (2004), plants' function not only contains aesthetic value but also serves to improve the quality of the surrounding environment. The various functions of plants can be classified as follows: 1) Visual Control, 2) Physical Barriers, 3) Climate Control, 4) Erosion Prevention, 5) Animal Habitat, and) Aesthetic Value.

Some of these things can be the basis for structuring a green space on a pedestrian path. An appropriate landscape arrangement will create a pedestrian area with maximum function for users and the surrounding environment. In addition, to maximize the existence of pedestrian paths in urban environments, it is also necessary to consider the criteria for vegetation or plants used. Based on the Regulation of the Minister of Public Works Number: 05/PRT/M2008 concerning Guidelines for Provision and Utilization of Green Open Space in Urban Areas, namely:

1. Non-Toxic, No Thorns, Roots do not disturb the foundation
2. Header is quite shady but not too dark
3. The height of the plant varies; the green color with other color variations is balanced
4. Beautiful stature and header shape
5. Medium growth speed
6. In the form of local and seasonal plant habitats
7. Spacing closely to produce optimal shade
8. Resistant to plant pests and diseases
9. Able to absorb polluted air
10. Wherever possible is a plant that invites birds or small animals such as butterflies

6.4 Character Analysis of Green Planning on Pedestrian Paths

The arrangement of plants or green on the pedestrian path, Jln Kyai Tapa, Grogol, West Jakarta, is in the form of trees, shrubs, and ground cover. However, the arrangement in these areas cannot make the condition of this pedestrian path more visually and functionally comfortable (Fig. 3).

The park on the pedestrian path is also known as the green line, which is a place/land/part of the road as a place for planting plants. Parts of the road that are used green lanes include the median road, along the pedestrian path, and the shoulder of the road.

Green Open Space Arrangement Road Network

Arrangement of green open space on the road network such as pedestrian paths in the



Fig. 3. Existing Condition of Pedestrian Paths.

form of greening along the road, both on the edge of the road and the median. The function of the green element on the pedestrian path is as a safety, and protector, giving direction and providing visual quality to drivers and pedestrians, as well as minimizing air pollution and noise from motorized vehicles.

In the development of green space, several things need to be considered, including:

- a. Spacing between trees or shrubs
- b. The arrangement of plants and complementary elements must be kept in mind between the shape and size of the canopy and complementary elements
- c. In order not to give a monotonous impression, the arrangement of plants/trees can be planted crosswise
- d. In addition to security criteria, it is also necessary to pay attention to the quality or visual appearance to improve the area's aesthetic quality.

Bararatin and Hayati [2016](#) (cited from McClusky, 1992) state that plants in an environment provide deep psychological satisfaction for users in that area. Plants have been used concerning pedestrian paths, namely (Fig. 4):

1. Ecological functions, such as absorbing toxic gases and expelling oxygen
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The arrangement of the green line must be adjusted to the objectives to be achieved and adapted to the environment's location to form the area's character. The arrangement and selection of plant species must pay attention to various aspects such as the form of space, growing conditions, plant functions, and maintenance procedures. Elements of green planning on public pedestrian paths are related to aesthetics; in addition to choosing the type, paying attention to plant composition is also very important to form an area with maximum function and visual quality.

The green layout on pedestrian paths will affect pedestrian path users, in addition to sufficient space for comfort, such as shade, and comfort for the user's eye, it also needs to be a concern in structuring pedestrian paths. Pedestrian activities can be grouped into six: walking, standing, sitting, lying down, running, and playing. The most common activities are Walking, standing, and sitting. Based on interests, activities can still be divided into three types, namely necessary activity (the main activity), optional activity (the additional activities including leisurely walks and enjoying the scenery), and following activity (the social activities, including sitting relaxed and interacting). Based on this, it can be said that a good activity is if the additional activity is greater than the main activity. (Rahadi, Fitra Anindya 2003).

Figure 6 shows how a good plant composition in landscape arrangement and using low to high-height plants will provide a pleasing pedestrian experience. A good plant composition will also maximize the function of plants applied to the pedestrian path area, such as a space divider, protection from pedestrian paths, and creating a microclimate in the pedestrian path area.

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The Plant strata in the green system must be applied to pedestrian paths. Besides functioning as the beauty of the application of plant strata ranging from groundcover,

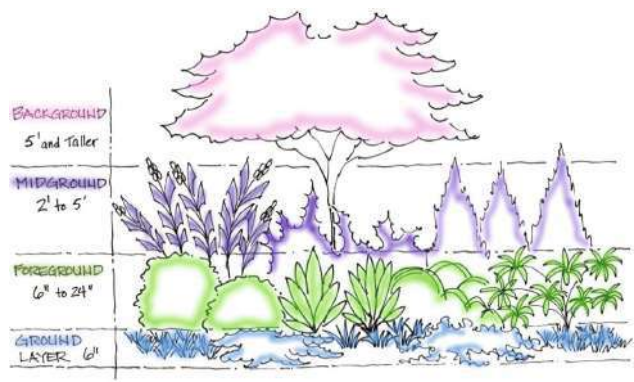


Fig. 5. Plant Composition



Fig. 6. Recommendations for Green. Planning for Pedestrian Paths

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The spacing of trees on the pedestrian path is crucial to pay attention to get maximum shade on a pedestrian path; an encounter between tree canopies will provide maximum shade or minimum spacing for each tree ± 3 m. The wrong green arrangement will affect the comfort of pedestrians, and this should not happen because the pedestrian path should be a means for people to go to a place without using a vehicle. If the pedestrian path is comfortable for users, people's habit of walking will likely increase and reduce the use of motorized vehicles.

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Based on the results of the analysis of the data that has been collected, it shows that the existing green system on the pedestrian path on Jln. Kyai Tapa, Grogol, West Jakarta. Several problems were found on the pedestrian path on Jln. Kyai Tapa, Grogol, West

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The Effect of Green Planning Design on Pedestrian Way at Jln. Kyai Tapa, Grogol Petamburan, West Jakarta

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Abstract. Urban areas have a variety of activities both indoors and outdoors. Green open space is one of the means to support urban community activities. Green open space is one of the essential factors for the urban environment, and pedestrian paths are one of the areas that can become green open spaces for urban areas. In addition to being a means of accessibility for the community, pedestrian paths can also be an identity for urban areas. The purpose of this study is to identify how an appropriate and suitable landscape design will affect users and the surrounding environment and look for factors that can influence the utilization of pedestrian paths to solve problems that arise so that the use of pedestrian paths can run optimally. The problem encountered at the research location is the lack of precise green arrangement on the pedestrian path, causing the influence of the existing green layout design to be not optimal for pedestrian activities. The proper arrangement of plants, in addition to adding comfort to the user, will also increase the aesthetic value of an area. This study uses the quantitative method to test specific theories by examining the relationship between variables obtained from survey results and data collection. Green Planning Design, using plant species, and pedestrian activities are the aspects studied in this study. The success of green open space is strongly influenced by the landscape design applied to the area, from the spatial arrangement to the arrangement of the supporting elements used on the pedestrian path.

Keywords: Landscape Design · Comfort · Pedestrians

1 Introduction

Green open space can be met through the availability of urban forests, green open space, and reforestation in residential or office yards. Furthermore, green open space helps socialize and exercise, improving the quality of the residential environment (Winandari, 2015). Pedestrian paths can be a place that accommodates community activities and can also function as linear green open spaces that become spaces for interaction and become the identity of urban areas. Good pedestrian paths should be able to be passed or accessed by all levels of society, including people with special needs.

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The pedestrian area on Jln. Kyai Tapa Grogol is an active pedestrian path because it is located in an urban area (Commercial and Offices), so sometimes the pedestrian path in this area is quite crowded. Therefore, arranging a suitable landscape to support activities on the pedestrian path is necessary. The main activity on the pedestrian path is walking; therefore, the main activity must be raised and equipped with other aspects of activities so that it will create an integration of existing activities.

The general problem is that the existing facilities or supporting elements have not functioned optimally, so pedestrian activities as the primary users have not been accommodated optimally. The phenomenon that often occurs is the misuse of the function of space or facilities by informal and other activities. Therefore, the proper arrangement of the pedestrian path by maximizing the primary function of the pedestrian path as a walking area will significantly affect the main activities on the pedestrian path.

The pedestrian path is a means of accessibility or connecting one area to another. It is necessary to consider the proper arrangement so that the main activities in the area take place well and are comfortable for its users.

2 Problem Formulation

- a. What is the current landscape design on Jln. Kyai Tapa, Grogol, West Jakarta, has it met the criteria for landscape design?
- b. Is the arrangement of existing facilities and supporting elements functioning optimally for pedestrian activities?
- c. What is a good landscape design for pedestrian paths in an urban environment?

3 Purpose

- a. Evaluating the existing landscape design on the Jln. Kyai Tapa, Grogol, West Jakarta
- b. Identify patterns and selection of materials, facilities, or supporting elements in the pedestrian path Jln. Kyai Tapa, Grogol, West Jakarta
- c. Identifying the existing green pattern on the Jalan Pedestrian Jln. Kyai Tapa, Grogol, West Jakarta

4 Literature Review

4.1 General Concept of Pedestrian Paths

Sidewalks or pedestrian paths are located side by side with vehicle traffic lanes, which are used explicitly by pedestrians. For pedestrian safety, this sidewalk must be separated from the vehicle traffic lane by a physical structure in the form of a roadblock. Whether or not sidewalks are provided depends on the volume of pedestrians and the traffic volume of the road users, the width of the sidewalks used generally ranges from 1.5 to 3.0 m (Sukoco, 2002). The Flow of vehicles where the relationship between volume, speed, and density is the same. The volume and density of the pedestrian flow increases, from what was originally a free flow to a more crowded condition, so that the speed and movement ahead of other pedestrians decreases. The level of service can be used to determine the

level of comfort on the highway, and it can also be used for pedestrian facilities. With the concept of service level, the comfort factor is the ability to choose a walking speed where pedestrians will walk faster, avoiding conflicts with others related to pedestrian density and volume.

4.2 Criteria Pedestrian

The pedestrian path physically is an architectural form that has a specific shape and provides benefits as space. From the theory of form, space, and architectural arrangement proposed by Ching (1979), form (building architecture) is composed of visual characteristics of its shape, which can be described as follows:

- 1 a. Form is the result of a specific configuration of the surfaces and sides of a form, which is the main characteristic of a constructive form.
- b. Dimensions, regarding width, length, and height, where these dimensions also
- 1 determine proportions.
- c. Color is a pattern of intensity and tone on the surface of a form. Color is the most striking attribute that distinguishes a form from its environment. Color also affects the visual weight of a form.

4.3 The Pedestrian Zone

The pedestrian zone consists of several parts, namely the front zone of the building, the use zone for pedestrians, the plant/furniture zone, and the roadside zone (The Guidelines for Provision and Utilization of Infrastructure and Facilities for Pedestrians in Urban Dept. PU, 2012 - Pedoman Penyediaan dan Pemanfaatan Prasarana dan Sarana Ruang Pejalan Kaki di Perkotaan Dept.PU, 2012).

4.4 Pedestrians

According to Amos Rapoport (1977), based on the speed, the walking mode has the advantage of being low speed, so it is advantageous because it can observe the surrounding environment and objects in detail and is quickly aware of the surrounding environment.

4.5 Circulation and Parking

The urban circulation includes the available road infrastructure, the shape of the urban structure, public service facilities, and the level of vehicle density in the urban area. Circulation flow can be interpreted as a “rope” that binds the spaces of a building or a series of indoor and outdoor spaces to be interconnected, as expressed by Francis DK Ching, 1993.

4.6 Elements Landscape

Elements Landscape are everything in the form of objects, sounds, colors, and atmospheres that make up the landscape, both natural and artificial. (Procedures for Road Landscape Engineering Planning, No: 033/T/Bm/1996 March 1996, Ministry of Public Works, Directorate General of Highways.

4.7 The Planting Path

The planting path is a path for placing plants and other landscape elements within the Road Owned Area (Daerah Milik Jalan - DAMIJA) or in the Road Monitoring Area (Daerah Pengawasan Jalan DAWASJA). Often called the green line because of the dominance of landscape elements and plants that are generally green. (Procedures for Road Landscape Engineering Planning, No: 033/T/4n/1996 March 1996, Ministry of Public Works, Directorate General of Highways - Tata Cara Perencanaan Teknik Lansekap Jalan, No: 033/T/Bm/1996 Maret 1996, Departemen Pekerjaan Umum Direktorat Jenderal Bina Marga).

4.8 Elements of Pedestrian Paths

According to Rubenstein (1992), elements of pedestrian paths include:

1. Paving is a flat pavement or expanse (Echols, JM, 1983). In this case, paying attention to the scale of the pattern, color, texture, and absorption of running water are essential.
2. Lamps are used as lighting at night. Several types of lights are elements of supporting urban design (Chearra, 1978).
3. Signs, elements intended for providing an identity, information, or prohibition.
4. Sculptures, elements intended to provide an identity, information, or prohibition, or attract attention (vocal points), are usually located in the middle or front of the plaza.
5. Bollards are elements for being barriers between pedestrian paths and vehicle lanes. They are usually used in conjunction with laying lamps.
6. Bench, to provide a rest area when tired of walking and give pedestrians time to enjoy the atmosphere of the surrounding environment.
7. The shade plants, for covering and conditioning pedestrian paths. According to Rustam Hakim (1987), the criteria for plants needed for pedestrian paths are resistance to the effects of air and weather and also the dense leaf mass.
8. The kiosks' existence can liven up the atmosphere on the pedestrian path so that it is not monotonous. Especially kiosks for buying and selling activities, if at any time pedestrians are needed.
9. Trash cans should be placed on pedestrian paths to keep them clean.
10. Halte, Harris and Dinnes (1988) stated that the requirement for a bus stop is to have freedom of sight towards arrival, both standing and sitting at the stop, and the bus stop zone must be part of the pedestrian access network. According to 1993 Minister of Transportation Decree no. 65 of 1993 bus stop facilities should be built close to pedestrian crossing facilities.

4.9 Transition Area

The transition area is expected to be a facility for pedestrians where after they rest, they can continue their journey back on foot (Irawati & Utami, 2013).

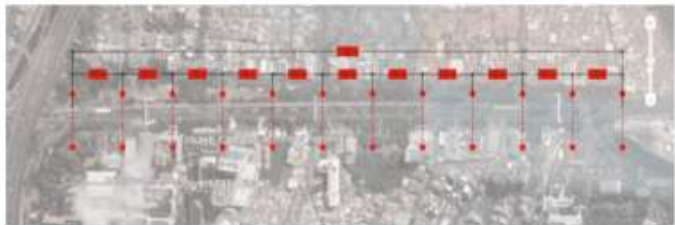


Fig. 1. Research Locations

5 Research Methods

1 5.1 Time and Place of Research

The research was conducted on Jln. Kyai Tapa, Grogol, West Jakarta. The area is quite busy with activities because it is in the middle of the city with several buildings, such as campuses, shopping centers, hotels, and terminals. Furthermore, the area is not far from the residential area, so the pedestrian path on Jln. Kyai Tapa, Grogol, West Jakarta, is a pedestrian path that is quite busy with activities (Fig. 1).

5.2 Methods of Analysis

3 In this research, the method used is a quantitative method. Quantitative research is a 5 method used to test certain theories by examining the relationship between variables. These variables will be measured so that the data collected and consists of numbers can be analysed based on statistical procedures. (Cresswell, 2012).

- Data processing is done by processing the results of survey activities, interviews along with various kinds of information and data obtained during field surveys
- Examination of survey and interview data is carried out by comparing, identifying with data and information obtained from literature studies.

The variables determined in this study include: 1) Functional variables where each facility is on the pedestrian path that affects pedestrian comfort. 2) User comfort is closely related to the arrangement of the green layout and facilities located on the pedestrian path, whether the existing facilities and arrangements have given and have a positive effect on users.

5.3 Data Collection Method

The primary data collection method was conducted by field observation, and secondary data collection was carried out via the internet or other literature. Data analysis using descriptive statistical analysis method is used to analyze the data that has been collected by describing or describing the data.

6 Discussion

6.1 Overview

This research was conducted on a pedestrian path on Jln. Kyai Tapa, Grogol, West Jakarta. Specifically on the pedestrian path on the side of the Trisakti Campus Jln. Kyai Tapa, Grogol from the Reform Monument (12 May) to the Police Office near Roxy Mall. The discussion in this research is carried out on the pedestrian path, which will be divided into two parts; the pedestrian path arrangement and the pedestrian path is green arrangement. The activities on the pedestrian path Jln Kyai Tapa, Grogol are relatively active. This existence is in an urban area between office buildings, hotels, campuses, and terminals, especially during and after work.

6.2 Pedestrian Path Arrangement

According to the Guidelines for Building Construction Materials and Civil Engineering, (Pedestrian Facility Technical Planning, Ministry of PUPR 2018). The general principles of pedestrian facility planning must at least meet the following rules:

- a) Fulfilling aspects of system integration, from environmental management, transportation system² and inter-regional accessibility;
- b) Fulfilling aspects of continuity, namely connecting the place of origin to the destination and vice versa;
- c) Meet the safety, security, and comfort aspects²
- d) Fulfilling the accessibility aspect, the planned facilities must be accessible to all users, including users with various physical limitations.

In points C and D, it can be concluded that comfort and usability must be accessible to all users. Therefore the arrangement of the pedestrian path will affect user convenience. Without a proper arrangement, the function of the pedestrian path will not be optimal due to disturbances or problems that arise if the arrangement of the pedestrian path is not appropriate and follows the conditions or circumstances of the existing location (Fig. 2).

The picture above shows the existing condition of the pedestrian path on the campus side of Jln. Kyai Tapa, Grogol Petamburan, West Jakarta. The green layout in the pedestrian area looks not optimal; visually, it can be seen that there are a lot of empty



Fig. 2. Existing Condition of Pedestrian Paths.

spaces that can be filled by greening. Besides, the current plant arrangement is also not good because the functions of these plants are not optimal.

6.3 The Green Arrangement for Pedestrian Paths

Murdaningsih (2010) states that plants or vegetation on the road must meet efficiency, comfort, and safety aspects as well as an attractive appearance for the smooth circulation of road users. Vegetation has several functions for open spaces that can be used as a reference in determining and organizing the vegetation or green needs of open spaces.

Choosing the type of plant will be maximized if it is adjusted to the function that will appear according to the conditions and character of the site. Plants or vegetation on pedestrian paths generally serve as barriers, directions, safety, and shade.

According to Rustam Hakim (2004), plants' function not only contains aesthetic value but also serves to improve the quality of the surrounding environment. The various functions of plants can be classified as follows: 1) Visual Control, 2) Physical Barriers, 3) Climate Control, 4) Erosion Prevention, 5) Animal Habitat, and) Aesthetic Value.

Some of these things can be the basis for structuring a green space on a pedestrian path. An appropriate landscape arrangement will create a pedestrian area with maximum function for users and the surrounding environment. In addition, to maximize the existence of pedestrian paths in urban environments, it is also necessary to consider the criteria for vegetation or plants used. Based on the Regulation of the Minister of Public Works Number: 05/PRT/M2008 concerning Guidelines for Provision and Utilization of Green Open Space in Urban Areas, namely:

1. Non-Toxic, No Thorns, Roots do not disturb the foundation
2. Header is quite shady but not too dark
3. The height of the plant varies; the green color with other color variations is balanced
4. Beautiful stature and header shape
5. Medium growth speed
6. In the form of local and seasonal plant habitats
7. Spacing closely to produce optimal shade
8. Resistant to plant pests and diseases
9. Able to absorb polluted air
10. Wherever possible is a plant that invites birds or small animals such as butterflies

6.4 Character Analysis of Green Planning on Pedestrian Paths

The arrangement of plants or green on the pedestrian path, Jln Kyai Tapa, Grogol, West Jakarta, is in the form of trees, shrubs, and ground cover. However, the arrangement in these areas cannot make the condition of this pedestrian path more visually and functionally comfortable (Fig. 3).

The park on the pedestrian path is also known as the green line, which is a place/land/part of the road as a place for planting plants. Parts of the road that are used green lanes include the median road, along the pedestrian path, and the shoulder of the road.

Green Open Space Arrangement Road Network

Arrangement of green open space on the road network such as pedestrian paths in the



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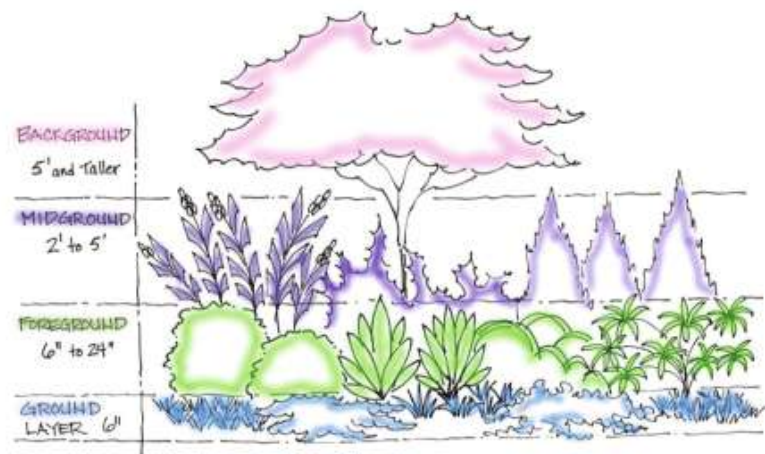


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