SCIENTIFIC PROGRAM BOOK

Empowering Future Scientists for Global Food and Environmental Resilience

December 15th, 2025

The 5th International Undergraduate Conference on Agriculture & Life Sciences

University of Bengkulu
Bengkulu, Indonesia

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15 December 2025

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	08.15 – 08.20	Praying	**Mr. Rasyid**
	08.20 – 08.25	Indonesian National Anthem "Indonesia Raya"	**Committee**
	08.25– 08.30	Opening remarks by the chairman	**Dr. Nurmeiliasari**
	08.30– 08.35	Opening remarks from the Dean of Princess of Naradhiwas University	**Assoc. Prof. Dr. Jakkhapan Pitchayapipatkul**
	08.35– 08.40	Opening remarks from the Dean of Yala Rajabhat University	**Asst. Prof. Dr. Wilaiwan Kaewtathip**
	08.40– 08.45	Opening remarks and officially opening the 5th IUCA by the Rector of the University of Bengkulu	**Prof. Dr. Indra Cahyadinata, S.P., M.Si.**
	08.45– 08.55	Keynote speaker sessions	Moderator
	08.55 – 09.15	Keynote Speaker 1	**Prof. Bora Kaydan** **"Use of Smart Traps in Insect Pest Management"**
	09.15-09.25	Question and Answer	Moderator
	09.25 – 09.45	Keynote Speaker 2	**Assoc. Prof. Dr. Sukree Hajisamae** **"Community Crab Bank (CCB): A Strategic Tool for Sustainable Seafood and Coastal Environmental Resilience"**
	09.45 - 09.55	Question and Answer	Moderator
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	10.15-10.25	Question and Answer	Moderator
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	10.35 – 12.00	Parallel Session Breakout Room	Committee and Presenter
	12.30-13.00	Best Presenter Announcement Closing Ceremony Closing Remark	Committee

WELCOMING REMARKS

The Rector of the University of Bengkulu

Welcoming Remarks Rector of University of Bengkulu Prof. Dr. Indra Cahyadinata, S.P., M.Si Greetings from Bengkulu!

Assalamualaikum warahmatullahi wabarakatuh.

Honorable colleagues, respected co-organizers, and our bright undergraduate participants from many universities and countries, it is my great honor, as Rector of the University of Bengkulu, to welcome you all to the 5th International Undergraduate Conference in Agriculture and Life Sciences, IUCA 2025. This year, we are proud to host the conference in collaboration with Yala Rajabhat University, Prince of Songkla University, and Princess of Naradhiwas University. Together, we have built a platform where young scholars can share their research, exchange ideas, and strengthen international academic collaborations. IUCA is more than a conference; it is a celebration of innovation, diversity, and collaboration. I encourage each of you to participate fully, to learn from one another, and to let this experience inspire new perspectives for the future of agriculture and life sciences.

With great joy, I now declare the 5th International Undergraduate Conference in Agriculture and Life Sciences officially open.

Welcome, and may this conference be a meaningful journey for us all.

Wassalamualaikum warahmatullahi wabarakatuh.

Bengkulu, December 2025

CHAIRMAN REMARKS

Welcoming remarks chairman of the IUCA 2025 committee Dr. Ir Nurmeiliasari, S.Pt., M.Sc

Assalamualikum wrahmatullahi wabarakatuh.

It is a great honor for me to present the activity report of the 5th International Undergraduate Conference on Agriculture (IUCA 2025). This conference has consistently served as an important international platform for undergraduate students and young researchers to share ideas, present research findings, and engage in meaningful academic discussions. The University of Bengkulu, in collaboration with Princess Naradhiwas University, Prince of Songkla University, Yala Rajabhat University, and Cukurova University, organized IUCA 2025 and hosted 43 participants across diverse fields—from Animal Science and Food Technology to Marine Studies and Fisheries. Their varied backgrounds enrich discussions and highlight the interdisciplinary nature of agricultural and life sciences. Participants from Malaysia, Thailand, Indonesia, and Turkey further underscore IUCA's growing role in fostering international collaboration and cross-cultural exchange among young scholars. We sincerely hope that this seminar will provide valuable academic experiences, broaden participants' perspectives, and strengthen global networks that support future collaboration in agriculture, fisheries, and life sciences.

On behalf of the organizing committee, I would like to express our most profound appreciation to all contributors, respected speakers, enthusiastic participants, and supportive co-organizers whose commitment and cooperation have made this conference possible. May IUCA 2025 run smoothly and yield meaningful outcomes for advancing science and international collaboration.

Thank you.

Bengkulu, December 2025

THE COMMITTEE

The 5th International Undergraduate Conference on Agriculture & Life Sciences

List of Committee

Organizer: University of Bengkulu, Indonesia

Co-Organizer:

Princess of Naradhiwas University, Thailand
Yala Rajabhat University, Thailand
Prince of Songkla University, Pattani Campus, Thailand
Cukurova University, Turkey

Keynote Speaker

1. **Prof. Bora Kaydan**
   Presentation title: Use of Smart Traps in Insect Pest Management.
2. **Assoc. Prof. Dr. Sukree Hajisamae**
   Presentation title: Community Crab Bank (CCB): A Strategic Tool for Sustainable Seafood and Coastal Environmental Resilience.
3. **Assoc. Prof. Dr. Yansen**
   Presentation title: Challenges and opportunities in plant conservation in the tropics: Perspectives from Sumatra, Indonesia.

Steering Committee	**Dr. Indra Cahyadinata, S.P., M.Si.**
	Prof. Agustin Zarkani, S.P., M.Si., Ph.D
	Prof. Dr. Kamaludin, S.E., M.M
	Dr. Yulian Fauzi, S.Si., M.Si
	Prof. Ashar Muda Lubis, S.Si., M.Sc., Ph.D
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	Syafa Aisyah Putri
	Fikri Luthfi
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Division Equipment & Logistics	**Dery Sepriansyah**
Division Documentation	**M. Fikro Habibullah**
Division Consumption Division	**Buchari Hakim**

PARALLEL SESSION

A. Room 1 (10.40-12.35 WIB)

Moderator : Rahayu Arraudah, SP., M.Si

Operator : Citra Washita Dwi Oktitania

NO	PRESENTER	TIME	TITLE	TOPICS
1	Ivana Maharani Putri	10.40-10.50	Morphological characterization of Spores and Analysis of Leaf Rust Disease Severity on Welsh Onion (Allium fistulosum L.) in the Horticultural Center of Rejang Lebong	Plant Protection
2	Hengki Windra	10.50 - 11.00	Detection, Molecular Characterization, and Host Interaction Analysis of Tomato Yellow Leaf Curl Kanchanaburi Virus (TYLCKaV) in Chili Pepper (Capsicum annuum L.) from Bengkulu, Indonesia	Plant Protection
3	Rofen Diantara	11.00 - 11.10	The Potential of Arbuscular Mycorrhizal Fungi (AMF) in Controlling Rust Disease (Puccinia allii) Bunching Onion (Allium fistulosum L.)	Plant Protection
4	Aksan Sutopo	11.10 - 11.20	Growth Rate and Leaf Rust Disease Infection of Puccinia alli on Spring Onion in Rejang Lebong Allium fistulosum L.	Plant Protection
5	Deka Apriyadi	11.20 - 11.30	Potensi Trichoderma sp. Dalam Mengendalikan Penyakit Karat Pada Tanaman Bawang Daun (Allium fistulosum L.)	Plant Protection
6	Binsaman, F., Thepkamnerd, P. and Kaewchai, S.	11.30 - 11.40	Control of Colletotrichum siamense the Causal Agent of Leaf Fall Disease of Rubber Trees using Trichoderma sp.	Plant Protection
7.	Petek Yanık, Gülbeyaz Peko, Mehmet Bora Kaydan	11.40-11.50	Experience of using the adaptogen ApaSil in Turkiye	Plant Protection

B. Room 2 (10.40-12.40 WIB)
Moderator : Nurlina Maratana Nabiu, S.Pi., M.Si
Operator : Iqbal Fahmi Muttaqin

NO	PRESENTER	TIME	TITLE	TOPICS
1	Zulmansyah	10.40-10.50	Comparative Study of Shoreline Change Using the Digital Shoreline Analysis System (DSAS) and QGIS Shoreline Change Analysis Tools (QSCAT) in Bengkulu City	Marine, Aquaculture and Fisheries
2	Syafa Aisyah Putri	10.50 - 11.00	Mapping Mangrove Spatial Distribution in Muara Jenggalu Bengkulu City Using Sentinel-2a Imagery and Obia	Marine, Aquaculture and Fisheries
3	Sigit Widianto Firsta	11.00 - 11.10	Application of Remote Sensing Technology for Estimating Above-Ground Mangrove Carbon Stock Using Sentinel-2a Imagery in Banjarsari, Enggano	Marine, Aquaculture and Fisheries

C. Room 3 (10.40-11.40 WIB)
Moderator : Arina Fatharani, SP.,M.Sc.
Operator : Fatimah Azzahra

NO	PRESENTER	TIME	TITLE	TOPICS
1	Waris Rahman	10.40-10.50	Pharmacological Evaluation of the Antihyperglycemic Efficacy of Musa paradisiaca var. Enggano Peel Infusion: A Comparative Study on Biogeographical Potency in Streptozotocin-Induced Mice (Mus Musculus)	Pharmacy/ Food Science
2	Samsuree Seenamnung	10.50 - 11.00	Effects of Chitosan Coating on Eggshell Preservation and Egg Quality	Food Science
3	M. Byan Pamungkas	11.00 - 11.10	Organoleptic Properties and Economic Value of Milk Candy with the Addition of Granulated Palm Sugar (Arenga pinnata) and Cinnamon Bark Powder (Cinnamomum burmannii)	Food Science
4	Eriyansyah Saputra	11.10 - 11.20	Effect of Coconut Shell Liquid Smoke Concentration on the Quality of Dried Smoked Bleberan Fish (Thryssa sp.)	Food Science

5	Taufik	11.10 - 11.20	Aquatic Animals and Water Quality Variance in The Reservoir Area, Narathiwat College of Agriculture and Technology, Narathiwat, Thailand	Marine, Aquaculture and Fisheries

D. Room 4 (10.30-12.00 WIB)
Moderator : Indi Irawan. SP., M.Sc
Operator : Fakhrudin

NO	PRESENTER	TIME	TITLE	TOPICS
1	M Valian	10.40-10.50	How Organic Fertilizers Shape Soil Health: An Integrative Literature Overview	Crop production
2	Emmy Afila Binti Tumin	10.50 - 11.00	Agronomic Impact, Operational Efficiency and Economic Evaluation of Robotic Foliar Spraying in Sensor-Controlled Irrigation System for Brassica spp.	Crop production
3	Sahrul Ahmad Umar	11.00 - 11.10	Natural Plant Growth Regulators as Biological Inputs for Strengthening Sustainable Crop Production	Crop production
4	Raheema Wamaedeesa	11.10 - 11.20	Evaluation of In-Media Sodium Hypochlorite (NaOCl) Sterilization for Protocorm Culture of Hybrid Cymbidium aloifolium (L.) Sw.	Crop production
5	Santat Sinjaroonsak	11.20 - 11.30	Effects of Planting Material from Coconut Husks on Growth and Productivity of Thai Green Chili (Capsicum annuum L.)	Crop production

E. Room 5 (10.30-12.00 WIB)
Moderator : Woki Bilyaro, S.Pt.,M.Si
Operator : Fadhil

NO	PRESENTER	TIME	TITLE	TOPICS
1	Chintya Nurul Faizah, Nilam Aqria, Mega Silfiani	10.40-10.50	Cluster Analysis of Horticultural Crop Productivity in Indonesia Using the K- Medoids Method	Socio economic Agriculture
2	Devi Agustina, Nur Riska Ayu Dwi Yanti, Mega Silfiani	10.50 - 11.00	Segmentation of Indonesian Regions Based on the Price Patterns of Strategic Food Commodities Using the K-Medoids Method	Socio-economic Agriculture
3	Dian Nurul Izzah, Eden Gideon Harefa, Mega Silfiani	11.00 - 11.10	Grouping of Provinces in Indonesia Based on Fruit Crop Production in 2023 Using the K-Medoids Clustering Method	Socio-economic Agriculture

4	Raditya Anugrah Pratama, Enisa Puji Astuti, Muhammad Ridho, Gempur Alamseh, Muhammad Kelvin Afandi, Julia Nurfadillah	11.10 - 11.20	Evaluation of the Correlation between Economic Factors and the Laying Hen Population: A Case Study in Bengkulu 2014– 2024	Socio-economic Agriculture
5	Mutia Isna Pratiwi, Zafika Azalia Ananda, Aulia Azzahra, Muhammad Agil Rahardi Herdian, Gempar Alamseh, Revania	11.20-11.30	Analysis of the Relationship between Carcass Prices and Broiler Chicken Populations in Bengkulu Province	Socio-economic Agriculture

F. Room 6 (10.30-12.00 WIB)
Moderator : Virna M.D., S.Pt.,M.Sc
Operator : M. Fikro Habibullah

NO	PRESENTER	TIME	TITLE	TOPICS
1	Rahmadani Nata Fali	10.40-10.50	The Role of Stress Tolerant Varieties as a Component of Climate Smart Agriculture in Climate Change Adaptation in Dryland Farming Systems: An Integrative Literature Overview	Precision Agriculture
2	Jusuf Austin Hakim, Adisvara Prakasa Nugraha, Dewita Octareza	10.50 - 11.00	Design Challenges and Innovative Solutions for Poultry Closed House Across Tropical, Subtropical, and Temperate Regions	Precision Agriculture
3	Yelsa Vanessa Pakpahan	11.00 - 11.10	The Effect of Monsoon Winds on Changes in Rainfall Patterns in Bengkulu Province	Precision Agriculture
4	Bagus Laksmana Surya	11.10 - 11.20	Land Use Change in The Kelingi Tugumulyo Irrigation Area, Musi Rawas Regency	Precision Agriculture

G. Room 7 (10.40-12.00 WIB)
Moderator : Firmansyah
Operator : Hidayat Ramadhani

NO	PRESENTER	TIME	TITLE	TOPICS
1	Cici Roro Reza	10.40-10.50	Supplementation Of Sakura Block Plus Containing Solids (SBPS) on Nutrients Digestion in Kaur Cattle Fed Complete Palm Oil Waste Rations	Animal Nutrition
2	Bukhoree Matukae	10.50 - 11.00	Dietary Effects on Leg Pigmentation in Southern Thai Native Ornamental Chickens	Animal Nutrition
3	Rajaman Dominggo Haloho	11.00 - 11.10	The Effect of Curcuma sp Supplementation on Crude Protein and Crude Fiber Digestibility in Different Cross-Breed Sheep	Animal Nutrition

4	Sheva Syahdameazza, Roro Erina Wirasekti, Wenda Ra Adeha	11.10 - 11.20	Innovative Weaning Strategies for Cattle to Improve Calf Welfare and Performance	Animal Nutrition
5	Qulafa Qurrosida	11.20-11.30	Digestibility of Crude Protein and Crude Fiber Cross Breed Dorper Supplemented PKC, Different Levels of Maize Waste, and Pennisetum Grass-Based Herbal Waste	Animal Nutrition
6	Putri Nirwana	11.30 - 11.40	Effect of Curcuma sp. Supplementation on Extract Ether and Energy Digestion in Different Cross Sheep Breeds	Animal Nutrition

H. PARALLEL / Room 8 (10.30-12.00 WIB)
Moderator : Muhammad Dani, S.Pt.,M.Sc.
Operator : Ilham Musthofa

NO	PRESENTER	TIME	TITLE	TOPICS
1.	Sareena Semae, Rusnee Umar, Masitoh Bindoloh	10.40-10.50	Effects of Azolla spp. Supplementation in Concentrated Feed on Feed Intake and Digestibility in Goat	Animal Nutrition
2.	Yulia Ananda	10.50 - 11.00	Digestibility Of Crude Fat and Energy of Dorper Crossbreed Supplemented with PKC, Maize Waste at Different Levels, And Herbal Waste Based on Pennisetum Grass	Animal Nutrition
3.	Delia Yeka Fitri	11.00 - 11.10	Digestibility of Dry Matter and Organic Matter in Dorper Crossbreed Supplemented with PKC, maize Waste at Different Levels, and Herbal Waste in pennisetum Grass-Based Feed	Animal Nutrition
4.	Ifta Husaini	11.10 - 11.20	Physiological responses of different sheep breeds supplemented with Curcuma sp	Animal Nutrition
5.	Farud Kolaeh	11.20 - 11.30	Dietary Effects on Leg Pigmentation in	Animal Nutrition
			Southern Thai Native Ornamental Chickens	
6.	Rizki Aprian Inzagi	11.30 - 11.40	Effect of Curcuma sp. Supplementation on Dry Matter and Organic Matter Digestion in Different Cross Sheep Breeds	Animal Nutrition
7.	Nurhusna Aiadwang	11.40- 11.50	Utilization of Fermented Sago Palm Pith Silage on Growth Performance and Carcass Traits in Thai Native Chickens	Animal Nutrition

ABSTRACTS OF ROOM 1
PLANT PROTECTION

The 5th International Undergraduate Conference on Agriculture & Life Sciences
University of Bengkulu, December 15th, 2025

Morphological characterization of Spores and Analysis of Leaf Rust Disease Severity on Welsh Onion (*Allium fistulosum* L.) in the Horticultural Center of Rejang Lebong

Putri, Ivana Maharani. [1]*, Sariasih, Yenny[2] and Sutrawati, Mimi[3]

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Abstract

Leaf rust disease caused by *Puccinia alii* is one of the major constraints in the cultivation of Welsh onion (*Allium fistulosum* L.) in the horticultural center of Rejang Lebong, Bengkulu. This disease reduces crop quality and yield due to the damage of photosynthetic leaf tissue. This study aimed to characterize the morphology of *P. alii* spores and analyze the severity level of leaf rust disease in Welsh onion plantations. Observations were conducted on several farmer fields in Rejang Lebong using an exploratory survey method. Disease intensity was calculated based on the percentage of infected leaves per plant clump, while disease severity was analyzed using a scoring system of leaf damage. Spore morphology was identified microscopically using rust pustule preparations observed under a light microscope. The results showed that the intensity of leaf rust disease at the study site reached more than 20%, while the average disease severity was 30%, indicating a moderate level of infection. Microscopically, *P. alii* spores were elliptical to oval in shape with an average size of about 30 µm, thick-walled, yellowish-brown, and had fine spines on their surface. Characteristic symptoms of the disease appeared as yellow-orange spots that turned brownish rust on the leaf surface, causing necrosis and drying of the upper leaf tissue. It can be concluded that leaf rust disease caused by *Puccinia alii* has developed significantly on Welsh onion plants in the horticultural center of Rejang Lebong with a moderate level of severity. The morphological characteristics of the spores correspond to the typical features of *P. alii* reported in previous studies. Integrated disease management efforts are needed to suppress disease development, particularly through the use of tolerant varieties and field sanitation management.

Keywords: *Allium fistulosum*, *Puccinia alii*, leaf rust, spore morphology, disease severity.

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University of Bengkulu, December 15th, 2025

Detection, Molecular Characterization, and Host Interaction Analysis of *Tomato Yellow Leaf Curl Kanchanaburi Virus* (TYLCKaV) in Chili Pepper (*Capsicum annuum* L.) from Bengkulu, Indonesia

Hengki Windra[1], Deri Gustian[1,2*], Mimi Sutrawati[1*], Yenny Sariasih[1], Sempurna Br. Ginting[1], Rachmad Hersi Martinsyah[3], Duy-Hung Do[4], Nakachew Minuye[5]

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Abstract

Chili pepper (*Capsicum annuum* L.) is an economically important horticultural crop in Indonesia, yet its production is highly susceptible to viral infections, particularly from the genus Begomovirus. This study aimed to detect the presence of *Tomato Yellow Leaf Curl Kanchanaburi Virus* (TYLCKaV) in chili pepper from Bengkulu using molecular approaches. Six symptomatic plants exhibiting leaf mosaic, vein chlorosis, and yellowing were analyzed using PCR with degenerate primers specific to Begomovirus. Five out of six samples tested positive for TYLCKaV, yielding DNA fragments of 1.2-1.3 kb. Sequence and phylogenetic analyses revealed that the Bengkulu isolate shared up to 99% nucleotide identity with isolates from Indonesia, the Philippines, and China, while displaying nucleotide divergence from the Philippines (TYLCVVIP6) and Cambodia isolates. Quantitative PCR (qPCR) showed variation in viral accumulation among samples, which correlated with symptom severity. Predicted structures of replication-associated proteins (AC1-AC4) and host protein interaction analyses (*Histone-3*, *IMPA1*, *BTF3*) indicated that amino acid substitutions may influence viral virulence and host adaptation. This study represents the first report of TYLCKaV infecting chili pepper in Bengkulu, providing a molecular basis for effective disease management and the development of resistant varieties.

Keywords: TYLCKaV, *Capsicum annuum* L., Begomovirus

The 5th International Undergraduate Conference on Agriculture & Life Sciences
University of Bengkulu, December 15th, 2025

The Potential of Arbuscular Mycorrhizal Fungi (AMF) for Controlling Rust Disease (*Puccinia allii*) in Bunching Onion (*Allium fistulosum* L.)

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Abstract

Bunching onion (*Allium fistulosum* L.) is an important horticultural commodity with increasing market demand. However, its productivity in Bengkulu Province declined from 2023 to 2024, partly due to rust disease caused by *Puccinia alli*. This disease damages leaf tissues and significantly reduces yield. Farmers generally rely on chemical fungicides for disease control, which may negatively impact the environment. This study aims to evaluate the effectiveness of *arbuscular mycorrhizal fungi* (AMF) in suppressing the development of rust disease in Welsh onion. The research used a Completely Randomized Design (CRD) with four treatments: no treatment (PO), AMF application (P1), fungicide application (P2), and a combination of AMF with half of the recommended fungicide dose (P3). The inoculation method was carried out by placing two rust pustules on two leaves for each treatment. The inoculation method was carried out by placing two rust pustules on two leaves for each treatment. The observed variables included growth components number of leaves and number of tillers, disease incubation period, percentage of infected leaves, disease severity, and total phenolic content of leaves. The results showed that the number of leaves in the three weeks after planting ranged from 3–9 leaves, increasing to 5–13 leaves in the in the four weeks after planting. The number of tillers ranged from 1–3 in the three week after planting and increased to 1–4 in the four weeks after planting. The incubation period varied among treatments, with some plants showing rust pustules one week after inoculation, while others showed no symptoms. Disease incidence after inoculation ranged from 0–40%, and disease severity ranged from 0–10%. The total phenolic content in 0.2 g of leaf samples differed across replicates within each treatment, with the highest average phenolic content found in treatment P1 (AMF application) P1U2 = 1.8893 mg GAE/g, and the lowest average phenolic content found in treatment P2 (fungicide application) P2U4 = 0.9787 mg GAE/g.

Keywords: *Allium fistulosum*, *Puccinia alii*, *Arbuscular Mycorrhizal Fungi* (AMF); disease severity; phenolic

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Growth Rate and Leaf Rust Disease Infection of *Puccinia alli* on Spring Onion in Rejang Lebong *Allium fistulosum* L

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Abstract

Allium fistulosum L. is one of the important horticultural vegetable commodities widely cultivated in Rejang Lebong. The growth of spring onion in this area is generally good due to suitable temperature and humidity conditions. However, one of the main constraints in its cultivation is leaf rust disease caused by *Puccinia alli*. This disease exhibits a high attack intensity under the climatic conditions of Rejang Lebong. This study aimed to observe the growth rate of spring onion and the level of *P. alli* leaf rust infection in Rejang Lebong. Observations were conducted once per week on a single experimental plot using a Completely Randomized Design (CRD) with six treatments and twelve replications, resulting in a total of 72 plants, with one plant per polybag. Inoculation of *P. allii* was carried out in the third week after plant. The inoculation method was carried out by placing two rust pustules on two leaves for each treatment. The results showed that the number of leaves in the (three weeks after planting) ranged from 3–9 in the third weeks, increasing to 3–15 in the fourth weeks. The number of tillers ranged from 1–3 in the third weeks and increased to 1–4 in the fourth weeks. the incidence of disease after inoculation ranged from 0–40% in the fourth weeks, while the disease severity ranged from 0–17.8% in the fourth weeks.

Keywords: *Allium fistulosum, Puccinia alli, leaf rust, plant growth, disease severity level.*

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The Potential of *Trichoderma* sp. in Controlling Rust Disease in Leek Plants (*Allium fistulosum* L.)

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Abstract

Leek Plants (*Allium fistulosum* L.) are a type of vegetable commodity that has the potential and is worthy of being developed intensively on an agribusiness scale. Leek Plants can grow in lowlands to highlands, ideally at altitudes between 900-1700 m asl with temperatures ranging from 19°- 24°C. The objectives of this study were to determine the potential of *Trichoderma* sp. in controlling rust disease caused by *Puccinia alli* in Leek Plants (*A. fistulosum*) and to assess the impact of using *Trichoderma* sp. on the growth and yield of Leek Plants infected with rust disease. The study was conducted in early September to February 2025 in Rejang Lebong Curup and at the Laboratory of Plant Protection Study Program, University of Bengkulu. This study used a Completely Randomized Design (CRD) consisting of 5 treatments, namely: P0: Control (without treatment), P1: Plants inoculated with *P. Alli,* P2: *Trichoderma* sp. + *P. alli*, P3: *P. alli* + Fungicide, P4: *Trichoderma* sp. + *P. alli* + Fungicide. From these treatment factors, the research results showed that the number of leaves ranged from 1–6 in the third week (P_4, P_0), increasing to 3–9 in the fourth week (P_4, P_1) The number of tillers ranged from 1–3 in the third week (P_2, P_4) and increased to 1–4 in the fourth week (P_3, P_4) The disease incidence after inoculation ranged from 0–33.3% in the fourth week(P_2, P_1) while the disease severity ranged from 0–5% in the fourth week (P_2, P_1).

Keywords: Leek Plants*, P. alli, Trichoderma* sp.*, fungicide, disease severity.*

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University of Bengkulu, December 15th, 2025

Control of *Colletotrichum siamense* the Causal Agent of Leaf Fall Disease of Rubber Trees using *Trichoderma* sp.

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Abstract

This study aimed to control *Colletotrichum siamense*, the causal agent of leaf fall disease of rubber tree by using *Trichoderma* sp. as antagonistic fungi. The experiment was conducted in the laboratory and greenhouse condition. *C. siamense* and 3 isolates of *Trichoderma* sp. (T11-01, T11-02, T11-03) were given by Plant pathology Laboratory, Faculty of Agriculture, Princess of Naradhiwas University. The experimental design was completely randomized design. The spore suspension of *C. siamense* and *Trichoderma* sp. were prepared and dropped at the lesion on rubber's leaf. The results of laboratory condition revealed that *Trichoderma* sp. isolates T11-01 and T11-02 were able to reduce the disease incidence caused by *C. siamense* at 1.75 and reduced the lesion size at 0.10 and 0.15 cm, respectively, with statistically significant differences at the 0.05. Furthermore, the experiment in the greenhouse condition by using two-month-old rubber seedling revealed that all 3 isolates of *Trichoderma* sp. could reduce the lesion size at 0.28, 0.31, and 0.38 cm, respectively but were unable to reduce the disease incidence.

Keywords: *Colletotrichum siamense*, leaf fall disease, rubber tree, *Trichoderma* sp.

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Experience Of Using The Adaptogen Apasil In Turkiye

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Abstract

This study presents the experience of using **ApaSil**, a silicon-based plant biostimulant, in various crop production systems in Türkiye. Sustainable agriculture has become increasingly important due to rising global food demand, climate change, decreasing arable land, and the need to reduce losses caused by pests and pathogens. Biostimulants, especially silicon-containing products, offer an environmentally friendly alternative to chemical inputs by enhancing plant growth, stress tolerance, and nutrient efficiency.**ApaSil**, containing 31.5% amorphous silicon dioxide and produced using e-PAS technology, combines monosilicic acid and amorphous silica in a stable form. As an adaptogen and natural immunity inducer, it improves physiological processes that support plant development and resilience. Field trials were conducted in Türkiye on key horticultural crops including **eggplant, tomato, pepper, and potato**.

Results indicated improved plant vigor, stress tolerance, and yield potential when compared to untreated control groups. The findings demonstrate the practical value of silicon-based biostimulants in enhancing crop performance, supporting sustainable production, and reducing dependence on chemical inputs and imported hybrid seeds. Overall, ApaSil represents a promising tool for modern agriculture in Türkiye, contributing to higher productivity and improved crop quality under challenging environmental conditions.

Keywords: Plant biostimulant, Silicon dioxide, Sustainable agriculture, Abiotic stress tolerance,

ABSTRACTS OF ROOM 2
MARINE, AQUACULTURE, AND FISHERIES

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Comparative Study of Shoreline Change Using the Digital Shoreline Analysis System (DSAS) and QGIS Shoreline Change Analysis Tools (QSCAT) in Bengkulu City

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Abstract

Shoreline change is a dynamic phenomenon influenced by the interaction between hydro-oceanographic factors and anthropogenic activities. This study aims to comparatively analyze shoreline changes along the coastal area of Bengkulu City using two geospatial methods: the DSAS V.6 and the QSCAT. The analysis was conducted using Sentinel-2A imagery form 2017 to 2025, with a segmental approach applied to four major coastal zones. Shoreline extraction was performed using the MNDWI, followed by the calculation of NSM and EPR parameters for each method and transect configuration. The results indicate that shoreline change in Bengkulu City is fluctuating. The most significant accretion occurred around the Fish Landing Site Pondok Besi area, while the most intensive erosion was identified near the Kualo Estuary and around Lentera Merah Beach. In general, accretion dominated during the 2017–2019 and 2021– 2023 intervals, whereas erosion was more prominent in the 2019–2021 and 2023–2025 periods. The average NSM values ranged from –33.82 to 35.05 meters, while EPR values ranged from –16.48 to 19.37 meters/year. Statistical analysis using ANOVA revealed no significant differences between method and transect configurations ($p > 0.05$). These findings suggest that both DSAS and QSCAT can be used complementarily in shoreline change studies, with careful consideration of transect structure and local morphological characteristics.

Keywords: Shoreline change, DSAS, QSCAT, Sentinel-2A, Bengkulu City.

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Mapping Mangrove Spatial Distribution In Muara Jenggalu Bengkulu City Using Sentinel-2a Imagery And Obia

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Abstract

Mangroves are coastal ecosystems that play a vital role in maintaining coastal stability, providing habitat for diverse biota, and reducing the impacts of climate change. However, these ecosystems continue to face threats, including in Muara Jenggalu, Bengkulu City. This study aims to map the spatial distribution of mangroves using Sentinel-2A imagery with the Object-Based Image Analysis (OBIA) method, which employs SVM (Support Vector Machine) as a statistical technique for prediction and classification, while also examining the relationship between the vegetation index (NDVI) and mangrove canopy cover. The results indicate that the segmentation scale influences classification accuracy, with scale 3 achieving a high accuracy of 97.17% and a mangrove area of 42.01 ha. The classification segments the study area into four main classes: mangroves, non-mangrove vegetation, water bodies, and non-vegetation. NDVI values ranged from 0.12 to > 0.66, with mangrove areas primarily in the medium to high vegetation category. Simple regression analysis revealed a significant positive relationship between canopy cover percentage and NDVI values.

Keywords: Mangrove, Sentinel-2A, OBIA, NDVI, Muara Jenggalu

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APPLICATION OF REMOTE SENSING TECHNOLOGY FOR ESTIMATING ABOVE GROUND MANGROVE CARBON STOCK USING SENTINEL-2A IMAGERY IN BANJARSARI, ENGGANO

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Abstract

Global climate change remains one of the major challenges of the 21st century, and mangrove ecosystems play a crucial role as a blue carbon sink capable of mitigating greenhouse gas emissions. However, data on mangrove carbon stocks in Indonesia's outermost islands, such as Enggano Island, are still limited. This study aims to estimate the above-ground carbon stock of mangrove forests in Banjarsari Village, Enggano District, through the integration of field measurements and Sentinel-2A imagery. Biomass was calculated using an allometric approach, while spatial carbon estimation was derived from the Normalized Difference Vegetation Index (NDVI). The results show that the mangrove area covers approximately 193,25 ha, dominated by dense vegetation (98%) with NDVI values ranging from 0.1 to 0.94. The dominant species were Rhizophora apiculata. The total above-ground carbon stock was estimated at 44,276.78 tons C. The regression between NDVI and carbon stock produced the equation y 0,2265x+176,57, with a coefficient of determination (R^2) of 0.48 and an RMSE of 161,14 tons/ha. These findings demonstrate the significant carbon storage capacity of Enggano's mangrove ecosystem and highlight its crucial role in supporting climate change mitigation and low carbon development in Indonesia's remote coastal regions.

Keywords: Mangrove, Carbon, Sentinel 2A.

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Aquatic Animals And Water Quality Variance In The Reservoir Area, Narathiwat College Of Agriculture And Technology, Narathiwat, Thailand

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Abstract

Aquatic animals have been important food resources for human consumption over centuries. With demanding increase and natural habitats of aquatic animals are deteriorated, aquatic animals depleted in the wild rapidly. A reservoir area in Narathiwat college of agriculture and technology (NCAT), Princess of Naradhiwas university has been fishing and recreational spot for local people around college with high activities conduction during weekend. The aim of the present study was to determine the aquatic animal species and monitored water quality in the reservoir. Present study was conducted in April, 2025. From the study results found that there were 10 species from 5 families of fish with Cyprinidae was dominant species (50%), then Osphronemidae (10%), Siluridae (10%), Belonidae (10%) and Channidae (10%) consecutively. For water quality parameters, the study monitored 4 parameters namely temperature, pH, dissolved oxygen and conductivity with 3 different times at 7.00, 15.00 and 23.00 and 3 different sites included reservoir, earthen pond and NCAT's fisheries building**.** The results indicated that there were significance differences ($P<0.05$) in water quality parameters between sites. From the study suggested that water quality in NCAT's fisheries building was suitable for aquaculture point of view but aeration need to be added.

Keywords: Fish, diversity, water quality, Narathiwat, Thailand

ABSTRACTS OF ROOM 3
PHARMACY/ FOOD SCIENCE

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Pharmacological Evaluation of the Antihyperglycemic Efficacy of *Musa paradisiaca* var. Enggano Peel Infusion: A Comparative Study on Biogeographical Potency in Streptozotocin-Induced Mice (*Mus Musculus*)

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Abstract

The rising prevalence of Diabetes Mellitus (DM) represents a critical global health concern, with Indonesia among the most affected countries. DM pathogenesis, characterized by chronic hyperglycemia and oxidative stress, highlights the need for effective, affordable, and accessible therapeutics. Simultaneously, the substantial agricultural waste from banana (*Musa paradisiaca*) cultivation underscores the urgency for sustainable biomass utilization. This study evaluates the antihyperglycemic potential of aqueous infusions from *Musa paradisiaca* peels, comparing the endemic Enggano Island variety with the common Sumatran mainland variety. Using 40 male *Mus musculus* induced with Streptozotocin (150 mg/kg BW), subjects were distributed into eight groups: Negative Control, Positive Control (Metformin), and six treatment groups receiving Enggano or Sumatran peel infusions at 200, 500, or 1000 g/L. Infusa extraction was selected to resemble traditional preparation and target polar metabolites. Phytochemical screening identified alkaloids, flavonoids, tannins, and saponins in both varieties, with the Enggano peel demonstrating notably higher phenolic intensity. In vivo results showed a dose-dependent glucose-lowering effect, with the 1000 g/L Enggano infusion reducing blood glucose by up to 50%, achieving non-inferiority to Metformin and outperforming the Sumatran variety. These findings affirm banana peel waste as a promising antihyperglycemic source where biogeographical isolation enhances secondary metabolite production. The study supports the development of standardized nutraceuticals from Enggano banana peels as a sustainable approach to DM management.

Keywords: *Musa paradisiaca* peels, antihyperglycemic, Enggano Island, *Mus musculus*

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Title: Effects of Chitosan Coating on Eggshell Preservation and Egg Quality

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Abstract

This study investigated the effect of coating chicken eggshells with chitosan solution on the preservation of egg quality during storage. A Completely Randomized Design (CRD) was employed, with four treatment groups, three replications per group, and 30 eggs per replication, for a total of 360 eggs. The experimental treatments included: uncoated eggs (control), eggs coated with 1% acetic acid, and eggs coated with chitosan dissolved in acetic acid at concentrations of 1% and 2%, respectively. The objective was to determine whether chitosan coating at different concentrations could effectively maintain egg internal quality and extend shelf life under room-temperature storage conditions. The results demonstrated that the percentage of egg weight loss did not differ significantly among the treatments ($P > 0.05$), indicating that chitosan coating did not markedly reduce moisture loss compared with the control or acetic-acid-coated eggs. However, significant differences were observed in internal quality indicators. Eggs coated with 1% and 2% chitosan exhibited significantly higher Haugh Unit values ($P < 0.001$) than the control and acetic-acid groups throughout the storage period. These higher Haugh Unit scores reflect superior albumen height and freshness. Notably, eggs coated with 1% and 2% chitosan maintained an AA quality grade for up to 3 and 4 weeks, respectively, while the control and acetic-acid-coated eggs retained AA quality for only 2 weeks. In addition, eggs coated with 1% or 2% chitosan showed significantly lower albumen pH values ($P < 0.001$) than the other groups. The lower pH levels suggest reduced carbon dioxide loss from the egg interior, indicating that the chitosan coating acted as a semipermeable barrier that slowed gas exchange across the eggshell. This mechanism is likely responsible for the improved preservation of albumen viscosity and overall freshness. Overall, the study confirms that coating eggshells with a 2% chitosan solution effectively slows internal quality deterioration and extends the period during which eggs maintain high-grade freshness. Despite no significant reduction in weight loss, chitosan coating provides clear advantages in maintaining albumen quality, controlling pH changes, and prolonging the shelf life of eggs stored at room temperature.

Keywords: coating chicken eggshells, chitosan solution, egg quality

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Organoleptic Properties and Economic Value of Milk Candy with the Addition of Granulated Palm Sugar (*Arenga pinnata*) and Cinnamon Bark Powder (*Cinnamomum burmannii*)

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Abstract

Milk candy is a dairy-based confectionery product that requires refinement in sensory attributes, visual quality, and economic efficiency. Granulated palm sugar and cinnamon bark powder offer potential improvements to organoleptic properties. This study evaluated the influence of palm sugar (20 and 30%) and cinnamon powder (1 and 2%) on sensory characteristics, CIELab color parameters (L*: Lightness, a*: redness, b*: yellowness), and production costs of milk candy. The research hypothesized that these additives would enhance sensory quality, produce significant differences in color attributes, and increase economic value. The experiment was conducted at the Animal Husbandry Department Laboratory using five treatments (G0K0, G1K1, G1K2, G2K1, G2K2) evaluated by 25 trained panelists. Sensory analysis indicated that the added ingredients significantly affected color, aroma, flavor, texture, and firmness. The hedonic test showed that the control (G0K0) remained the most preferred sample, with the highest scores for color (5.26 ± 0.79), flavor (5.43 ± 0.68), texture (5.13 ± 0.61), firmness (5.20 ± 0.69), and overall acceptability (5.40 ± 0.69). Its brighter appearance resulted from the absence of Maillard browning and caramelization. For aroma, the highest score was obtained by G2K1 (4.81 ± 0.60), indicating the effectiveness of cinnamaldehyde in masking goat-milk odor. Hedonic quality results showed that increasing palm sugar and cinnamon decreased lightness and produced darker coloration, with the highest color quality score in G2K2 (6.21 ± 0.68). Aroma quality was highest in G1K2 (6.08 ± 0.57), reflecting cinnamon's strong aromatic contribution. Higher concentrations reduced texture quality, making G2K2 the roughest sample. Palm sugar addition also decreased firmness due to a denser caramel matrix. CIELab values confirmed significant color differences, with the highest L* in G0K0 (60.97) and the lowest in G2K2 (16.97). The highest a* value was recorded in G1K2 (14.37), while the highest b* value occurred in the control (24.42). Economic evaluation showed increased margins in all formulations, rising from Rp14,000/500 g (control) to Rp17,100–Rp19,225 (22–37% increase). Overall, although the control was most preferred, G2K1 provided the best balance of sensory quality, color stability, and economic performance, with an acceptability score of 4.91 ± 0.55.

Keywords: Milk candy, Palm sugar, Cinnamon powder, Organoleptic quality, Economic analysis

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Effect of Coconut Shell Liquid Smoke Concentration on the Quality of Dried Smoked Bleberan Fish (*Thryssa* sp.)

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Abstract

Bleberan fish can be found along the coast of Bengkulu Province throughout the year. Considering the potential of Bengkulu's fisheries and the limitations of traditional fumigation—which can produce carcinogenic compounds—liquid smoke was selected as an alternative to improve the durability and the physical, chemical, and microbiological quality of the product. This study examined the characteristics of dried smoked fish (*Thryssa* sp.) soaked in coconut-shell liquid smoke at concentrations of 0%, 1%, 2%, 3%, and 4% using a Completely Randomized Design (CRD) with three replications. The results showed that differences in liquid smoke concentration had a significant effect on moisture content (20.92–20.17%), color lightness (53.33–44.13), Hue Angle (89.89–88.09), and texture parameters such as hardness (1.20–4.51), springiness (0.86–0.93), gumminess (1.25–4.41), chewiness (1.07–4.12), and resilience (1.07%). Significant effects were also observed on protein content (63.29–65.04%), fat content (8.33–12.13%), ash content (15.41–13.24%), and total plate count (1.4×10^6–1.9×10^4 cfu/g).The 4% liquid smoke concentration was identified as the best treatment, producing moisture content (20.17%), lightness (44.13), Hue Angle (88.09), hardness (4.51), springiness (0.93), gumminess (4.41), chewiness (4.12), resilience (1.07), protein (65.04%), fat (12.13%), ash content (13.24%), and total plate count (1.9×10^4 cfu/g). This treatment has the potential to increase the economic value of bleberan fish in Bengkulu. Further research is recommended to include storage-duration testing to evaluate shelf-life extension.

Keywords: Quality, Thryssa sp, liquid smoke, coconut shell, smoked fish

ABSTRACT ROOM 4
CROP PRODUCTION

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How Organic Fertilizers Shape Soil Health: An Integrative Literature Overview

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Abstract

Soil degradation in agricultural fields is increasingly recognized as a fundamental barrier to long-term crop productivity, driven by a drop in soil organic matter, an overreliance on chemical fertilizers, and a loss of biological activity within the soil ecosystem. These circumstances substantially diminish soil functionality and resilience, making soil health restoration a strategic priority. The literature consistently highlights the important role of organic fertilizers in reversing soil deterioration by increasing soil organic carbon and improving the physical, chemical, and biological properties of soil. Chemically, organic fertilizers support the gradual release of nutrients, enhance cation exchange capacity, and help maintain a more balanced soil pH, thereby improving nutrient availability and buffering capacity. Physically, they improve aggregate stability, soil structure, porosity, and water-holding capacity, while reducing bulk density-conditions that collectively promote greater aeration, infiltration, and root development. Biologically, organic fertilizers stimulate the growth and activity of soil microorganisms and fauna that drive decomposition, humification, nutrient cycling, and other ecological processes essential for soil fertility. These benefits are further reinforced by composting techniques and complementary practices such as the integration of legumes, cover crops, and in-situ organic matter inputs, which collectively increase soil organic matter and strengthen long-term soil functioning. Farmer empowerment through compost production and organic matter management training has been shown to increase the adoption of organic-based practices across a range of agricultural systems, including organic farming, the System of Rice Intensification (SRI), integrated crop management, and crop-livestock systems. Overall, organic fertilizers function not only as nutrient sources but also as key agents in restoring degraded soils, improving soil ecosystem processes, and promoting more productive, resilient, and sustainable agricultural systems.

Keywords: organic fertilizer, soil degradation, soil health, nutrient cycling, sustainable agriculture

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Agronomic Impact, Operational Efficiency and Economic Evaluation of Robotic Foliar Spraying in Sensor-Controlled Irrigation System for *Brassica* spp.

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Abstract

Advances in agricultural robotics have bloomed interest in automating nutrient delivery systems. However, empirical evidence on their agronomic performance, operational efficiency and economic feasibility remains limited. Thus, this novel study aimed to address this gap by providing multi-domain assessment on robotic foliar application for *Brassica* spp, integrating quantitative agronomic measurement, operational time analysis and economic modelling to determine feasibility of robotic intervention in commercial cultivation. A Blocked Factorial Design experiment was implemented involving three Brassica species, namely *Brassica oleracea Alboglabra*, *Brassica chinensis var. parachinensis* and *Brassica rapa subsp. Chinensis* under controlled irrigation conditions. Three nutrient delivery treatments were compared: (i) granular-compound fertiliser spot application, (ii) granular-compound fertiliser spot application with manual foliar fertiliser, and (iii) granular-compound fertiliser spot application with robotic foliar fertiliser. Random sampling (n=15 per treatment) was conducted at harvest to obtain fresh weight, plant height and leaf width. The agronomic response was analysed using Linear Mixed Model (LMM) in R Studio to adjust for random variation across varieties. Operational performance was quantified by total time required for each foliar application cycle across treatments and analysed using independent-sample t-test. Economic viability was evaluated through Cost-Benefit Analysis (CBR), amortisation of robot capital expenditure and break-even production modelling to estimate the minimum cultivated area required for profitable adoption. The result of this field study has confirmed that robot-assisted foliar application produced significantly higher fresh weight compared to manual application ($p < 0.01$), alongside measurable improvements in leaf width. Operational analysis showed substantial reduction in labour time for foliar application when using robotic systems. Despite the agronomic and operational advantages, economic modelling indicated that the CBR of robotic foliar application remains less favourable than manual method at small to medium production scales, with profitability achieved only beyond calculated breakeven cultivation area. Overall, this study contributes robust empirical evidence to the growing literature on agricultural robotics and identifies critical technological and economic gaps that must be addressed to enable scalable, cost-effective deployment of robotic foliar fertilisation systems.

Keywords: *agriculture robotics; foliar fertilisation; yield; cost-benefit analysis; operational performance*

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Natural Plant Growth Regulators as Biological Inputs for Strengthening Sustainable Crop Production

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Abstract

Sustainable agriculture requires resource management practices that maintain ecological, social, and economic balance, including efforts to reduce the use of chemical inputs that contribute to soil degradation, declining water quality, and loss of biodiversity. Natural plant growth regulators (PGRs) offer substantial potential as environmentally friendly inputs to support sustainable agricultural systems. Compounds such as auxins, gibberellins, cytokinins, ethylene, and abscisic acid can be derived from various biological sources, including Allium bulbs, bamboo shoots, mung bean sprouts, ripe bananas, and shallot peels. These natural PGRs play essential roles in seed germination, cell elongation, shoot formation, and fruit development. Extracts formulated from combinations of materials such as shallots, coconut water, and banana corms have been shown to enhance seed vigor, root elongation, and early plant growth. Consequently, natural PGRs hold significant promise for reducing dependence on synthetic inputs, thereby lowering the risks of soil and water contamination and supporting the stability of agricultural ecosystems. Moreover, the utilization of locally available materials—including shallots, coconut water, and banana corms—promotes cost efficiency and strengthens the implementation of environmentally friendly and sustainable farming practices.

Keywords: natural growth regulators, sustainable agriculture, organic farming, phytohormones, plant extracts

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Evaluation of In-Media Sodium Hypochlorite (NaOCl) Sterilization for Protocorm Culture of Hybrid *Cymbidium aloifolium* (L.) Sw.

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Abstract

This study aimed to evaluate the feasibility of using sodium hypochlorite (NaOCl) as a chemical sterilizing agent for plant tissue culture media as an alternative to autoclave sterilization, and to compare the effects of different sterilization methods on the growth and development of protocorms of hybrid *Cymbidium aloifolium* (L.) Sw. Three-month-old protocorms were cultured on MS medium that was either autoclave-sterilized or supplemented with NaOCl at concentrations of 4, 6, 8, 10, 17, 33, 50, 67, and 83 ppm. The experiment was arranged in a Completely Randomized Design (CRD), and cultures were maintained for 60 days under a 12-hour photoperiod at 25 °C.

The results showed that no microbial contamination occurred in any medium prepared by either sterilization method. Protocorms cultured on autoclave-sterilized medium showed clear growth and development, including enlargement, formation of new protocorms, initiation of shoot primordia, and subsequent seedling development. In contrast, protocorms cultured on NaOCl supplemented media exhibited tissue whitening at all concentrations. New protocorm formation was observed only at low NaOCl concentrations (4–8 ppm), with average numbers of 0.11, 0.03, and 0.02, respectively. No shoot primordia or seedling development occurred in any NaOCl treatment, and no new protocorms were observed at concentrations of 10–83 ppm.

These results indicate that while both sterilization methods effectively prevented microbial contamination, only autoclave sterilization supported the growth and development of hybrid *Cymbidium aloifolium* protocorms. Sodium hypochlorite, at the concentrations tested, did not support protocorm development despite its sterilizing effectiveness.

Keywords: Sodium hypochlorite (NaOCl), Plant tissue culture sterilization, *Cymbidium aloifolium* protocorms, Autoclave sterilization, Plant tissue culture development

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Effects of Planting Material from Coconut Husks on Growth and Productivity of Thai Green Chili (*Capsicum annuum* L.)

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Abstract

The chili pepper (*Capsicum annuum* L.) is a significant economic crop in Thailand. Soilless cultivation using containerized alternative substrates can reduce production costs and land requirements for chili production. This study aimed to evaluate the growth and productivity of Thai green chili grown in planting media composed of processed coconut husk, cow manure, and ash from a palm oil mill. A completely randomized design was used with two factors: (i) organic amendment (no manure, cow manure, or a mixture of cow manure and vermicompost) and (ii) the presence or absence of ash. Overall, coconut husk–based substrates supported satisfactory vegetative growth. Total leaf number, plant height, canopy width, branch number, leaf width, leaf length, and flower number per plant ranged from 12.00–17.00 leaves, 19.66–26.56 cm, 15.75–23.71 cm, 4–5 branches, 3.33–3.90 cm, 6.13–7.33 cm, and 11–24 flowers, respectively. Yield and fruit quality traits were also within commercially attractive ranges: fruit number per plant 4.66–14 fruits, fruit weight per plant 51.96–240.38 g, single fruit weight 9.74–18.27 g, fruit length 12.60–16.63 cm, fruit diameter 12.10–17.73 mm. The results indicate that coconut husk is a suitable planting medium for Thai green chili, and that the addition of cow manure or cow manure mixed with vermicompost has strong potential to enhance growth and improve yield and fruit quality. In particular, the treatment combining coconut husk with the cow manure–vermicompost mixture produced the tallest plants, the largest leaves and fruits, the heaviest fruits, and the highest overall yield. These findings highlight coconut husk–based media enriched with organic fertilizers as a promising, low-cost strategy for sustainable soilless production of Thai green chili.

Keywords: Coconut husk, cow manure, planting material, Thai green chili, vermicompost

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Effect of Tea Residue Growing Media on Growth and Yield of Chinese Kale (*Brassica oleracea* var. alboglabra) in Container Production

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Abstract

Tea ranks as the second-most-consumed beverage globally, generating substantial amounts of tea residue as organic waste. This residue contains valuable plant nutrients, including nitrogen (5%), phosphorus (5%), and potassium (3%), presenting opportunities for agricultural recycling. The purpose of this study was to evaluate the effects of incorporating tea residue at varying proportions on the growth and productivity of container-grown Chinese kale. The experiment employed a completely randomized design with four treatments: a mixed soil control (T1), and mixed soil amended with 25% (T2), 50% (T3), and 75% (T4) tea residue. The growing media were prepared by composting tea residue with mixed soil (equal parts soil and cow manure) for 30 days prior to transplanting. Results indicated that at 7–14 days after transplanting, significant differences were observed in stem diameter, plant height, leaf length, and leaf width, with the 75% tea residue treatment demonstrating superior growth compared to other treatments. Leaf number remained statistically similar across all groups. By 21–28 days after transplanting, no significant differences were detected among treatments for any vegetative growth parameters. However, yield assessments based on fresh weight indicated that tea residue significantly enhanced productivity. The 75% treatment produced the highest whole-plant fresh weight (152.15 g) and shoot fresh weight (135.00 g), followed by the 50% treatment (141.41 g and 122.71 g, respectively). The 25% treatment and the control produced lower yields, with the 25% treatment recording the lowest shoot fresh weight (117.15 g). These findings demonstrate that tea residue serves as an effective organic amendment for Chinese kale, with a 75% incorporation rate yielding optimal results.

Keywords: tea residue, growing media, Chinese kale, growth, yield

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Impact of Organic and Inorganic Fertilizer Application on Heavy Metal Dynamics and Lettuce Quality in Sandy Soil

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Abstract

Sandy media has a low water and nutrient holding capacity, necessitating proper fertilization measures to promote horticulture crop growth. Lettuce (Lactuca sativa L.) has a relatively high nutritional need and is sensitive to growing medium conditions. This study was conducted to evaluate the effectiveness of organic and inorganic fertilizers in increasing growth, yield, and dynamics of nutrients and heavy metals in lettuce cultivated in sandy media. The experiment was conducted in a greenhouse using a Completely Randomized Block Design with four treatments, namely control, King Farmer organic fertilizer, Four Kings organic fertilizer, and AB 4Mix inorganic fertilizer. The results of the study showed that the fertilization treatment had a significant effect on plant height, number of leaves, media pH, micronutrients Mo, Zn, Mn, and the content of heavy metals As, Pb, Cd, and Hg. Differences in fertilizer types did not significantly affect the fresh weight of plants, fresh weight of shoots and roots, chlorophyll content, media EC, macronutrients (N, P, K, Ca, S, Mg), micronutrients Cu, B, Fe, and heavy metal Cr. AB Mix fertilizer produced the tallest plants, while King Farmer organic fertilizer increased leaf number, crop fresh weight, and chlorophyll content. Meanwhile, Four Kings fertilizer increased P, Ca, S, Zn, and Mn and produced higher root weights than the other fertilizers. The application of inorganic fertilizer resulted in higher heavy metal content of As, Pb, Cd, and Hg at the end of the observation period compared to organic fertilizer. Thus, organic fertilizer can improve lettuce growth and quality with lower heavy metal content, making it a safer and more sustainable option for lettuce cultivation in sandy soils. Therefore, using organic fertilizers can reduce the risk of soil contamination by heavy metals, supporting more environmentally friendly horticultural crop cultivation, especially on sandy soils that are poor in nutrients.

Keywords: Lettuce, organic fertilizer, synthetic fertilizer, heavy metals, sandy soil

ABSTRACTS OF ROOM 5
SOCIO-ECONOMIC AGRICULTURE

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Cluster Analysis of Horticultural Crop Productivity in Indonesia Using the K-Medoids Method

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Abstract

Horticultural crop productivity plays a significant role in supporting national food security and strengthening the economic value of the agricultural sector. The substantial variation in productivity across Indonesian provinces reflects differing regional characteristics that warrant systematic analysis to better understand existing production patterns. This study aims to classify Indonesian provinces based on the productivity of ten horticultural commodities in 2023 using the K-Medoids clustering method. In addition, the study seeks to determine the optimal number of clusters through three evaluation approaches—Silhouette Score, Elbow Method, and Davies–Bouldin Index—to ensure that the resulting clusters are objective, reliable, and accurately represent productivity conditions. The dataset utilized in this research was obtained from the official publication Angka Tetap Hortikultura Tahun 2023 issued by the Ministry of Agriculture, which provides productivity data measured in tons per hectare for all provinces in Indonesia. The analysis began with data standardization using the z-score method to minimize differences in scale across variables. The K-Medoids algorithm was then applied to group provinces based on similarities in horticultural productivity profiles. Cluster quality was assessed by evaluating internal cohesion and separation between clusters to ensure the stability and validity of the clustering results. The findings indicate that the K-Medoids method successfully identified clear grouping patterns among provinces. The resulting clusters exhibit distinct productivity characteristics, including a group of provinces with high productivity for specific vegetable commodities, a group with moderate yet balanced productivity across multiple commodities, and a group of provinces with relatively low productivity in most commodities. Evaluation metrics, particularly the Silhouette Score and Davies–Bouldin Index, demonstrate that the cluster structure obtained is stable and of good quality, confirming that K-Medoids is an effective method for regional-scale horticultural productivity analysis. A limitation of this study is its reliance on single-year data, which restricts the observation of interannual dynamics. Future research may incorporate time-series analyses to capture long-term trends, integrate spatial data to explore spatial dependencies among provinces, or compare the performance of K-Medoids with other clustering methods such as K-Means, Hierarchical Clustering, or DBSCAN.

Keywords: Horticultural productivity, K-Medoids, cluster analysis, Silhouette Score, Davies–Bouldin Index, Indonesia.

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Segmentation of Indonesian Regions Based on the Price Patterns of Strategic Food Commodities Using the K-Medoids Method

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Abstract

Food prices serve as an important indicator of economic stability and societal welfare. Geographical differences and varying distribution conditions across regions in Indonesia contribute to significant price variations in strategic food commodities. This study aims to segment Indonesian regions based on the price patterns of 14 strategic food commodities across 37 provinces using the K-Medoids method, which is more robust to outliers compared to mean-based methods such as K-Means. The data were obtained from the National Food Agency (Bapanas) as of October 19, 2025. The research stages include data cleaning, descriptive statistical analysis, outlier detection, correlation analysis for redundant variable elimination, standardization, model evaluation using the Silhouette Score, and clustering using the K-Medoids algorithm. The evaluation results indicate that the optimal number of clusters is two (k = 2), with a Silhouette Score of 0.458. Cluster 0 consists of 29 provinces located mainly in Sumatra, Java, parts of Kalimantan, and Sulawesi, characterized by relatively lower and more stable food prices. Cluster 1 comprises 8 provinces in the Maluku, Papua, and North Kalimantan regions, which exhibit higher commodity prices due to distribution challenges and limited supply availability. The findings highlight disparities in food prices across regions and may serve as a basis for government efforts to design more targeted distribution strategies and price stabilization policies.

Keywords: *Food Prices, Regional Segmentation, K-Medoids, Clustering, Silhouette Score.*

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Grouping of Provinces in Indonesia Based on Fruit Crop Production in 2023 Using the K-Medoids Clustering Method

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Abstract

Fruit production in Indonesia shows significant variation between provinces due to differences in geographic conditions, land suitability, and agricultural resource potential. This variation makes it difficult for the government to identify groups of provinces with similar production characteristics, resulting in often inaccurate horticultural development policies. Therefore, a cluster analysis approach is needed to map production patterns in a more objective and structured manner. This study aims to group provinces in Indonesia based on fruit crop production patterns in 2023 using the K-Medoids clustering method. The data used are secondary data from the Central Statistics Agency (BPS), with 35 provinces and 18 types of fruit commodities as research variables. The analysis stages include data preprocessing. descriptive analysis, outlier identification, correlation analysis, dimensionality reduction using Principal Component Analysis (PCA). determining the optimal number of clusters, and evaluating cluster results using the Silhouette Score. Calinski-Harabass Index, and Davies-Bouklin Indes metries. The modeling results indicate that the most optimal cluster structure consists of two clusters. The first cluster consists of provinces with generally higher and more diverse fruit production tevels, while the second cluster includes provinces with lower production levels or those dominated by specific commodities. The xalidity of the cluster selection was evaluated using several metries, namely a Silhouette Score of 0.7332. a Calinski-Harabasz Index of 44.3190, and a Davies-Bouldin Index of 0.6616. A high Silhouette Score -0.71 indicates that objects within a cluster have a strong degree of internal similarity and clear separation between clusters Meanwhile, a high Calinski-Harabasz score indientes good quality chister separation, and a low Davies Bouldin score confirms that the two clusters tormed have minimal overlap. These findings provide a comprehensive overview of the distribution of truit production potential between provinces and can be used as a basis For consideration in fommalating agocultural policies, infrastructure development, and horticultural commodity development strategies in Indonesia.

Keywords: Herticultural productivity. K-Medoeds, cluster analysis. Silhouette Score, Dasies Houldin Index, Indonesen

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Evaluation of the Correlation between Economic Factors and the Laying Hen Population: A Case Study in Bengkulu 2014–2024

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Abstract

The objective of the research was to evaluate the effect of chicken egg prices on the dynamics of the laying hen population in Bengkulu Province for the period 2014–2024, and to assess the extent to which price variations can explain population changes through correlation and simple linear regression analyses. Secondary data on egg prices (Rp/kg) and laying hen populations (heads) were analyzed using descriptive statistics, Pearson's correlation test, and simple linear regression. The results of the study show that the price of chicken eggs in Bengkulu Province during the 2014–2024 period fluctuated with an upward trend from IDR 17,660/kg in 2012 to IDR 29,880/kg in 2024. while the population of laying hens also experienced dynamics with the lowest number in 2017 at 49,458 and the highest in 2021 at 617,900 before declining again in 2022–2024; The correlation test yielded a value of r = 0.787 with a p-value = 0.01, indicating a positive, strong, and significant relationship between egg prices and the population of laying hens, while simple linear regression analysis yielded the equation Population = –784,436.816 + 48.697 (Egg price) with a positive regression coefficient, meaning that every increase in egg price of Rp 100 will increase the laying hen population by approximately 4,869 birds. The R-square value of 0.620 indicates that 62% of the variation in the population can be explained by egg prices, with the remaining 38% accounted for by other factors. In conclusion, this study demonstrates that the price of chicken eggs significantly affects the population of laying hens in Bengkulu Province. These findings have important implications for the development of poultry policies, particularly in maintaining a balance between product prices and the sustainability of livestock populations.

Keywords: Egg price fluctuation, Layer hen production, Poultry Industry

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Analysis of the Relationship between Carcass Prices and Broiler Chicken Populations in Bengkulu Province

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Abstract

This study aims to analyze the relationship between broiler chicken carcass prices and broiler chicken populations in Bengkulu Province during the period 2014–2024. The dynamics of the poultry industry are often influenced by fluctuations in chicken meat prices and changes in livestock populations, making it essential to determine the extent to which these two variables are interrelated. Secondary data on chicken carcass prices (Rp/kg) and broiler chicken population (heads) were collected from relevant agencies and then analyzed using descriptive statistics, Pearson's correlation test, and simple linear regression. The results of descriptive analysis show that broiler chicken carcass prices have increased from IDR 27,660/kg in 2012 to IDR 38,050/kg in 2024, with fluctuations throughout the research period. The broiler chicken population also showed an upward trend, especially after 2018, with the lowest population in 2017 at 4,824,572 birds and the highest in 2024 at 10,704,499 birds. The correlation test produced a coefficient of r = 0.383 and a p-value of 0.197, indicating a positive but weak and insignificant relationship between chicken carcass prices and the broiler population. Changes in meat prices do not consistently follow changes in the broiler chicken population. Simple linear regression analysis produced the following equation: Population = –2,113,000 + 293.45(Meat price). The regression coefficient is positive, indicating that a Rp 1,000 increase in price can increase the population by around 293 animals. However, this result is not significant ($p > 0.05$), with an R-Square of 0.146, indicating that only 14.6% of the population variation is explained by chicken carcass prices, while factors outside the model influence 85.4%. In conclusion, broiler chicken carcass prices do not have a significant effect on the broiler chicken population in Bengkulu Province.

Keywords: Broiler chicken, carcass prices, population, Bengkulu Province

ABSTRACTS OF ROOM 6
PRECISION AGRICULTURE

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\The Role of Stress Tolerant Varieties as a Component of Climate Smart Agriculture in Climate Change Adaptation in Dryland Farming Systems: An Integrative Literature Overview

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Abstract

Stress-tolerant varieties are a strategic component within the Climate Smart Agriculture (CSA) framework because they play a direct role in strengthening the resilience of production systems to climate variability. This literature review aims to analyze the contribution of stress-tolerant varieties to improving crop adaptation, yield stability, and resource efficiency in various agroecosystems vulnerable to climate change. The literature search was conducted through international scientific databases with inclusion criteria that included publications from the last ten years, a focus on major agricultural commodities in tropical and subtropical regions, and quantitative and qualitative evaluations of plant responses to drought, temperature, salinity, and rainfall measurements. The synthesis shows that the use of stress-tolerant varieties consistently improves plant physiological performance through air use efficiency, photosynthetic stability, increased cell membrane integrity, and root system strengthening. Furthermore, the integration of stress-tolerant varieties with other CSA practices such as conservation soil management and precision irrigation has been shown to produce synergies that enhance adaptive effects. However, the review also identified limitations, including gaps in adoption at the smallholder level, unequal seed access, and reliance on long-term breeding programs that require sustained investment. Overall, the literature findings suggest that stress-tolerant varieties are a crucial pillar of climate adaptation strategies, but their effectiveness is heavily influenced by institutional support, technology distribution, and the variety's suitability to local conditions. This study provides a foundational concept for policy development and further research in strengthening CSA-based agricultural systems.

Keywords: stress tolerant varieties, climate smart agriculture, climate change adaptation, dryland farming systems.

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Design Challenges and Innovative Solutions for Poultry Closed House Across Tropical, Subtropical, and Temperate Regions

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Abstract

A closed house is designed to create a controlled, optimal environment for the growth of broiler chickens. The main principle is to regulate the temperature, humidity, air circulation, and gas levels inside the house to suit the physiological needs of the chickens, thereby maximising production performance and livestock health. House design, especially in closed houses, is strongly influenced by climate because it determines the need for temperature control, humidity, ventilation, and protection against heat or cold stress. This study aims to (1) describe the differences in closed house broiler chicken designs; (2) identify challenges to create a better design to adapt to the climate in three regions with different climates, namely tropical, subtropical, and temperate. The research method used is descriptive with a literature study approach and secondary data analysis from various studies related to poultry house design and broiler chicken performance in each climate zone. The results showed that closed house designs in tropical regions emphasised active ventilation and cooling systems (such as cooling pads and exhaust fans) to overcome high temperatures and humidity, thereby maintaining house temperatures in the range of 30–32°C and supporting optimal productivity. Design challenges for a closed house in a tropical area include coping with constant overheating and humidity. In improve fan and cooling pad efficiency, energy-saving fans and automatic water-circulating cooling pads can be used to save energy. Tunnel roof ventilation, a double roof using an aluminium foil-coated roof or sandwich panels, can be used to reduce cooling loads. In subtropical and temperate regions, housing design focuses more on thermal insulation, the use of heaters during winter, and ventilation systems that can be adjusted according to seasonal changes to maintain stable temperature and humidity. Therefore, a poultry house must accommodate extreme seasonal conditions by using dual-purpose ventilation and insulated walls and a roof. These design adjustments have been proven to affect broiler chicken performance, energy efficiency, and livestock welfare in each region. In conclusion, climate differences require adaptations to closed-house coop designs to create an optimal microenvironment for broiler chicken growth and health.

Keywords: broiler chicken, closed house design, climate challenges, microenvironment, broiler chicken performance

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The Effect Of Monsoon Winds on Changes in Rainfall Patterns in Bengkulu Province

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Abstract

Monsoon is one of the factors that influence weather and climate in Indonesia. Monsoon activity affecting Indonesia, including Bengkulu Province, is influenced by the Australian monsoon during the dry season and the Asian monsoon during the rainy season. This study aims to explain the influence of monsoon winds on changes in rainfall patterns and to identify rainfall patterns in the Bengkulu Province from 2013 to 2022. The data used includes zonal wind data at the 850 hPa layer from the European Centre for Medium-Range Weather Forecasts (ECMWF) ERA5 and rainfall data from 2013 to 2022. The method used was to compile wind data to obtain a monsoon index used for data grouping, and rainfall data was grouped based on seasonal zones, followed by statistical testing. The results of the study show that the peak of the Australian Monsoon Index (AUSMI) occured in May-October, indicating the dominance of strong easterly winds that bring dry air from the Australian continent to the Indonesian region, causing an increase in the intensity of the dry season. The peak of the Western North Pacific Monsoon Index (WNPMI) occured from June to October, where positive values indicate the presence of a western monsoon during that month. However, this occurs in the northern hemisphere, where humid air is centered in the northern area and increases humidity in that area, so that the southern hemisphere receives relatively less moisture and becomes drier. Negative values indicate that moist air shifts towards the south (maritime continent) with convection centers further south, increasing the potential for rainfall in the Sumatra area, including Bengkulu Province, so that the peak of the western monsoon in the southern hemisphere is in November, December-April. There are two main rainfall peaks each year, namely in the months of DJF (December-February) and SON (September-November). This pattern occurs due to the influence of the Asian monsoon winds that bring humid air from the Indian Ocean and cause the rainy season. When the Australian monsoon winds begin to take effect, the intensity of rainfall tends to decrease, marking the beginning of the dry season.

Keywords: AUSMI, Bengkulu Province, monsoon, Rainfall, WNPMI

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Land Use Change in The Kelingi Tugumulyo Irrigation Area, Musi Rawas Regency

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Abstract

Land use change is an important indicator in natural resource management and regional planning, especially in irrigation areas that play a role in food security and water control. This study aims to classify land use in the Kelingi Irrigation Area in 2014, 2019 and 2024, analyzing changes in its use during the periods. Land use data was obtained through satellite image interpretation and analyzed using a change and prediction matrix. The results show that the classification of land use in the Kelingi Tugumulyo Irrigation Area in 2014, 2019 and 2024 consists of water, plantations, irrigation ponds, fields, open land, built-up land, rice fields and shrubs. Land use changes in the Kelingi Tugumulyo Irrigation Area (2014–2024) show significant dynamics. Settlements and social infrastructures increased from 2,395.89 ha to 2,504.60 ha (+4.54%), Oil palm and rubber plantations areas raised from 2,486.25 ha to 3,394.77 ha (+36.54%), dryland annual crops cultivation areas increased from 1,272.45 ha to 1,408.38 ha (+10.66%), and fish ponds from 368.39 ha to 442.82 ha (+20.22%). In contrast, bare lands decreased drastically from 158.04 ha to 20.34 ha (–87.13%), rice fields from 8,543.60 ha to 8,231.04 ha (–3.66%), and shrubs from 1,135.70 ha to 701.71 ha (–38.25%).

Keywords: land use change, irrigation areas, rice fields, fish ponds, industrial crops, Musi Rawas Regency

ABSTRACTS OF ROOM 7
ANIMAL NUTRITION

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Supplementation Of Sakura Block Plus Containing Solids (SBPS) on Nutrients Digestion in Kaur Cattle Fed Complete Palm Oil Waste Rations

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Abstract

Kaur cattle is local Bengkulu cattle which are often herded in oil palm plantation areas. Palm oil plantation wastes (palm fronds) and by product of palm processing (such as palm oil sludge or solid) have potency as feed. Sakura block plus (SBP) is a block-shaped supplementary feed made from local feed ingredients. The addition of solid is a modification, hence the name Sakura block plus solids (SBPS). This study aimed to evaluate the effect of SBPS supplementation on nutrients digestibility consisted of dry matter (DM), organic matter (OM), crude protein (CP), crude fiber (CF), Ether extract (EE), and nitrogen-free extract (NFE) in Kaur cattle fed a complete palm oil waste ration. This study was conducted for three months at the Commercial Zone Animal Laboratory University Bengkulu. The feeding trial used a Latin Square Design (LSD), consisting of 4 treatments and 4 periods, where each period lasted 15 days. The basal diet consisted of 40% ammoniated palm fronds + 25% cassava flour+ 15% palm kernel meal. The treatments were the difference between the levels of tofu dregs, SBP and SBPS that were T0= 10% tofu dregs + 10% SBP, T1 = 12% tofu dregs + 8% SBPS, T2= 10% tofu dregs +10% SBPS, T3= 8% tofu dregs + 12%SBPS. The data were analyzed with ANOVA, and for detailed test used Duncan's Multiple Range Test (DMRT). The result showed that the supplementation of SBPS had no significant effect (P>0.05) on all nutrient digestibility. The average DM digestibility were T0: 80.58%, T1: 82.06%, T2: 81.88%, T3: 83.97% respectively. The OM digestibility of were T0: 81.64%, T1: 83.12%, T2: 83.00%, T3: 85. 42%. CP digestibility for T0: 88.46%, T1: 89.73%, T2: 89.95% and T3: 88.67%. CF digestibility of T0: 72.15%, T1: 74.47%, T2: 72.55% and T3: 74.65%. EE digestibility of T0: 90.98%, T1: 91.80%, T2: 95.25% and T3: 93.31%. NFE digestibility of T0 : 86.00%, T1: 87.91%, T2: 87.31% and T3: 88.62%. It can be concluded that the highest digestibility of DM, OM, Crude Fiber, and NFE was in the T3. While the highest digestibility of crude protein and ether extract was in T2.

Keywords: Sakura block, nutrient digestibility, Kaur cattle, complete palm waste ration.

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Dietary Effects on Leg Pigmentation in Southern Thai Native Ornamental Chickens

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Abstract

One of the aesthetic ideals of Southern Thai native ornamental chickens is a naturally pale or white shank. Diet plays a crucial role in determining shank pigmentation; however, many farmers commonly use commercial feeds containing corn as the primary energy source, which contributes yellow pigments that intensify shank coloration. In practice, some farmers prefer commercial swine feed because it produces less yellow pigmentation compared to native chicken feed. This preliminary study aimed to investigate the effects of different diets on shank coloration in Southern Thai native chickens. Twelve 3-month-old Lueng Hang Khao chickens of mixed sex were randomly assigned into three dietary treatments with four replicates per treatment (one bird per replicate). The treatments consisted of: T1 – commercial swine feed (control), T2 – commercial native chicken feed, and T3 – a formulated diet using broken rice as the main energy source mixed with soybean meal. All birds received their respective diets for a period of five weeks. The results demonstrated that birds in T3 showed a significant reduction in shank yellowness ($P < 0.05$), whereas shank color remained unchanged in T1 and slightly increased in T2. Although broken rice can reduce yellow pigmentation, excessive dilution of natural pigments may result in overly pale shanks. Supplementation with pigment-rich feed ingredients, such as corn or leafy green vegetables, may therefore be necessary to prevent undesirable shank paleness.

Keywords: Dietary, Leg Pigmentation, Thai Native Chickens

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The Effect of *Curcuma* sp Supplementation on Crude Protein and Crude Fiber Digestibility in Different Cross-Breed Sheep

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Abstract

The sheep population in Indonesia is mostly concentrated in Java, especially in West Java, Central Java, and East Java, which are the main areas in sheep farming. Local sheep in Indonesia have good adaptability to the tropical climate, but their growth performance, especially in terms of weight gain, is low. Therefore, Dorper, Texel and Awassi crossbred sheep are imported to improve the genetic quality of local sheep. To meet the feed requirements of imported crossbred sheep, especially during the dry season, commercial feeds are used, which are factory-made feeds that can meet the nutritional needs of livestock. However, this feed is relatively expensive, so farmers need to look for alternatives, such as using agricultural waste such as mung bean shells and Palm Kernel Cake (PKC), which have high protein content.

This study aimed to evaluate the digestibility of crude protein (PK) and crude fiber (SK) in cross breed sheep supplemented with herbal medicine waste, PKC, and cornstarch waste. The experimental design in this study used a completely randomized design (CRD) consisting of 4 treatments and 3 replicates in each treatment. P0: Cross Awassi, P1: Cross Dorper, P2: Cross Texel, P3: local sheep. The variables observed were crude protein and crude fiber consumption, fecal production of crude protein and crude fiber, and digestibility of crude protein and crude fiber. Then the data were analyzed with variance analysis (ANOVA), if there were significant differences, further tests were conducted using Duncan`s Multiple Range Test (DMRT). The results showed that the treatment of sheep given commercial feed supplemented with herbal medicine waste and PKC had a very significant effect ($P < 0.01$) on total SK consumption and a significant effect ($P < 0.05$) on total Crude Protein (PK) consumption. In addition, this treatment also had a significant effect ($P<0.05$) on PK and SK fecal production, and a significant effect ($P<0.05$) on PK and SK digestibility, with PK digestibility values ranging from 56.7%-71.0% and SK digestibility ranging from 28,9%-47,3%. Based on the research results of Crude Protein (PK) and Crude Fiber (SK), it was concluded that Cross Awassi(P0) had the best digestibility performance compared to other cross sheep breeds (Local Sheep, Dorper, and Texel).

Keywords: Digestibility, Crude Protein, Crude Fiber, Palm kernel cake, Odot Grass.

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The Effect of *Curcuma* sp Supplementation on Crude Protein and Crude Fiber Digestibility in Different Cross-Breed Sheep

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Abstract

The sheep population in Indonesia is mostly concentrated in Java, especially in West Java, Central Java, and East Java, which are the main areas in sheep farming. Local sheep in Indonesia have good adaptability to the tropical climate, but their growth performance, especially in terms of weight gain, is low. Therefore, Dorper, Texel and Awassi crossbred sheep are imported to improve the genetic quality of local sheep. To meet the feed requirements of imported crossbred sheep, especially during the dry season, commercial feeds are used, which are factory-made feeds that can meet the nutritional needs of livestock. However, this feed is relatively expensive, so farmers need to look for alternatives, such as using agricultural waste such as mung bean shells and Palm Kernel Cake (PKC), which have high protein content.

This study aimed to evaluate the digestibility of crude protein (PK) and crude fiber (SK) in cross breed sheep supplemented with herbal medicine waste, PKC, and cornstarch waste. The experimental design in this study used a completely randomized design (CRD) consisting of 4 treatments and 3 replicates in each treatment. P0: Cross Awassi, P1: Cross Dorper, P2: Cross Texel, P3: local sheep. The variables observed were crude protein and crude fiber consumption, fecal production of crude protein and crude fiber, and digestibility of crude protein and crude fiber. Then the data were analyzed with variance analysis (ANOVA), if there were significant differences, further tests were conducted using Duncan`s Multiple Range Test (DMRT). The results showed that the treatment of sheep given commercial feed supplemented with herbal medicine waste and PKC had a very significant effect ($P < 0.01$) on total SK consumption and a significant effect ($P < 0.05$) on total Crude Protein (PK) consumption. In addition, this treatment also had a significant effect ($P<0.05$) on PK and SK fecal production, and a significant effect ($P<0.05$) on PK and SK digestibility, with PK digestibility values ranging from 56.7%-71.0% and SK digestibility ranging from 28,9%-47,3%. Based on the research results of Crude Protein (PK) and Crude Fiber (SK), it was concluded that Cross Awassi(P0) had the best digestibility performance compared to other cross sheep breeds (Local Sheep, Dorper, and Texel).

Keywords: Digestibility, Crude Protein, Crude Fiber, Palm kernel cake, Odot Grass.

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Digestibility of Crude Protein and Crude Fiber Cross Breed Dorper Supplemented PKC, Different Levels of Maize Waste, and Pennisetum Grass-Based Herbal Waste

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Abstract

The purpose of this study is to evaluate the digestibility of Crude Protein (CP) and crude fiber (CF) in Dorper Cross Breed Sheep given supplementation of Palm Kernel Cake (PKC), Maizena Waste at different levels, and Herbal Waste Based on Pennisetum Grass. The experimental design used in this research is a Complete Randomized Design (CRD) consisting of 4 treatments and 5 replications per treatment. P0: Control (without PKC), P1: Pennisetum Grass + Maizena Waste 41% + PKC 7%, P2: Pennisetum Grass + Maizena Waste 39% + PKC 9%, P3: Pennisetum Grass + Maizena Waste 37% + PKC 11%. The parameters observed were digestibility of crude protein and crude fiber. Variables measured included total feed intake, fecal production, and nutrient digestibility. ANOVA analysis results showed that PKC supplementation significantly affected total feed intake and fecal production ($P<0.05$), and highly significantly affected the digestibility of CP and CF ($P<0.01$). Total feed intake increased with higher levels of PKC, from 92.83±3.19 g in P0 to 155.05±10.97 g in P3. Fecal production also increased from 23.92±1.34 g (P0) to 37.34±2.28 g (P3). Crude protein digestibility varied among treatments, with the highest value in P0 (74.31±0.01%) and the lowest in P2 (60.51±0.03%), but increased again in P3 (69.33±0.03%). Crude fiber digestibility decreased in P1 (76.51±0.01%), but then increased again in P2 (70.49±0.02%) and P3 (75.33±0.01%). The increase in feed intake and fermentation activity due to PKC addition is suspected to be a factor supporting the increased digestibility at higher PKC levels. Based on the research results, supplementing Palm Kernel Cake up to 9% level is effective in increasing feed intake and improving nutrient digestibility, thus potentially serving as an alternative feed ingredient in rations.

Keywords: Digestive health, Protein, Crude fiber, PKC, Curcuma Longa.

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The Effect of Curcuma sp Supplementation on Ether Extract and Energy Digestibility in Different Crossbred Sheep

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Abstract

This study aimed to evaluate the effect of *Curcuma sp* supplementation on the digestibility of Ether Extract (EE) and Energy in different crossbred sheep based on a *factory feed* diet. The experimental design used in this research was a Completely Randomized Design (CRD) consisting of 4 treatments and 2 supplementations. The treatments were P0: Local Sheep, P1: Awassi Cross Sheep, P2: Dorper Cross Sheep, and P3: Texel Cross Sheep, combined with S0: without supplementation, and S1: *Curcuma sp* supplementation. The obtained data were analyzed using the analysis of variance (ANOVA) technique. If a significant difference was found, a post-hoc test would be performed using the Duncan's Multiple Range Test (DMRT). The results of the analysis of variance showed that the treatment involving sheep breeds fed commercial feed with herbal medicine and Palm Kernel Cake (PKC) supplementation had a highly significant effect (P = 0.000) on crude fat digestibility (likely the EE component mentioned later) which ranged from 88.5%-92.5%, and had a significant effect (P = 0.004) on energy digestibility, which ranged from 61.5%-71.9%. Statistical analysis also indicated that the treatment significantly affected crude fat intake (P = 0.031) and energy intake (P = 0.028), demonstrating a clear difference in nutrient consumption among the given treatments. Fecal production also showed a noticeable variation, with fecal crude fat production being highly significant (P = 0.002) and fecal energy production being significant (P = 0.026), reflecting the difference in undigested feed output across each treatment. Overall, this study found that the treatments were able to influence feed intake, fecal production, and enhance nutrient digestibility. This indicates that the treatments have the potential to improve the efficiency of feed utilization by livestock.

Keywords: Exotic Crossbred Sheep, Commercial Feed, Herbal Medicine, PKC, Ether Extract, Energy, *Curcuma sp*.

ABSTRACTS OF ROOM 8
ANIMAL NUTRITION

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Effects of Azolla spp. Supplementation in Concentrated Feed on Feed Intake and Digestibility in Goat

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Abstract

The objective of this study was to evaluate the effects of incorporating azolla into a concentrated diet on feed intake and nutrient digestibility in Thai native crossbred goats. Azolla (*Azolla pinnata*), harvested at 10–15 days of age, is known for its rapid growth rate and valuable nutrient composition, containing approximately 18.61% crude protein (CP). Owing to its potential as an alternative and sustainable protein source, it is important to identify appropriate inclusion levels in ruminant diets. This study therefore aimed to determine the influence of dried azolla supplementation on feeding Intake and digestive efficiency. A completely randomized design (CRD) was implemented using 18 male goats that were 50% Thai native crossbreds, aged 12–15 months, with an average initial body weight of 21.55 ± 1.50 kg. Fresh *A. pinnata* was collected at 10–15 days of maturity, dried in a hot-air oven at 70–75°C to achieve consistent moisture reduction, and incorporated into the concentrate. The experimental diets consisted of three inclusion levels: 0%, 5%, and 10% dried azolla. Throughout the study, all goats received Signal grass (*Brachiaria humidicola*) *ad libitum* as the roughage source. Feed intake was recorded daily and nutrient digestibility was determined using standard evaluation procedures.

The results demonstrated that varying levels of dried *A. pinnata* had no significant effects ($P > 0.05$) on feed intake and nutrient digestibility among the goats. All treatment groups exhibited similar consumption patterns, and the inclusion of azolla up to 10% did not negatively affect digestive performance. These findings indicate that early-harvested A. pinnata with moderate protein content can be incorporated into the diets of Thai native crossbred goats without compromising feeding efficiency. In conclusion, supplementing concentrated feed with dried A. pinnata dried at inclusion levels up to 10% does not adversely influence feed intake and nutrient digestibility in goats. The use of oven-dried young azolla presents a practical, sustainable, and cost-effective feeding strategy, particularly in regions with limited access to conventional feed ingredients.

Keywords: goat, azolla, digestibility, concentrate meal, protein source

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Digestibility Of Crude Fat and Energy of Dorper Crossbreed Supplemented with PKC, Maize Waste At Different Levels, And Herbal Waste Based on Pennisetum Grass

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Abstract

This study aims to determine the digestibility of crude fat and energy in Dorper crossbred supplemented with PKC, maize waste at different levels, and herbal waste based on Pennisetum grass. The animals used were 20 female Dorper sheep. The experimental design was a Complete Randomized Design (CRD) consisting of 4 treatments and 5 replications per treatment. P0: Control (without PKC), P1: Pennisetum grass + Maize Waste 41% + PKC 7%, P2: Pennisetum grass + Maize Waste 39% + PKC 9%, P3: Pennisetum grass + Maize Waste 37% + PKC 11%, with the addition of herbal waste at 1% in each treatment. The variables observed were crude fat and energy, fecal crude fat and energy production, and the measurement of digestibility of crude fat and energy. This research was conducted at Setya Lembu Multifarm, Plesan Village, Nguter District, Sukoharjo Regency, Central Java Province in June 2025. The analysis of crude fat (CF) and energy samples was carried out at the Inter-University Central Laboratory (PAU) of Bogor Agricultural Institute (IPB). The data were analyzed using ANOVA, and if significant effects were found, further tests were conducted using Duncan's Multiple Range Test (DMRT). Based on the ANOVA results, the supplementation treatments had a significant effect ($P<0.05$) on crude fat intake and no significant effect ($P>0.05$) on energy intake, a significant effect ($P<0.05$) on fecal crude fat and energy production, and a significant effect ($P<0.05$) on the digestibility of crude fat ranging from 83.65% to 87.78% and energy from 62.22% to 75.20%. Based on the results, it can be concluded that supplementing PKC up to 9% level is effective in improving the digestibility of crude fat and energy.

Keywords: Digestibility, Crude Fat, Energy, PKC, Curcuma longa

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Digestibility of Dry Matter and Organic Matter in Dorper Crossbreed Supplemented with PKC, maize Waste at Different Levels, and Herbal Waste in pennisetum Grass-Based Feed

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Abstract

This study aimed to evaluate the digestibility of dry matter and organic matter in Cross Breed Dorper sheep supplemented with Palm Kernel Cake. The study was conducted at Setya Lembu Multifarm in June 2025. Sample analysis was carried out at the Central Inter-University Laboratory (PAU) of Bogor Agricultural University (IPB). The experimental design in this study was a completely randomized design (CRD) consisting of 4 treatments and 5 replicates in each treatment: P0: Control (without PKC), P1: PKC 7%, P2: PKC 9%, P3: PKC 11%. The variables observed were dry matter and organic matter intake, dry matter and organic matter production in feces, and dry matter and organic matter digestibility. The data were analyzed using ANOVA analysis, and if there were differences, a follow-up test was performed using DMRT. The data obtained through ANOVA showed that the treatment of PKC and cornstarch waste supplementation on Cross Breed Dorper sheep had a significant effect ($P<0.05$) on dry matter and organic matter consumption, but did not have a significant effect ($P<0.05$) on dry matter and organic matter production in feces. In terms of dry matter digestibility, supplementation had a significant effect ($P<0.05$) on dry matter digestibility with a value of 74.85-71.56%. In terms of organic matter digestibility, supplementation had a significant effect ($P<0.01$) with a digestibility value ranging from 77.99 to 74.01%. Based on the research results, it can be concluded that PKC supplementation up to a level of 9% effectively increases dry matter and organic matter digestibility.

Keywords: Digestibility, Dry Matter, Organic Matter, PKC, Odot

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Physiological responses of different sheep breeds supplemented with *Curcuma sp*

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Abstract

The objective of this study was to evaluate the effects of *Curcuma sp* supplementation on the physiological responses of different sheep breeds. The experimental design used a Completely Randomized Design (CRD) consisting of eight treatments with three replications each. The treatments were as follows: P1: Awassi without herbal supplement, P2: Awassi with herbal supplement, P3: Dorper without herbal supplement, P4: Dorper with herbal supplement, P5: Texel without herbal supplement, P6: Texel with herbal supplement, P7: Local sheep without herbal supplement, and P8: Local sheep with herbal supplement. The observed parameters of physiological responses included respiratory rate, pulse rate, and rectal temperature. ANOVA results indicated that respiratory rate was not significantly different among treatments ($P>0.05$) in the morning, afternoon, and evening, suggesting that *Curcuma sp* supplementation did not affect the respiratory rate of the sheep. Pulse rate showed a highly significant effect at midday ($P<0.01$), ranging from 72 to 113 beats per minute. Rectal temperature showed a highly significant effect in the afternoon and evening ($P<0.01$). All physiological parameters remained within the normal range for healthy sheep. The supplementation provided was safe, did not induce respiratory stress, only influenced pulse rate, and affected body temperature, which was likely triggered by ambient environmental temperature.

Keywords: *Curcuma sp*, Respiratory Rate, Pulse Rate, Rectal Temperature.

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Dietary Effects on Leg Pigmentation in Southern Thai Native Ornamental Chickens

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Abstract

One of the aesthetic ideals of Southern Thai native ornamental chickens is a naturally pale or white shank. Diet plays a crucial role in determining shank pigmentation; however, many farmers commonly use commercial feeds containing corn as the primary energy source, which contributes yellow pigments that intensify shank coloration. In practice, some farmers prefer commercial swine feed because it produces less yellow pigmentation compared to native chicken feed. This preliminary study aimed to investigate the effects of different diets on shank coloration in Southern Thai native chickens. Twelve 3-month-old Lueng Hang Khao chickens of mixed sex were randomly assigned into three dietary treatments with four replicates per treatment (one bird per replicate). The treatments consisted of: T1 – commercial swine feed (control), T2 – commercial native chicken feed, and T3 – a formulated diet using broken rice as the main energy source mixed with soybean meal. All birds received their respective diets for a period of five weeks. The results demonstrated that birds in T3 showed a significant reduction in shank yellowness ($P < 0.05$), whereas shank color remained unchanged in T1 and slightly increased in T2. Although broken rice can reduce yellow pigmentation, excessive dilution of natural pigments may result in overly pale shanks. Supplementation with pigment- rich feed ingredients, such as corn or leafy green vegetables, may therefore be necessary to prevent undesirable shank paleness.

Keywords: Dietary, Leg Pigmentation, Thai Native Chickens

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Effect of *Curcuma sp*. Supplementation on Dry Matter and Organic Matter Digestion in Different Cross Sheep Breeds

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Abstract

This study aims to evaluate the effect of Curcuma sp. supplementation on the digestibility of Dry Matter (DM) and Organic Matter (OM) in different sheep breeds. The experimental design of this study was a Completely Randomized Design (CRD) with 2 factors, the first factorial consisted of 2 Supplementations, while the second factorial consisted of 4 treatments, and 3 repetitions. P1: Awassi Sheep; P2: Dorper Sheep; P3: Texel Sheep; P4 = Local Sheep. S0: non-herbal supplementation; S1: herbal supplementation. The variables observed were the consumption of dry matter (DM) and organic matter (OM), the production of dry matter (DM) and organic matter (OM) feces and the digestibility of dry matter (DM) and organic matter (OM). The results of the ANOVA analysis showed that Curcuma sp. supplementation significantly affected the total feed intake of DM and OM ($P<0.05$), as well as DM fecal production ($P<0.05$), and significantly affected DM digestibility ($P<0.01$) and significantly affected OM digestibility ($P<0.05$). Total dry matter (DM) intake for Awassi, Texel, and local breeds increased, while in Dorper sheep it decreased when supplemented with Curcuma sp. 814±191.7 g (P1S0) to 1073.5±183.5 g (P1S1) for Awassi Sheep, 1120±83.8 g (P2S0) to 1064.4±122.2 g (P2S1) for Dorper Sheep, 890.7±128.1 g (P3S0) to 1138.2±47.6 g (P3S1) for Texel Sheep, and 1132.7±33.4 g (P4S0) to 1220.9±178.1 g (P4S1) for Local Sheep. The dry matter (DM) fecal production of each breed of sheep increased when supplemented with Curcuma sp. 291.3±90.5 g (P1S0) to 346.8±94.9 g (P1S1) for Awassi sheep, 387.9±85.2 g (P2S0) to 437.9±29.1 g (P2S1) for Dorper sheep, 309.7±60.2 g (P3S0) to 437.7±17.8 g (P3S1) for Texel sheep, and 335.6±8.7 g (P4S0) to 462.5±81 g (P4S1) for Local sheep. The digestibility of dry matter and organic matter of Awassi sheep increased, while Dorper, Texel, and Local sheep decreased after supplementation with Curcuma sp. 64.5±3.4% (P1S0) to 67.9±4.2% (P1S1) for Awassi sheep, 65.6±5% (P2S0) to 58.7±1.9% (P2S1) for Dorper sheep, 65.3±3.5% (P3S0) to 61.5±0.3% (P3S1) for Texel sheep, and 70.4±1.1% (P4S0) to 62.2±1.7% (P4S1) for Local sheep. After supplementation with Curcuma sp. the total feed intake for Awassi, Texel, and Local sheep increased, while in Dorper sheep there was a decrease. However, fecal production in each breed also increased after supplementing with Curcuma sp., as did feed digestibility. An increase in digestibility was observed in the Awassi sheep breed, while a decrease was observed in the Dorper, Texel, and Local sheep breeds. Therefore, supplementation in the Awassi sheep breed can be used as an alternative feed, but needs to be reconsidered for the Dorper, Texel, and Local sheep breeds.

Keywords: Digestibility, Dry Matter, Organic Matter, *Curcuma sp.,* Sheep.

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Utilization of Fermented Sago Palm Pith Silage on Growth Performance and Carcass Traits in Thai Native Chickens

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Abstract

The objective of this study was to investigate the effect of using fermented sago palm pith silage on growth performance and carcass production in Thai native chicken. In the experiment, eighty mixed-sex native chicken aged 2 to 4 months were used. The chickens were divided into two treatment groups, each including five duplicates of eight birds each. Group 1 received a commercial broiler diet for 3–6-week-old chicks, with 19% crude protein, while Group 2 received a similar commercial broiler diet mixed with fermented sago palm pith silage fermented sago palm pith silage. The trial started when the chickens were two months old and continued for eight weeks, providing ad libitum access to feed and water. Body weight, feed intake, feed conversion efficiency, and carcass yield were recorded. Statistical comparisons between treatment means were performed using independent t-tests implemented in Microsoft Excel. The results showed that chickens fed with the commercial broiler diet exhibited significantly higher final body weight, feed intake, and feed conversion efficiency than those receiving the diet combined with fermented sago palm pith silage at a 50:50 ratio ($p < 0.01$). There were no significant differences in live weight, carcass yield, retail cut percentage, pH, and drip loss between the dietary diets ($p > 0.05$). As a result, fermented sago starch can be included into commercial broiler feed at up to 50% without reducing carcass production in native chickens.

Keywords: sago palm pith silage, growth performance, carcass production, Thai Native Chicken