ISFA

Guidebook

THE 3rd INTERNATIONAL SYMPOSIUM ON FOOD AND AGRO-BIODIVERSITY (ISFA) 2021

Faculty of Animal and Agricultural Sciences
Universitas Diponegoro
Jl. Prof. Sudarto, S.H. Tembalang Semarang 50275
Tel. 0822-2123-8423
email: isfa@ift.or.id
www.isfa.ift.or.id

Guidebook

The 3rd International Symposium on Food and Agro-Biodiversity (The 3rdISFA)

online seminar via zoom

Zoom links:

ISFA Day One: 14 September 2021
https://s.id/isfaday1
Meeting ID: 920 9263 9939
Passcode: 643348

ISFA Day Two: 15 September 2021
https://s.id/isfaday2
Meeting ID: 985 5973 9075
Passcode: 680641

14-15 September 2021

Guidebook

The 3rd International Symposium on Food and Agro-Biodiversity

Arranged by:

Ardiansyah Ditya Pratama
Evan Adrian
Hidayah Safira
Mardiana
Ridho Pangestu
Timothy Agatha Sinaga

Content & Cover Design:

Yehezkiel Allen Santoso

ISBN : -

Publisher : Indonesian Food Technologist

Table of Contents

PROGRAM

THE 3rd INTERNATIONAL SYMPOSIUM ON FOOD AND AGRO-BIODIVERSITY, 14-15 SEPTEMBER 2021

Tuesday, 14 September 2021

Time	Activities
07.00 – 08.00	Regristration
08.00 – 09.00	Opening ceremony Welcoming Speech by Faculty Dean of Animal & Agricultural Sciences Welcoming Speech & Opening by Vice Rector of Universitas Diponegoro for Research and Innovation
09.00 – 10.00	Keynote Speaker Session 1: **Professor Indrawati Oey** (Department of Food Science, University of Otago, New Zealand) "Learning from Nature to Produce Sustainable Healthy Diet" Moderator: Dr Setya Budi Muhammad Abduh
10.00 – 10.15	Coffee Break
10.15 – 11.15 11.15 – 12.15	Keynote Speaker Session 2: **Professor Peter J. Batt** (Curtin University, Australia) "Transforming Pathways: working with farmers in agri-food systems" Keynote Speakers Session 3: **Professor Shigeru Hayakawa** (Kagawa University, Japan) "The Utilisation of Rare Sugar in Processed Food" Moderator: Professor V. Priyo Bintoro*
12.15 – 13.00	Lunch
13.00 – 14.00 14.00 – 15.00	Keynote Speaker Session 4: **Professor Maurice Ku** (Department of Bioagricultural Science, College of Agriculture, National Chiayi University, Taiwan) "Sustainable Agriculture in Facing Climate Changes: Production of C4 rice" Keynote Speaker Session 5: **Dr Ching Lik Hii** (Nottingham University, Malaysia) "Recent Developments in Advance Drying Technologies for Food and Bio-products" Moderator: Dr Didik Wisnu Widjajanto
15.00 – 15.15	Coffee break
15.15 – 16.15	Keynote Speaker Session 6: **Professor Joost van den Borne** (HAS University of Applied Sciences, Netherland) "Sustainable Animal Production: aspect of animal, human, food safety and environment" Moderator: Professor Anang Mohamad Legowo
16.15 – end	Closing

Wednesday, 15 September 2021

Time	Activities
07.00 -- 09.00	Registration
09.00 -- 10.00	Parallel presentation session 1: Room 1, Room 2, Room 3, Room 4
10.00 -- 10.15	Coffee break
10.15 -- 11.45	Parallel presentation session 2: Room 1, Room 2, Room 3, Room 4
11.45 -- 12.45	Lunch
12.45 -- end	Parallel presentation session 3: Room 1, Room 2, Room 3, Room 4
Congress of Indonesian Food Technologists	

Note. Room 1: Food Processing and Engineering; **Room 2**: Food Safety, Food for Well-being and Agricultural Biotechnology; **Room3**: Food Security and Agricultural Economic; **Room 4**: Agricultural Production System, Agricultural and Food Wastes.

DISCUSSION ROOMS AND TIME ALLOCATION FOR THE PARALLEL PRESENTATIONS

Room 1: Food Processing and Engineering

Time allocation	Paper ID	Presenter
Session 1 (Moderator: Dr Juni Sumarmono)		
09.00 – 09.10	FP-001-2021	PROPERTIES OF READY TO EAT GROUND BEEF JERKY WITH THE ADDITION OF TAPIOCA FLOUR. Baiq Rien Handayani, Wiharyani Werdiningsih, Tri Isti Rahayu, Alvi Zarkasya Fajri
09.10 – 09.20	FP-002-2021	MODELLING HEAT AND MASS TRANSFER PROCESSES DURING DRYING: EMPIRICAL, THEORETICAL AND REACTION ENGINEERING APPROACH Ching Lik Hii, Chiang Choon Lai, Aditya Putranto, Zhi Bin Chia
09.20 – 09.30	FP-003-2021	THE USE OF FLOUR FROM FRACTION OF PARBOILED PADDY MILLING RESULTS AND LOW-CALORIE SWEETENERS ON THE QUALITY AND GLYCEMIC INDEX OF BISCUITS Wisnu Adi Yulianto, Raka Ardi Kurniawan, Muhamad Fikran Baharudin, Sri Luwihana
09.30 – 09.40	FP-004-2021	GELATIN EXTRACTION OF BALI CATTLE SKIN AND IT POTENCE AS EDIBLE FILM ON BEEF SAUSAGE I Nyoman Sumerta Miwada, I ketut Sumadi, Luh Putu Wrasisati, I Nyoman Sutarpa Sutama
09.40 – 09.50	FP-005-2021	HEALTH BENEFIT AND NUTRIENT VALUE OF CHICKEN SAUSAGE ENHANCE WITH LOCAL BEETROOT POWDER (pre clinic study in *Rattus Novergicus L.*) Winny Swastike, Rio Olympias Sujarwanta, Edi Suryanto, Jamhari
09.50 – 10.00	FP-006-2021	SPORT DRINK CONTAINING MALTODEXTRIN TO IMPROVE PHYSICAL PERFORMANCE OF SOCCER ATHLETES Naintina Lisnawati, Nur Amin, Yanesti Nuravianda Lestari
10.00 – 10.15	Coffee Break	
Session 2 (Moderator: Dr Siti Susanti)		
10.15 – 10. 25	FP-007-2021	PHYSICAL PROPERTIES OF SET YOGURT MANUFACTURED FROM DIFFERENT TYPES OF MILKS WITH COLLAGEN HYDROLYSATE ADDITION Juni Sumarmono, Triana Setyawardani, Agustinus H.D. Raharjo, Erika Setyawardani, Sarah Destiana
10.25 – 10.35	FP-008-2021	EVALUATION OF PHYSICOCHEMICAL AND SENSORY PROPERTIES OF FREEZE-DRIED DURIAN: INFLUENCE OF DRYING TIME Sandi Darniadi, Sunarmani Sunarmani, Sri W
10.35 – 10.45	FP-009-2021	SENSORY PROFILE AND NUTRITIONAL COMPOSITION OF GLUTEN FREE CAKES AND MUFFINS FROM MOCAF-COMPOSITE FLOUR WITH LOCAL FOOD SUBSTITUTION

		Yannie Asrie Widanti, Erni Widajanti, Andri Astuti Itasari, Widasari Atrilania Sri Kunciati, Skolastika Anggita Ayunigtyas, Almira Bhadra Khairunisa
10.45 – 10.55	FP-010-2021	EFFECT OF PHYSICAL MODIFICATION OF CASSAVA FLOUR ON PHYSICAL AND SENSORY PROPERTIES OF MUNG BEAN FLOUR SUBSTITUTED ANALOG RICE Nur Annisa Metya Novikasari, Iffah Muflihati
10.55 – 11.05	FP-011-2021	RESTRUCTURED TURKEY MEAT PRODUCTS QUALITIES Bambang Dwiloka, Bhakti Etza Setiani, Yoyok Budi Pramono, Ahmad Ni'matullah Al-Baarri, Samuel Rudison, Stella Putri Tomya, Robby Rusdiansyah, Melania Anin, Mustofa
11.05 – 11.15	FP-012-2021	COWPEA SPROUTED MILK RICH IN PHENOLIC ANTIOXIDANTS, VITAMIN C, PROTEIN, AND DIETARY FIBER AS AN ANTIDIABETIC DRINK Hery Winarsi, Erminawati, Gumintang Ratna Ramadhan, Elysa Meliyana Gumelar, Lavia Androviterra Sekar Kencana
11.15 – 11.25	FP-013-2021	EFFECT OF PACKAGING TYPE AND STORAGE TEMPERATURE ON THE CHEMICAL AND SENSORY PROPERTIES OF CORN GETAS Nur Aini, Muhammad Hadi, Retno Setyawati, Hidayah Dwiyanti, Budi Sustriawan
11.25 – 11.35	FP-014-2021	IN SILICO ANALYSIS OF THE POTENTIAL OF SARGASSUM SP BREWED AND SYZYGIUM POLYANTHUM LEAF AS NUTRACEUTICALS Putut Har Riyadi, Eko Dewi, Apri Anggo, Apri Anggo, Alfrista Damayanti
11.35 – 11.45	FP-015-2021	DESIGN AND PERFORMANCE TEST OF PORTABLE SPECTROMETER USING AS7265X MULTISPECTRAL SENSOR FOR DETECTION OF ADULTERATED CANE SUGAR IN GRANULATED COCONUT SUGAR Susanto Budi Sulistyo, Arief Sudarmaji, Purwoko H. Kuncoro, Pepita Haryanti
11.45 – 12.45	Lunch Break	
Session 3 (Moderator: Dr Susanto Budi Sulistyo)		
12.45 – 12.55	FP-016-2021	THE QUALITY OF FROZEN CATFISH FILLET (*Pangasius Sp.)* WITH FOOD ADDITIVIES NACL AND SODIUM TRYPOLYPHOSPHATE Resti Demayanti, Arpi Dwi Anggo, A. Suhaeli Fahmi
12.55 – 13.05	FP-017-2021	ETHANOL EXTRACT OF NAGASARI LEAVES (*Mesua Ferrea L*.) NANOEMULSION DOSAGE FORM WITH VIRGIN COCONUT OIL (VCO) AS THE OIL PHASE Annisa M. A. Dhafah, Tuti Sri Suhesti
13.05 – 13.15	FP-018-2021	EVALUATION OF COLOUR AND PHYSICOCHEMICAL PROPERTIES OF ANNATTO SEED AQUADEST EXTRACT IN THE VARIATION PH OF SOLVENT Isti Handayani, Aisah Tri Septiana, Budi Sustriawan, Pepita Haryanti, Susanto Budi Sulistyo

13.15 – 13.25	FP-019-2021	THE CHEMICAL COMPOSITION OF COCONUT SAP AT DIFFERENT TAPPING CONDITION Pepita Haryanti, Karseno, Isti Handayani, Susanto B. Sulistyo
13.25 – 13.35	FP-020-2021	CHARACTERISTICS OF ARABIC COFFEE (COFFEA ARABICA) LOCAL LEKSANA BANJARNEGARA ON VARIOUS LEVELS OF ROASTING AND BREWING Ike Sitoresmi Mulyo Purbowati, Ali Maksum, Gunawan Wijonarko, Rumpoko Wicaksono
13.35 – 13.45	FP-021-2021	PHYSICOCHEMICAL CHARACTERISTICS OF MILK FERMENTED WITH POWDERED KEFIR STARTER Juni Sumarmono, Triana Setyawardani, Agustinus H. D. Raharjo, Anggita N. F. Astuti, Nopva Agustina
13.45 – 13.55	FP-022-2021	DISSIMILARITY ANALYSIS OF BREADS OF DIFFERENT FINAL THERMAL PROCESSING TECHNIQUES BASED ON THE CHEMICAL COMPOSITION AND STARCH HYDROLYSIS Setya Budi Muhammad Abduh, Valentinus Priyo Bintoro, Sri Mulyani, Ahmad Ni'matullah Al-Baarri
13.55 – 14.05	FP-023-2021	LEAVES AS ECO-FRIENDLY TRADITIONAL FOOD PACKAGING: A CASE STUDY IN TRADITIONAL MARKETS IN MAGELANG, INDONESIA Setiyo Prajoko, Clarisa Febri Prastiwi, Indria Arganingtias, Ira Dian Melawati, Nafis Ayyada Affa, Syahrul Ramdhani
14.05 – 14.15	FP-024-2021	CHARACTERISTICS OF *Cymbopogon nardus* L. EXTRACT WITH VARIATIONS IN LEAF WITHERING TIME Purbowati ISM, Maksum, A, Wijonarko, G, and Wicaksono, R
14.15 – 14.25	FP-025-2021	OZONATED CHILI PASTE FROM SECOND GRADE QUALITY AGAINST A WEEK STORAGE ON UNCONTROLLED TEMPERATURE IN THE ALUMINIUM BASED PACKAGING Ahmad Ni'matullah Al-Baarri, Anang Mohamad Legowo, Muhammad Nur, Kusmiyati, Teuku Sabrina, and Ailsa Afra Mawarid
14.25 – 14.35	FP-026-2021	LESS PREMIUM CHILI PASTE USING HYPOIODOUS TREATMENT AFTER A WEEK STORAGE IN ALUMINIUM PACKAGING Ahmad Ni'matullah Al-Baarri, Setya Budi Muhammad Abduh, Anang Mohamad Legowo, Muhammad Nur, Mulyana Hadipernata, and Ailsa Afra Mawarid
14.35 – end	Closing	

Room 2: Food Safety, Food for Well-being and Agricultural Biotechnology

Time allocation	Paper ID	Presenter
Session 1 (Moderator: Dr Yoyok Budi Pramono)		
09.00 – 09.10	FS-002-2021	ELECTRONIC MORPHOLOGY OF ACRYLAMIDE IN ROASTED COFFEE AND COCOA PRODUCTS BY CYCLIC VOLTAMMETRY Hasim Munawar, Harmoko, Budi Yarsi, Amalia Rakhmawati, Luis André L.Fernandes, Ireng Darwati
09.10 – 09.20	FS-003-2021	DIGITAL COMMUNICATION MEDIA AND HEALTHY FOOD CONSUMPTION BEHAVIOR: A STRUCTURAL MODEL AND EXTENSION STRATEGY IMPLICATION Sik Sumaedi, Sumardjo, Amiruddin Saleh, Agus Fanar Syukri
09.20 – 09.30	FS-004-2021	CHARACTERISTICS OF VIRGIN COCONUT OIL (VCO) BASED ON CHANGE OF POLARIZATION ANGLE WITH TREATMENT OF DOSE, DISPOSAL AND OZONATION DURATION Heri Sugito, Faridl Muhammad Abidin, Fajar Arianto, Much Azam, Ketut Sofjan Firdausi
09.30 – 09.40	FS-005-2021	PRODUCTION PERFORMANCE OF BROILERS SUPPLEMENTED WITH WATER EXTRACT OF TURMERIC RHIZOME AND TAMARIND FRUIT Ni Wayan Sudatri, Gusti Ayu Mayani Kristina Dewi, I Gede Mahardika, I Gusti Nyoman Gde Bidura
09.40 – 09.50	FS-007-2021	GROWTH PERFORMANCE, SERUM BIOCHEMICAL, PHYSICAL AND SENSORY EVALUATION OF BROILER CHICKENS SUPPLEMENTED WITH LEILEM (CLERODENDRUM MINAHASSAE TEIJSM & BINN) LEAVES JUICE IN DRINKING WATER Jet Saartje Mandey, Meity Sompie, Cherly J. Pontoh, Christina Junus
09.50 – 10.00	FS-008-2021	CHANGES IN PROTEIN PROPERTIES OF PASTEURIZED LIQUID WHOLE EGG WITH ADDED SUGAR Antonius Hintono, Nurwantoro, Anang Mohamad Legowo, Sri Mulyani, Casriyati
10.00 – 10.15	Coffee break	
Session 2 (Moderator: Bhakti Etza Setiani, MSc)		
10.15 – 10.25	FS-009-2021	LEAD CONTENT OF HUMAN MILK IN LOWLAND AND HIGHLAND AGRICULTURAL AREAS Dina Rahayuning Pangestuti, Apoina Kartini, Suhartono, Budiyono, Naintina Lisnawati, Sulistyawati
10.25 – 10.35	FS-010-2021	ANTHOCYANIN PRODUCTION AND EATING QUALITY OF TROPICAL PURPLE CORNS Arifin Noor Sugiharto, Azeri Gautama Arifin, Damanhuri
10.35 – 10.45	FS-011-2021	FORMALDEHYDE ADULTERATION IN MEATBALL IS STILL PREVALENT AND CONSUMERS CANNOT DIFFERENTIATE THE PRODUCT BY ITS PHYSICAL PROPERTIES Yoga Pratama, Asri Astuti, Bhakti Etza Setiani

10.45 – 10.55	FS-012-2021	THE USE OF SEVERAL SAP PRESERVATIVES ON QUALITY CHARACTERISTICS OF COCONUT SUGAR IN NUSAWUNGU DISTRICS, CILACAP REGENCY Karseno, Tri Yanto, Pepita Haryanti
10.55 – 11.05	FS-014-2021	THE ROLE OF CARBOHYDRATES IN TEENEGE BIMOTOR ABILITIES Topo Suhartoyo, Neva Widanita, Pramesthi Widya Hapsari
11.05 – 11.15	FS-015-2021	THE EFFECTS OF THE EARLY ORAL FEEDING ON PRETERM INFANTS LENGTH OF HOSPITAL STAY Amanda Candraning Pratiwi, Haryatiningsih Purwandari, Meivita Dewi Purnamasari
11.15 – 11.25	FS-016-2021	IMPLEMENTATION OF STATISTICAL QUALITY CONTROL (SQC) AS A DEFECTIVE QUALITY PRODUCT CONTROL OF CHINES TOFU Yoyok Budi Pramono, Clarisa Gunawan, Ahmad Ni'matullah Al-Baarri
11.25 – 11.35	FS-017-2021	QUALITY CONTROL WITH SCORING METHODS IN THE PRODUCTION PROCESS OF PEAS IN THE BEAN INDUSTRY Yoyok Budi Pramono, Risma Novita Sari, Hari Wibowo C, Sri Mulyani, Setya Budi Muhammad Abduh
11.35 – 11.45	FS-018-2021	HOUSEHOLD FOOD AVAILIBILITY, MATERNAL NUTRITIONAL KNOWLEDE, AND STUNTING IN ELEMENTARY STUDENTS, BEKASI INDONESIA Alfi Fairuz Asna, Mayang Erianti, Muh. Nur Hasan Syah, Arindah Nur Sartika
11.45 – 12.45	Lunch Break	
Session 3 (Moderator: Yoga Pratama, MSc)		
12.45 – 12.55	FS-019-2021	CHARACTERISTICS OF ARRAY MOS GAS SENSORS IN DETECTION OF ADULTERATION ON PATCHOULI OIL WITH CANDLENUT OIL Arief Sudarmaji, Agus Mirgiwiyatmo, Susanto Budi Sulisyo
12.55 – 13.05	FS-020-2021	THE CONSUMPTION OF SCHOOL CHILDREN'S SNACKS AS POTENTIAL RISK FACTOR FOR OBESITY IN CHILDREN ELEMENTARY SCHOOL Sulistiyani, Bagoes Widjanarko
13.05 – 13.15	FS-021-2021	THE EFFECT OF DIFFERENT HABITATS AND POSTHARVEST TREATMENTS OF CATFISH (*Clarias Gariepinus*) ON ESCHERICIA COLI ABUNDANCE: A STUDY IN BREBES, CENTRAL JAVA INDONESIA Nur Endah Wahyuningsih, Yusniah Hanani Darundiati, Deni Ardi Lourina
13.15 – 13.25	FS-022-2021	COMPARISON OF ANTIBACTERIAL ACTIVITY OF YOUNG AND OLD LEAVES OF NAGASARI (*Mesua Ferrea L.)* ETHANOL EXTRACT AGAINTS STAPHYLOCOCCUS AUREUS Adam Hamid, Tuti Sri Suhesti, Sarmoko
13.25 – 13.35	FS-023-2021	THE EFFECT OF MATERNAL INFANT-FEEDING STYLE ON THE PORTION OF FOOD CONSUMED BY INFANT AGED 6 TO 12 MONTHS IN INDONESIA

		Dian Susmarini, Made Sumarwati, Atyanti Isworo
13.35 – 13.45	FS-026-2021	CHANGES VALUE OF STARCH, AMYLOSE, AND AMYLOPECTIN IN CIHERANG RICE FOR EIGHT MONTHS STORAGE Mulyana Hadipernata, Nikmatul Hidayah, Ridwan Rachmat, Eka Rahayu, Ahmad Ni'matullah Al-Baarri
13.45 – 13.55	FS-027-2021	UTILIZATION OF KERSEN LEAVES (*Muntingia calabura* L.) FOR DIABETES MELLITUS PATIENTS: A SYSTEMATIC REVIEW Lentera Firdausi, Nur Indahsari, Nur Fadillah Wati, Saryono Saryono
13.55 – 14.05	AB-001-2021	FORMULATION AND EVALUATION OF "NATA DE CURCUMA" Annisa Auliya Rahmah, Atika Putri, Felicia Ivena, Monica Ramadhanti, Harwoko
14.05 – 14.15	AB-002-2021	THE EFFECT OF DIETARY PEANUT FLOUR *(Arachis hypogeae L.)* ON THE QUALITY OF CHICKEN EGGS Florencia Sompie, Jein Rinny Leke, Jacqueline Laihad, Linda Tangkau, Malcky Telleng
14.15 – 14.25	AB-003-2021	ANTIBACTERIAL ACTIVITY OF MUDSKIPPER (*Boleophthalmus Boddarti)* Riviani, Maria dyah Nur Meinita, Nuri Fitria, Nadhila Salwa, Dewi Wisduyanti
14.25 – end	Closing	

Room 3: Food Security and Agricultural Economic

Time allocation	Paper ID	Presenter
Session 1 (Moderator: Ghina Fitri Ariesta Susilo, MSc)		
09.00 – 09.10	FS-001-2021	DEVELOPING AGRIBUSINESS FOR MEETING DEMAND OF QUALITY FOODS DURING AND POST COVID-19 PANDEMIC Taslim Sjah, Zainuri
09.10 – 09.20	FS-006-2021	HORTICULTURAL COMMODITY SUPPLY CHAIN SUSTAINABILITY IN FACING THE COVID-19 PANDEMIC Novi Haryati, Neza Fadia Rayesa, Febriananda Faizal
09.20 – 09.30	FS-013-2021	THE CORRELATION OF FOOD LITERACY AND NUTRITIONAL STATUS AMONG ADOLESCENT GIRLS IN CENTRAL JAVA Siti Masfiah, SKM, M.Kes, MA, Arum Firda Ayu Maqfiroch, Windri Lesmana Rubai, Siwi Pramatama Mars Wijayanti, Dian Anadari, Arif Kurniawan
09.30 – 09.40	FS-024-2021	ANALYSIS OF INFLUENCING FACTORS FOOD SECURITY OF FISHERMEN'S HOUSEHOLDS IN TAYU DISTRICT, PATI REGENCY Lu'lu'a Ulyn Ni'mah, Wulan Sumekar, Anang M. Legowo
09.40 – 09.50	FS-025-2021	INDONESIAN FOOD LAW POLITICS IN THE ERA OF THE COVID-19 PANDEMIC IN THE ORDER TO REALIZE FOOD SECURITY Rani Pajrin, Jamal Wiwoho, Moch Najib Imanullah, Pujiyono
09.50 – 10.00	AE-001-2021	FARMERS' BEHAVIOR IN FACING SOYBEAN PRODUCTION RISKS IN GROBOGAN REGENCY, CENTRAL JAVA, INDONESIA Wiludjeng Roessali, Kustopo Budiraharjo, Suryani Nurfadillah
10.00 – 10.15	Coffee Break	
Session 2 (Moderator: Dr R. Ahmad Romadhoni Surya Putra)		
10.15 – 10.25	AE-002-2021	ANALYSIS OF FACTORS AFFECTING CUSTOMERS DECISION IN BUYING IMPORTED APPLES (CASE STUDY IN TRANSMART MODERN MARKET, SEMARANG) Ilham Dwipa Brahmantyo Aji, Mukson, Wiludjeng Roessali
10.25 – 10.35	AE-003-2021	FINANCIAL RISK OF SMALLHOLDER DAIRY BASED ON FARM-SCALE AT MALANG INDONESIA Hari Dwi Utami, Umi Wisaptiningsih, Hary Nugroho
10.35 – 10.45	AE-004-2021	STRATEGY AND POLICY OF LOCAL BEEF CATTLE DEVELOPMENT Femi Hadidjah Elly, Zulkifli Poli, Agustinus Lomboan, Deasy Soeikrimo, Meiske Rundengan
10.45 – 10.55	AE-005-2021	RESILIENCE OF THE BROMO TENGGER SEMERU TOURISM VILLAGE COMMUNITY THROUGH OPTIMIZING AGRICULTURAL RESOURCES DURING THE COVID PANDEMIC Kliwon Hidayat, Mas Ayu Ambayoen
10.55 – 11.05	AE-006-2021	SOURCE OF FINANCE AND FACTORS CONSIDERED BY BANKS IN THE PROVISION OF CREDIT FOR CATTLE FATTENING IN EAST JAVA PROVINCE, INDONESIA I Gusti Ayu Putu Mahendri, Scott Waldron, Rob Cramb, Malcolm Wegener

11.05 – 11.15	AE-007-2021	CHARACTERISTICS OF SHEEP BUSINESSES OWNED BY FARMERS IN NORTH SUMATERA PROVINCE IN ORDER TO ACCESS PROGRAM CREDIT I Gusti Ayu Putu Mahendri, Ismeth Inounu
11.15 – 11.25	AE-008-2021	INFLUENCE OF PRICE VOLATILITY TO REGIONAL PRODUCTION OF YELLOW CORN Yumna Raisa Noor, Putri Budi Setyowati, Rosihan Asmara, Arifin Noor Sugiharto
11.25 – 11.35	AE-009-2021	BRINGING THE SPICES YOGHURT "YOMPIMPAH" TO THE MARKET: A FEASIBILITY STUDY Vania Fauziyah Kembang Rohmadi, Sherina Audry Hendrostuti, Sherina Audry Hendrostuti, Cherly J. Pontoh, Yasmine Zahra Shabira, Muhammad Irfan Rafif Pratama, Harwoko Harwoko
11.35 – 11.45	AE-010-2021	HALAL'S INFLUENCE ON THE CONTINUITY OF THE TRADITIONAL FOOD INDUSTRY IN MAGELANG REGENCY Endang Kartini Panggiarti
11.45 – 12.45	Lunch Break	
Session 3 (Moderator: Yosephine Laura Raynardia Esti Nugrahini, MSc)		
12.45 – 12.55	AE-011-2021	COCONUT BONSAI DECORATION PLANTS WITH BATIK PATTERNS IN THE MODERN ERA Yhenis Apriliana, Putri Mega Lestari, Aldi Nur Fadilah, Indah Setiawati
12.55– 13.05	AE-012-2021	THE EXPORT POTENTIAL OF ARACEAE ORNAMENTAL PLANTS FROM INDONESIA BASED ON TREND AND CONSUMER CHARACTER ANALYSIS Gayuh Lestari, Khofifah Majid Afah, Sugeng Pangestu Agung, Indah Setiawati
13.05 – 13.15	AE-013-2021	UTILIZATION OF BITTER GOURD FOR HAIR CARE AND ITS MARKET OPPORTUNITY Nur Annisa Wulandari, Naila Rukhil Azizah, Lusi Setiawati, Sandra Novitasari, Indah Setiawati
13.15 – 13.25	AE-014-2021	THE DIFFERENCE BETWEEN KNOWLEDGE AND ATTITUDE OF JENDRAL SOEDIRMAN UNIVERSITY STUDENTS IN CONSUMING HALAL FOOD Qisti Lativa Wardani, Munasib, Atikah Proverawati
13.25 – 13.35	AE-015-2021	THE INFLUENCE OF ENVIROMENTAL, ECONOMIC, GOVERNMENT AND INCOME FACTORS ON SUSTAINABILITY OF PORANG *(Amorphophallus Muelleri Blume)* IN MADIUN REGENCY, EAST JAVA Mohammad Rizki Ridhanto, Mukson, Anang M. Legowo
13.35 – 13.45	AE-016-2021	FARMERS' PREFERENCES OF AGRICULTURAL INSURANCE PRODUCT'S ATTRIBUTES IN PATI REGENCY Wahyu Dyah Prastiwi, Tutik Dalmiyatun, Wiludjeng Roessali
13.45 – 13.55	AE-017-2021	STRENGTHENING THE NETWORK OF HALAL CENTERS TO SUPPORT INDONESIA'S HALAL MANDATORY SYSTEM

		Poppy Arsil, Rumpoko Wicaksono, Hety H. Hidayat, Dian Novitasari, Rahajeng Aina Nurrahmah
13.55 – 14.05	AE-018-2021	THE POPULARITY OF FOOD SOUVENIRS IN PALANGKARAYA, INDONESIA Ervina Mela, Laeli Budiarti, Mustaufik,Dian Novita
14.05 – 14.15	AE-019-2021	ADDITION OF AZOLLA MICROPHYLA TO FEED ON THE DIGESTIVE TRACT OF MAGELANG DUCKS Faishal Rizqy Setyawan
14.15 – 14.25	AE-020-2021	EXPERIENCE SHOCKS OF STRATEGIC FOOD CONSUMERS IN INDONESIA DURING COVID-19 PANDEMIC Fitrotul laili, Wiwit Widyawati, Dian Islami Prasetyaningrum
14.25 – 14.35	AE-021-2021	EFFECT OF THE COVID-19 PANDEMIC ON DEMAND FOR GOAT'S MILK IN CENTRAL JAVA Danang Mahendra Agus Setiadi dan Rudi Hartanto
14.35 – end	Closing	

Room 4: Agricultural Production System; Agricultural and Food Wastes

Time allocation	Paper IDE	Presenter
Session 1 (Moderator: Dr Teysar Adi Sarjana)		
09.00 – 09.10	AF-001-2021	UTILIZATION OF EGG YOLK AS AN ALTERNATIVE FATLIQUORING AGENT FOR FUR TANNING OF RABBIT SKIN Raden Lukas Martindro Satrio Ari Wibowo, Tutik Maryati, Ragil Yuliatmo
09.10 – 09.20	AF-002-2021	UNDERSTANDING CONSUMERS FOOD WASTE REDUCTION INTENTION: A CONCEPTUAL FRAMEWORK Sih Damayanti, Tri Rakhmawati
09.20 – 09.30	AF-003-2021	THE EFFECT OF FED MAGGOT FLOUR MEAL AS A SUPPLEMENT IN THE COMMERCIAL DIETS ON THE PERFORMANCE OF BROILER CHICKENS Winny Swastike, Salman Alfarisy Totalia, Hary Setyantoko, Rio Olympias Sujarwanta
09.30 – 09.40	AF-004-2021	PHYSICAL AND CHEMICAL PROPERTIES OF BUFFALO SKIN GELATIN EXTRACTED USING CRUDE ACID PROTEASE FROM GOAT ABOMASUM Tanalyna Hasna, Sri Mulyani, Umar Santoso, Yudi Pranoto
09.40 – 09.50	AF-005-2021	LIGNOCELLULOSIC CHARACTERIZATION OF INDONESIAN COCOA POD HUSKS (*Theobroma Cacao L.*) BASED ON THE DEGREE OF MATURITY AS A NANOCRYSTALLINE CELLULOSE PREPARATION Heni Radiani Arifin, Ivonne Maria Untu, Geetruida J.V. Assa, Heidy J. Manangkot, Wisje Lusia Toar
09.50 – 10.00	AF-006-2021	EFFECT OF SHADE AND COVER PORE ON DEVELOPMENT OF BSF PREPUPA Laurentius J.M. Rumokoy, Ivonne Maria Untu, Geetruida J.V. Assa, Heidy J. Manangkot, Wisje Lusia Toar
10.00 – 10.15	Coffee break	
Session 2 (Moderator: Dr Daud Samsudewa)		
10.15 – 10.25	AF-007-2021	EFFECT OF MONO SODIUM GLUTAMATE (MSG) AND LIQUID FERTILIZER ON LEAF AREA AND TUBER WEIGHT OF CANNAEDULIS KERR. Mahdalina Mursilati, Agus Suprapto, Esna Dilli Novianto
10.25 – 10.35	AF-008-2021	AGRICULTURAL BYPRODUCTS IN LAMB'S DIET CAN SUBTITUTE NAPIER GRASS WITHOUT DECREASING LAMBS PRODUCTS Retno Adiwinarti, Christina Maria Sri Lestari,Endang Purbowati, Vita Sestrisnani, Sri Mawati,Agung Purnomoadi, Edy Rianto
10.35 – 10.45	AF-009-2021	GROWTH RATE AND BODY COMPOSITION OF LAMBS RECEIVING AGRICULTURAL WASTES AS GRASS SUBSTITUTES Nikmah Nurbaeti, Endang Purbowati,Retno Adiwinarti, Vita Restitrisnani, Agung Purnomoadi, Edy Rianto

10.45 – 10.55	AF-010-2021	APPLICATION OF IAA AND BAMBOO VINEGAR AT DIFFERENT CONCENTRATION TO STIMULATE GROWTH OF VINE CUBEBA CUTTINGS*(Piper cubeba L.)* Laili Fauziatin Nikmah, Tri Suwarni Wahyudiningsih, Agus Suprapto
10.55 – 11.05	AF-011-2021	THE EVALUATION ON THE QUALITY OF LAMBSKIN LEATHER ORIGINATED FROM LAMBS FED BY DIFFERENT FEEDSTUFFS Iwan Fajar Pahlawan, Endang Purbowati, Sri Mulyani, Retno Adiwinarti, Agung Purnomoadi,Edy Rianto,Vita Restitrisnani
11.05 – 11.15	AF-012-2021	NITROGEN UPTAKE AND SOYBEAN YIELD (*Glycine max* L.) MERRIL. VAR. DEGA 1) ON LEGIN INOCULATION TREATMENT AND COW URINE LIQUID ORGANIC FERTILIZER Kharisma Dian Nurani, Tri Suwarni, Agus Suprapto
11.15 – 11.25	AP-003-2021	THE EFFECT OF INTRAMAMMARY INJECTION OF BINAHONG AND BETLE HERBAL ANTIBIOTICS ON THE NUMBER OF BACTERIA AND THE ORGANOLEPTIC QUALITY OF MILK Roidah 'Afro', Della Sundari, Asrofi Munir, Indah Kiky Melania, Dian Wahyu Harjanti
11.25 – 11.35	AP-007-2021	THE EFFECT OF ADDITION OF BETLE LEAF EXTRACT (*Piper Betle Linn*) TO THE QUALITY OF NATIVE CHICKEN SPERM Yudhistira Indra Pratama, Zurriyatina Qurrota A'yun, Ginar Rosita, Laras Nur Pawestri, Umi Fadilah, Yosephine Laura R. E. N.
11.35 – 11.45	AP-009-2021	CORTISOL HORMONES PROFILES IN DAIRY COWS UNDER REPEAT BREEDING Yosephine Laura Raynardia Esti Nugrahini, Tholibah Mujtahidah, Aqil Adyatama
11.45 – 12.45	Lunch Break	
Session 3 (Moderator: A'isyah Surya Bintang, M.Sc.)		
12.45– 12.55	AP-001-2021	EFFECT OF BIOFERTILIZERS APPLICATION ON GROWTH AND PRODUCTION OF CHERRY TOMATOES (*Lycopersicum cerasiforme*) Didik Wisnu Widjajanto, Sumarsono, Endang Dwi Purbajanti
12.55 – 13.05	AP-002-2021	THE EFFECT OF PANDAN *(Pandanus Amarylifolius Roxb)*LEAF FLOUR AS FEED ON THE PRODUCTION CONTENT OF EGGS AND THE FAT PROFILE OF LAYING HENS. Jein Rinny Leke, Jacqueline Laihad, Endang Pudjiastuti, Albert Podung
13.05 – 13.15	AP-004-2021	SWEET CORN PERFORMANCE THROUGH ORGANIC FARMING APPROACH Yugi R. Ahadiyat , Okti Herliana, Ahmad Fauzi
13.15 – 13.25	AP-005-2021	ESTIMATION OF VARIAN COMPONENT, HERITABILITY AND CORRELATION TO DETERMINE SELECTION CRITERIA IN F5 POPULATION OF YARDLONG BEAN Syaiful Anwar, Florentina Kusmiyati, Dwi Retno Lukiwati
13.25–13.35	AP-006-2021	EFFECT OF HONEY-EGG YOLK DILUENT ON SPERMATOZOA QUALITY OF LIMOUSINE CATTLE

		Lilis Hartati, Muhammad Riyadhi, Nuur Amalia
13.35 – 13.45	AP-008-2021	INSTALLATION AND PRACTICAL OPERATION OF WOODEN WATER WHEELS FOR SUSTAINABLE AGRICULTURE IRRIGATION Arrizka Yanuar Adipradana, Hery Teguh Setiawan, Apanggi Mustakhim
13.45 – 13.55	AP-010-2021	EFFECT OF APPLICATION OF TYPES FERTILIZER AND NUMBER OF SEEDS PER HILL ON PRODUCTION OF WHEAT (*Triticum Aestivum* L.) DEWATA 162 VARIETY Vatjarjinanto, Agus Suprapto, Siti Nurul Iftitah
13.55 – 14.05	AP-011-2021	GENETIC CHARACTERIZATION OF SOYBEAN LINES OBTAINED FROM PURE LINE SELECTION BASED ON RAPD MARKER Alice Yuniaty, Salam Permadi, Ponendi Hidayat, Agus Hery Susanto
14.05 – 14.15	AP-012-2021	EFFECT OF LIVE FOOD, CHAETOCEROS GRACILIS AND SKELETONEMA COSTATUM CULTURED BY WASHING CELL SEED TECHNOLOGY ON DEVELOPMENTAL AND SURVIAL RATE OF TIGER PRAWN (*Panaeus Monodon)* LARVAE Diana Chilmawati, Suminto Suminto
14.15 – 14.25	AP-013-2021	POPULATION DYNAMIC OF BACTERIA IN THE DIATOM MASS CULTURE OF CHAETOCEROS GRACILIS AND SKELETONEMA COSTATUM USING WITH AND WITHOUT WASHING TECHNOLOGY OF CELLS SEED Suminto Suminto, Diana Chilmawati
14.25 – 14.35	AP-014-2021	ENHANCEMENT OF PLANT ANTIOXIDANT DEFENSE SYSTEM AND RICE PRODUCTION Budi Adi Kristanto, Karno Karno, Didik Wisnu Widjajanto, Endang Dwi Purbayanti, Cindy Deviana Hariadi
14.35 – 14.45	AP-015-2021	THE DYNAMICS OF COMPETITIVENESS OF INDONESIAN CLOVE TOWARDS MALAYSIA IN THE INTERNATIONAL MARKET Yustirania Septiani, Rr. Retno Sugiharti, Nadia Auliani Santoso
14.45 – end	Closing	

Abstract Collection: Food Processing and Engineering

Properties of Ready to Eat Ground Beef Jerky with The Addition of Tapioca Flour

Baiq Rien Handayani[1, a)], Wiharyani Werdiningsih[1], Tri Isti Rahayu[1], and Alvi Zarkasya Fajri[2]

[1]*University of Mataram, Jl. Majapahit No.62, Gomong, Selaparang, Mataram, Nusa Tenggara Barat. 83115.*
[2]*PT. Mayora Indah. TBK, Jl. Tomang Raya Kav 21 – 23, Jakarta Barat*

[a)] baiqrienhs@unram.ac.id

Abstract. The processing of ready-to-eat beef jerky generally produce a number of meat flakes that are not utilized and will be detrimental to the beef jerky processing business group. Adding fillers such as tapioca flour will be profitable for jerky producers. This study aims to determine the effect of filler concentration on characteristics of ready-to-eat ground beef jerky produced. The research method used was an experimental method with a completely randomized design (CRD) with one factor, namely the concentration tapioca flour as filler consisted of 0, 5, 10, 15 and 20%. The parameters observed were chemical, physical, microbial, and sensory properties. Data were analyzed with analysis of variance (ANOVA) at 5% significance level using Co-Stat Software. Different data of chemical, physical and microbial were further tested with HSD test, while sensory was tested with DMRT at 5 % significance level. The results showed that addition tapioca flour had significantly different effect on the properties of ground beef jerky ready to eat mainly on water and protein content, color, aroma, taste, texture, L value and total microbes. However, it had no different on Hue value and total mold. It is recommended to use 10 % of tapioca flour to produce good quality of Ready-to-eat ground beef jerky with 24.38%water content, 22.51% of protein content, sensory value with favorable criteria. While total microbe and fungi has met the quality requirements of the contamination limit set by Indonesian national

Keywords: filler, flour, jerky, tapioca

Modelling Heat and Mass Transfer Processes During Drying: Empirical, Theoretical and Reaction Engineering Approach

Ching Lik Hii[1, a)], Chiang Choon Lai[1], Aditya Putranto[2], and Zhi Bin Chia[2]

[1]*University of Nottingham Malaysia, Jl. Broga, 43500 Semenyih, Selangor, Malaysia*
[2]*Monash University Malaysia,Jl. Lagoon Selatan, Bandar Sunway, 47500 Subang Jaya, Selangor, Malaysia*

[a)] Ching-Lik.Hii@nottingham.edu.my

Abstract. Drying is a simultaneous heat and mass transfer operations where heat input from the dryer is supplied to the product to facilitate moisture diffusion from the interior of the product to the surface and it is eventually removed through evaporation. Modeling of drying processes can be carried out by using empirical, theoretical and reaction engineering approach. Empirical modeling uses thin layer models that can be fitted to any experimental drying data via regression analyses. It is simple to use but lacks theoretical justification. On the other hand, theoretical model uses classical Fick's second law and heat conduction models which is more realistic and fulfill major theoretical considerations for a typical drying operation. Through advancement in drying research, reaction engineering approach enables a normalized activation energy curve is developed from a single accurate drying experiment to predict the moisture content and temperature profiles during drying. The estimated moisture content and product temperature could also have impact on important quality attributes. This paper attempts to provide a mini review on the above modeling approaches and also to compare the benefits/drawbacks when come to practical use.

Keywords: diffusion, drying, heat transfer, mass transfer, modeling

The Use of Flour From Fraction of Parboiled Paddy Milling Results and Low-Calorie Sweeteners on The Quality and Glycemic Index of Biscuits

Wisnu Adi Yulianto[1, a)], Raka Ardi Kurniawan[1)], Muhamad Fikran Baharudin[1)], and Sri Luwihana[1)]

[1]*Faculty of Agro-industry, University of Mercu Buana Yogyakarta, Karanglo, Argomulyo, Kec. Sedayu, Bantul, Daerah Istimewa Yogyakarta 55752*

[a)] wisnuadi@mercubuana-yogya.ac.id

Abstract. The number of diabetic patients in Indonesia continues to increase, while the availability of edible snacks for them is still limited. Therefore, this study aims to produce biscuits with low glycemic index that are favored by panelists using rice, broken rice, and bran flours from milled parboiled paddy and mixture of low-calorie sweeteners. This study was conducted with a completely randomized design using two factors, namely type of flour (rice, broken rice, and bran), and a mixture of low-calorie sweeteners. The rice, broken rice, and bran flours used were 40%, 30%, and 20%, respectively. Meanwhile, the sweetener was made in 6 variations, namely: sweetener 1 consists of isomaltose, sorbitol, and acesulfame, sweetener 2 consists of isomaltose and acesulfame, sweetener 3 consists of sorbitol and acesulfame, sweetener 4 consists of refined sugar and sorbitol, sweetener 5 consist of stevia (powder), and sweetener 6 consists of refined sugar. The analysis covered the chemical and physical properties, as well as panelists' preference level for the biscuits. The results showed that biscuits made using 40% rice, 30% broken rice, and 20% bran flours with a mixture of sweetener 4 (40% sorbitol and 60% refined sugar) were all favored and accepted by the panelists. Meanwhile, the most preferred are biscuits with 40% rice flour and a mixture of sweetener 4; these particular biscuits, have 5.69% water content, 6.65% protein, 20.57% sugar, the texture of 1249 g, lightness of 72.72, total phenol content of 2549 mg GAE/kg, and glycemic index of 31. These biscuits are suitable as snacks for diabetics due to their low glycemic index (< 55).

Keywords: biscuit, glycemic index, low-calorie sweetener, parboiled rice, rice bran

Gelatin Extraction of Bali Cattle Skin and It Potence as Edible Film on Beef Sausage

I Nyoman Sumerta Miwada[1, a)], I ketut Sumadi[1], Luh Putu Wrasisati[2], and I Nyoman Sutarpa Sutama[1]

[1]*Animal Husbandry, Udayana University, Kampus Bukit, Jl. Raya Kampus Unud Jimbaran, Kec. Kuta Sel., Kabupaten Badung, Bali 8036*
[2]*Agricultural Technology, Udayana University, Gedung GA, Kampus Bukit Jimbaran, Jimbaran, Kec. Kuta Sel., Kabupaten Badung, Bali 80361*

[a)] miwada@unud.ac.id

Abstract. The objective of the experiment was to develop gelatin of the bali cattle skin protein extract and it application as edible film on beef sausage. The method used on the first step of the experiment was completely randomized design with factorial design (4x3) i.e., acetic acid (A1=2%; A2=4%; A3=6% and A4=8%) and curing time (C1=2 days; C2=4 days and C3=6 days). The second step, making the best edible film from gelatin and applied as sausage packaging and tested for its effect during sausage storage with shelf life (0; 1; 2; 3 and 4 days). Result of the experiment showed that was significant interaction ($P<0.05$) between increased of acetic acid concentration (A) and curing time (C) in producing gelatin. Treatment A1C3 produced pH value for 4.5. The yield of gelatin was (12.26%) significant different ($P<0.05$) on A4C1. Moisture content of gelatin on A3C3 (7.02%), protein content on A1C1 (96.53%) and fat on A4C3 (0.98%) was significant it effects ($P<0.05$) but no significant different on ash content of gelatin. On the other hand, gelatin viscosity on A1C1 (7.71 cP) and gel strength of gelatin on A1C3 (12.96 bloom) were significant their effect ($P<0.05$). Result of FTIR test showed that was positive as protein due to presented of hydroxyl, carbonyl and amide group. Molecule weight was predicted about 67-135 kDa. Characteristic of beef sausage that was packed with edible film affected significantly during period of during storage ($P<0.05$). Value of pH (day 2), moisture content (day 3), free fatty acids (day 4) and microbial contamination (day 2) were 6.5; 50.98%; 0.85% FFA and 1.4 x 104 CFU/ml, respectively. Respond of panels were significantly different ($P<0.05$) to color score on day 2; smell on day 0; taste of sausage on day 2 but elasticity score was no significant affect during storage with edible film. Conclusion of the experiment where index of effectiveness gelatin was on A4C1. Application edible film as sausage pack with the best activity index was the day 2time storage.

Keywords: Bali cattle skin, beef sausage, edible film, gelatin

Food Processing and Engineering | **FP – 005 – 2021**

Health Benefit and Nutrient Value of Chicken Sausage Enhance with Local Beetroot Powder (pre clinic study in *Rattus novergicus*L.)

Winny Swastike[1, a)], Rio Olympias Sujarwanta[2], Edi Suryanto[2], and Jamhari[2]

[1]*Universitas Sebelas Maret, Jl. Ir. Sutami No.36, Kentingan, Kec. Jebres, Kota Surakarta, Jawa Tengah 57126*
[2]*Universitas Gadjah Mada, Bulaksumur, Caturtunggal, Kec. Depok, Kabupaten Sleman, Daerah Istimewa Yogyakarta 55281*

[a)] winny@staff.uns.ac.id

Abstract. Sausage is community's product, a processed meat product which is wrapped in a casing. However, the ingredients used in making sausages include meat, a mixture of fat, food additives such as synthetic color that make sausages have a negative impact on consumers. Sausages with high fat content contain high calories and will cause weight gain if consumed in excess. Weight gain that lasts a long time will also affect the lipid profile in the body, thus worsening the impact that can be caused if high-fat and high-calorie sausages are consumed continuously for a long time. Increasing public awareness on health demands for sausage products that are safe for consumption. The aims of this study were to determine the health benefit of consuming sausage enriched with beetroot flour on the performance and lipid profile of rats (*Rattus novergicus L.*). This study used white rats (*Rattus novergicus L.*) Spraque-Dawley strain male, aged between 7-8 months with a weight of 180 to 200 g. This research equipped with ethical clearance number: 00116/04/LPPT/XII/2018. The research material was 25 individuals who were fed AIN 93M and chicken sausage at doses of 1.8, 2.7, and 3.6 g/head/day for 30 days. The results of this study showed that the highest Daily Body Weight Gain (PBBH) was found in rats with AIN 93M basal diet of 234.4 ± 3.8 g/head/day while the lowest was found in rats that consumed chicken sausage substituted with beet flour at a dose of 2.7 g/head/day was 0.66 ± 0.4 g/head/day. In addition to the achievement of PBBH which can be slowed down, it is also necessary to look at the impact on the lipid profile. Tests on the consumption of chicken sausage substituted with 2% beet flour have an effect on increasing HDL, decreasing cholesterol, LDL, triglycerides and glucose. Giving chicken sausage containing 2% beet flour at a dose of 2.7 g/head/day will be effective for increasing HDL if consumed for 3 consecutive weeks. The higher the dose of sausage consumed, the lower the blood MDA level, which was 2.23 ± 0.74 nmol/ml. Consuming a dose of 2.7 g/head/day with an average consumption of chicken sausage substituted with beet flour as much as 2.07 ± 1.07 g/head/day in rats with an average weight of 189.8 ± 8.8 g/head. equivalent to the consumption of 0.33 g/kg BW/day. Based on this, it can be recommended that the consumption of chicken sausage containing 2% beet flour is 0.33 g/kg BW/day with a maximum time limit for consecutive consumption of 3 weeks.

Keywords: chicken sausage, MDA, profile lipid, weight gain

Food Processing and Engineering | **FP – 006 – 2021**

Sport Drink Containing Maltodextrin to Improve Physical Performance of Soccer Athletes

Naintina Lisnawati[1, a)], Nur Amin[2], and Yanesti Nuravianda Lestari[3]

[1] *Public Health Nutrition Department, Faculty of Public Health, Universitas Diponegoro, Indonesia*
[2] *Sport Science Department, Faculty of Public Health, Universitas Ngudi Waluyo, Indonesia*
[3]*Bachelor of Nutrition Department, Sport Science Faculty, Universitas Negeri Semarang, Indonesia*

[a)] naintina.lisnawati@live.undip.ac.id

Abstract. Sport drinks consist of carbohydrate dan electrolyte drink. Carbohydrate needed for energy metabolism in Soccer athletes. Maltodextrin is one of type of carbohydrate which is easily soluble in water and quickly absorbed by the intestines. Therefore, it's suitable for sport drink products. Methods: This research is a completely randomized design with 1 factor and 3 repetitions. There are 2 concentration of maltodextrin which is addition in 300 mL of electrolyte drinks, i.e., 6% (18 g) and 8% (24 g). Atomic Absorption Spectrophotometry (AAS) analysis was used to analyze minerals in sport drink products consisting of sodium (Na), potassium (K), calcium (Ca), and magnesium (Mg). Descriptive organoleptic analysis was also used to assess the respondent's level of preference for the product. Results: Sport drink products with the addition of 6% equal as 18 g maltodextrin in 300 mL electrolyte drink were more acceptable by respondents compared to 8% of maltodextrin, because theoretically it was closer to the osmolality of the athlete's body. The composition of Na, K, Ca, and Mg in sports drink which is additions of 6% of maltodextrin were 0.63 ppm, 0.55 ppm, 0.72 ppm, and 0.0014 ppm, respectively. Those mineral's composition closer to the amount of fluid needed of Soccer athletes during exercise. Conclusion: The addition of maltodextrin in electrolyte drink might be an effective way to improve physical performance of Soccer athletes.

Keywords: electrolyte, maltodextrin, physical performance, soccer athlete, sport drink

Food Processing and Engineering | **FP – 007 – 2021**

Physical Properties of Set Yogurt Manufactured from Different Types of Milks with Collagen Hydrolysate Addition

Juni Sumarmono[a)], Triana Setyawardani, Agustinus H.D. Raharjo, Sarah Destiana, and Erika Setyawardani

Universitas Jenderal Soedirman, Jl. Profesor DR. HR Boenyamin No.708, Dukuh bandong, Grendeng, Kec. Purwokerto Utara, Kabupaten Banyumas, Jawa Tengah 53122

[a)] juni.sumarmono@unsoed.ac.id

Abstract. Physical properties, in particular texture and syneresis, determine the overall quality characteristics of set-yogurt. The composition of raw materials and the addition of thickening agent are factors that contribute to the physical properties of set yogurt. The objective of the present study was to investigate the effects of type of milks on texture, syneresis, pH, viscosity, water holding capacity and color of set yogurt with collagen hydrolysate addition. Set yogurt was manufactured standard method from five different types of milk (1) pasteurized-fresh cow's milk, (2) pasteurized-fresh goat milk, (3) commercial pasteurized whole milk, (4) commercial pasteurized low-fat milk, and (5) mixes of cow's and goat milk. Collagen hydrolysate (1 % w/w) was added as thickening agent. A direct-set lactic acid bacteria culture was added to initiate the fermentation. Set yogurt was removed from the incubator after the end-point acidity was attained. Measurement of variables was conducted on fresh yogurt after conditioning. Results showed that types of milk contribute significantly on the variation of syneresis, viscosity, water holding capacity, gel strength, and elasticity of set yogurt with collagen hydrolysate addition. On the other hand, the variation of pH and color (L* value) of the yogurt was not significantly different. In summary, types of milk provide significant contribution of the variation of quality characteristics, and hence should be taken into consideration during the manufacture of set yogurt.

Keywords: physical properties, set yogurt, syneresis, thickening agent, type of milk

Food Processing and Engineering | FP – 008 – 2021

Evaluation of Physicochemical and Sensory Properties of Freeze-Dried Durian: Influence of Drying Time

Sandi Darniadi[a)], Sunarmani, and Sri Widowati

Indonesia Center for Agricultural Postharvest Research and Development (ICAPRD), Jl. Cimanggu Kecil No.12A, RT.01/RW.07, Ciwaringin, Kecamatan Bogor Tengah, Kota Bogor, Jawa Barat 16124

[a)] sandidarniadi@pertanian.go.id

Abstract. Durian is a seasonal tropical fruit from Southeast Asia (Indonesia, Malaysia, and Thailand) and has a strong smell and distinctive taste. The constraints on marketing fresh durian are minimal due to the shelf life of 2-5 days at ambient temperature. Therefore, the processing of fresh durian fruit into a dry whole is more necessary because of several advantages, including reduced transportation costs, practical consumption, and product stability against microorganisms. This study aimed to develop the dried durian products, which were obtained at different times, i.e., 30 and 36 hours, using a laboratory-scale freeze-dryer and investigating the changes of physicochemical and sensory properties of freeze-dried durian products. The results showed that the freeze-drying processes of durian fruit were successfully done at 30 and 36 hours (vacuum pressure 0.04 mbar, at – 55 °C). The moisture content of both dried products was not significantly different, about 10 %. The freeze-dried durian of 30 hours had a higher hardness level (1165 g) than those from 36 hours (931.7 g). The L* (brightness), a* (redness), and b* (yellowness) of both dried durian products were not significantly different. The dried particle of both dried durian products had a uniform and porous structure due to the small ice crystal sublimated. The sensory score for color, aroma, and taste was not significantly for freeze-dried durian 30 and 30 hours. However, panelists scored overall acceptance of 36 hours sample higher than those from 30 hours. This higher score revealed that 36 hours freeze-dried durian preferred than 30 hours sample.

Keywords: dried products, drying times, durian, freeze-drying

Sensory Profile and Nutritional Composition of Gluten Free Cakes and Muffins from Mocaf-Composite Flour with Local Food Substitution

Yannie Asrie Widanti[a)], Erni Widajanti, Andri Astuti Itasari, Widasari Atrilania Sri Kunciati, Skolastika Anggita Ayunigtyas, and Almira Bhadra Khairunisa

Universitas SlametRiyadi, Jl. Sumpah Pemuda No.18, Kadipiro, Kec. Banjarsari, Kota Surakarta, Jawa Tengah 57136

[a)] zepporay@gmail.com

Abstract. This study was explored the use of local food ingredients in bakery products to produce gluten-free bakery products using the main ingredient of mocaf flour with the substitution of various local food ingredients, i.e., pumpkin, breadfruit, and arrowroot. The experimental method used a completely randomized design with research factors consisting of ratio of mocaf flour to local food flour (60:40; 50:50; 40:60), types of local food flour (arrowroot, soybeans, red beans, and green beans), and types of bakery products (cake and muffins). Based on the results of sensory evaluation of sponge cake products, it is known that the highest level of consumer acceptance is in the sponge cake formulation using 60% mocaf flour, 30% arrowroot flour and 10% red bean flour with sugar sweetened. Sponge cake with this formulation has a moisture content of 20.66%, ash content of 1.46%, protein content of 7.88%, fat content of 15.67%, and fiber content of 7.19%. While the most preferred muffin products are muffins made with a ratio of mocaf flour and arrowroot flour 40%:60% with chemical characteristics consisting of 14.73% water content, 1.64% ash content, and 4,43% protein content, 20.64% fat content, 58.54% carbohydrate by difference, and 6.25% fiber content.

Keywords: cake, gluten free, muffin, nutrition composition, sensory profile

Food Processing and Engineering | **FP – 010 – 2021**

Effect of Physical Modification of Cassava Flour on Physical and Sensory Properties of Mung Bean Flour Substituted Analog Rice

Nur Annisa Metya Novikasari[a)] and Iffah Muflihati

Universitas PGRI Semarang, Jl. Sidodadi Timur No.24, Karangtempel, Kec. Semarang Tim., Kota Semarang, Jawa Tengah 50232

[a)] annisametya@gmail.com

Abstract. Analog rice is artificial rice made from non-rice raw materials, such as from cassava flour and mung bean flour. Modification of starch by annealing, Heat moisture treatment, and autoclaving-cooling was conducted to improve the characteristics of analog rice. This study purpose was to compare the effectiveness of physical modification of cassava flour and the ratio of modified cassava flour and mung bean flour on physical and organoleptic properties of analog rice. Analog rice was subjected to physical analyses of water absorption, cooking loss, cooking time, and expansion volume, while sensory properties were evaluated by descriptive method. The results showed that the type of modification and the ratio of modified cassava flour and mung bean flour improved water absorption, cooking loss, cooking time, and expansion volume. The type of physical modification and the ratio of flour addition affect the descriptive sensory properties of analog rice.

Keywords: analog rice, annealing, autoclaving-cooling, cassava flour, heat moisture treatment

Restructured Turkey Meat Products Qualities

Bambang Dwiloka[a)], Bhakti Etza Setiani, Yoyok Budi Pramono, Ahmad Ni'matullah Al-Baarri, Samuel Rudison, Stella Putri Tomya, Robby Rusdiansyah, Melania Anin, and Mustofa

Bachelor Program of Food Technology, Faculty of Animal and Agriculture, Diponegoro University, Jalan Prof. H. Soedarto, S.H. – Tembalang Semarang, Indonesia 5027

[a)] bambangdwiloka@gmail.com

Abstract. This research was done to analyze the protein and cholesterol contents, tenderness, hedonic quality of turkey nuggets as well as to analyze the protein and fat contents, pH, total lactic acid bacteria of turkey salami (fermented sausage). Turkey (*Meleagris gallopavo*) nugget was made of turkey meat, tapioca, sodium tripolyphosphate, skimmed milk and spices to enhance the flavor of nugget. Turkey salami were made of turkey meat, beef fat, isolated soy protein, lactic acid bacteria starter (*L. bulgaricus, S. thermophilus, L. acidophilus*), NPS salt (Nitrite Pokeln Salt), sugar, seasonings and ice water. The experimental design used was comparative quantitative with variations of treatment given are (T1) salami made from commercial breast pieces and (T2) salami made from commercial thighs pieces. Protein content of nugget and salami was analyzed with Kjeldahl distillation, cholesterol content was analyzed with UV-Vis (UV-1280, 220-240 CE) spectrophotometer, nugget's tenderness was analyzed with CT3 Texture Analyzer, pH was analyzed with pH meter, total lactic acid bacteria were analyzed with TPC (Total Plate Count) and deep-fried nuggets for hedonic quality test, determined by 25 panelists in a hedonic test. Protein and fat contents, pH, total lactic acid bacteria data of turkey salami as well as protein content of turkey nugget were analyzed by Independent T-Test with a significance level of 5%. Cholesterol content and tenderness data of turkey nugget were descriptively analyzed. Hedonic quality data of turkey nugget was analyzed using Kruskal-Wallis and Mann-Whitney test. Protein content of breast turkey nugget and thigh turkey nugget was 19.16±1.52% and 14.84±1.64%, cholesterol content was 156.35 mg/kg and 182.83 mg/kg (respectively), tenderness indicated by hardness value of breast turkey nugget was double the value of thigh turkey nugget. Overall panelists preference was significantly higher for breast turkey nugget. Salami which was processed based on commercial carcass cuts with breast and thigh treatment showed a protein content value of 14.82% - 17.33%, fat content of 8.40% - 10.93%, pH value of 4.75 - 5.16 and total lactic acid bacteria were in the same log that is 107. Turkey salami composed of commercial pieces of breast carcass is the best treatment according to tested parameters.

Keywords: breast, nugget, salami, thigh, Turkey meat

Food Processing and Engineering | **FP – 012 – 2021**

Cowpea Sprouted Milk Rich in Phenolic Antioxidants, Vitamin C, Protein, and Dietary Fiber as an Antidiabetic Drink

Hery Winarsi[1 a], Erminawati[2], Gumintang Ratna Ramadhan[1], Elsya Meliyana Gumelar[1], and Lavia Androviterra Sekar Kencana[1]

[1]*Department of Nutrition Science, Faculty of Health Sciences, Universitas Jenderal Soedirman, Purwokerto, 53123, Central Java, Indonesia*
[2]*Department of Food Technology, Faculty of Agricultural, Universitas Jenderal Soedirman, Purwokerto, 53123, Central Java, Indonesia*

[a)] Corresponding author: winarsi12@gmail.com

Abstract. This study aimed to obtain a formula of Cowpea sprouted milk rich in phenolic, vitamin C, protein, and dietary fiber based on the duration of germination. The experimental study used a randomized block design with 0, 8, 10, and 2 h germination time treatments, with 5 replications. Cowpeas were washed, soaked in warm water at 40°C for 10 hours, then drained in a basket, placed in a damp place, and sprayed with water once every 6 hours to germinate. Sprouts are washed, including the skin, blended with added water 8 times, filtered, so that a smooth liquid is obtained. Added 5% sugar into the smooth liquid, while stirring, is heated until it boils, called Cowpea sprout milk (CowpeaS-Milk). The product was determined for phenolic content (Follin Ciocalteau), vitamin C (Iodometry), fiber (oven), and soluble protein (Lowry). The data were tested using ANOVA, followed by the DMRT if there was a significant level of 5%. The duration of germination increased the levels of phenolic (P=0.003), fiber (P=0.02), soluble protein (P=0.05), and vitamin C (P=0.05). The best formula was obtained from CowpeaS-Milk with a germination time of 12 hours, containing phenolic antioxidants 4.67 mgGAE/g, vitamin C 75.8 mg/100g, dietary fiber 1.28%, and soluble protein 33%. Based on its nutritional content, CowpeaS-Milk is useful for people with Diabetes Mellitus.

Keywords**:** Cowpea sprouted milk, phenolic, fiber, protein, vitamin C

Food Processing and Engineering | **FP – 013 – 2021**

Effect of Packaging Type and Storage Temperature on the Chemical and Sensory Properties of Corn Getas

Nur Aini[a)], Muhammad Hadi[b)], Retno Setyawati[c)], Hidayah Dwiyanti[d)], and Budi Sustriawan[e)]

Department of Food Technology, Jenderal Soedirman University, Jalan Dr. Soeparno, Purwokerto, Indonesia, 53123

[a)] Corresponding author: nur.aini@unsoed.ac.id
[b)] mochammadhadi@sefunsoed.org
[c)] retno.setyawati@unsoed.ac.id
[d)] hidayah.dwiyanti@unsoed.ac.id
[e)] budi.sustriawan@unsoed.ac.id

Abstract. Corn *getas* is a popular traditional fried maize snack widely consumed among society. The high content of fat present in corn *getas* makes it susceptible to quality degradation during storage period. Quality degradation of corn getas occurs due to oxidation and hydrolysis reaction of fat which can cause rancidity in the product. Therefore, this product requires the appropriate of packaging and storage temperature to prevent corn *getas* from quality degradation. The purposes of this research are: 1) to study the appropriate packaging to the chemical and sensory characteristic of corn *getas* during storage period; 2) to studythe appropriate of storage temperature to the chemical and sensory characteristic of *corn* getas during storage; 3) to determine the best treatment combination of packaging and storage temperature during storage.The method used in this research is a split plot design with complete randomized design as its basic design that arranged in a factorial with the 16 combinations of treatment and repeated 2 times to obtain 32 unit'sexperiments. Factors tested in this research are storage period (S) as main plot, consists of 1 month (S1), 2 month (S2), 3 month (S3) and 4 month (S4), types of packaging (K) as sub plot, consists of aluminium foil (K1) and nylon plastic (K2) also storage temperature as sub plot (T) consists of 27°-30°C (T1) and 38°-40°C (T2). Chemicalcharacteristics were tested oncorn getas are moisture content, free fatty acid, and peroxide value, while the sensory characteristics were tested are color, odor, texture, flavor and preference. The results showed that aluminium foil packaging is better packaging material compared with nylon plastic packaging to preserve chemical and sensory quality of corn getas. Corn getas stored at 27°-30°C had better chemical and sensory quality compared with corn getas that stored at temperature 38°-40°C. The best treatment combination in this research is corn getas using aluminium foil packaging and stored at temperature 27°-30°C on 1 month storage period (S1K1T1) have moisture content 4.5 %; free fatty acid value 0.2 %; peroxide value 18.403 meqO2/kg and sensory characteristics of corn getas are light brown color (3.85); rancid smell slightly (4.73); crispy texture slightly (4.133); tasty flavor slightly (4.6); and like slightly (4.56).

Keywords: aluminium foil, corn getas, storage, temperature, time

Food Processing and Engineering | **FP – 014 – 2021**

In Silico Analysis of the Potential of *Sargassum* sp Brewed and *Syzygium polyanthum* Leaf as Nutraceuticals

Putut Riyadi[a)], Eko Dewi[b)], Apri Anggo[c)], and Alfrista Damayanti[d)]

Department of Fisheries Products Technology, Faculty of Fisheries and Marine Sciences, Diponegoro University, Semarang 50275, Central Java, Indonesia

[a)] Corresponding author: putut.riyadi@live.undip.ac.id
[b)] nurdewisatsmoko@gmail.com
[c)] aprianggo78@gmail.com
[d)] alfristanatasya@gmail.com

Abstract. The COVID-19 pandemic is causing a major public health crisis. One of the efforts that can be done is with protection from within the body by having a strong immune system. Increasing immunity can be done by consuming high antioxidant compounds, including *Sargassum sp* and *Syzygium polyanthum* leaf. This study aims to determine the bioactive potential of *Sargassum sp* brewed and *Syzygium polyanthum* leaf using in silico analysis. The method used is GC-MS analysis to obtain chemical profiles and in silico analysis (PASS server, SwissADME, Pro Tox II). GC-MS analysis with screen quality above 85 % obtained 6 (six) compounds, namely Pentane (69.12 %), 2-undecanone (3.80 %), Nerolidol (2.25 %), Biphenyl (8.50 %), Methylisoeugenol (13.08 %), 1-phenanthrenecarboxylic acid (3.26 %). These compounds have potential as antioxidants, anti-inflammatory, immunostimulators, and antivirals based on the PASS server. All compounds have good drug-likeness potential, absorption, distribution, metabolism, excretion, and toxicity in the body based on in silico analysis (Swiss ADME and Pro Tox II). It can be the basis for developing nutraceuticals to increase immunity and prevent exposure to Covid-19.

Food Processing and Engineering | **FP – 015 – 2021**

Design and Performance Test of Portable Spectrometer using AS7265x Multispectral Sensor for Detection of Adulterated Cane Sugar in Granulated Coconut Sugar

Susanto B. Sulistyo[1, a)], Arief Sudarmaji[1, b)], Purwoko H. Kuncoro[1, c)], and Pepita Haryanti[2, d)]

[1]*Department of Agricultural Engineering, Faculty of Agriculture, Jenderal Soedirman University, Jl. Dr. Soeparno, Karangwangkal, Purwokerto 53132 Indonesia.*
[2]*Department of Food Technology, Faculty of Agriculture, Jenderal Soedirman University, Jl. Dr. Soeparno, Karangwangkal, Purwokerto 53132 Indonesia.*

[a)] Corresponding author: susanto.sulistyo@unsoed.ac.id
[b)] arief.sudarmaji@unsoed.ac.id
[c)] purwoko.kuncoro@unsoed.ac.id
[d)] pepita.haryanti@unsoed.ac.id

Abstract. Cane sugar is frequently added into coconut sap during heating to trigger the sugar granulation despite negative consequences to economic value. The purpose of this study was to design a portable spectrometer to detect the adulteration of cane sugar in granulated coconut sugar. The developed portable spectrometer utilized AS7265x multispectral sensor as the main component. This sensor was equipped with two LEDs as the light source and had 18 channels to read the light reflectance of the coconut sugar in a range from visible to near infrared. We employed two types of neural network with different output to determine the purity of coconut sugar and to classify the level of cane sugar added. The developed neural network consisted of 18 output channels of the instrument as the predictors in the input layer and one hidden layer with 30 nodes. To calibrate the instrument, six treatments were prepared with the ratio of cane sugar and coconut sap of 0%, 10%, 20%, 30%, 40%, and 50% (w/v). The results showed that the portable spectrometer worked normally and can read the light reflectance of the coconut sugar. Furthermore, the developed neural network algorithm had an accuracy of 100% to classify 300 and 1500 samples of pure and adulterated coconut sugar, respectively. In addition, the average accuracy of the neural network to classify the intensity of cane sugar added to coconut sugar was more than 90%. The developed portable spectrometer and neural network algorithm can successfully detect cane sugar added to granulated coconut sugar.

Food Processing and Engineering | **FP – 016 – 2021**

The Quality of Frozen Catfish Fillet (*Pangasius sp.*) with Food Additives NaCl and Sodium Tripolyphosphate

Resti Demayanti[a)], Apri Dwi Anggo, and A. Suhaeli Fahmi[b)]

Department of Fisheries Technology Processing, Fisheries and Marine Science Faculty, Diponegoro University, Semarang, Indonesia

[a)] Corresponding author: dema.privat3@gmail.com
[b)] suhaeli.fahmi@live.undip.ac.id

Abstract. The fish freezing process can result in dehydration and protein tissue damage. The function of NaCl and *Sodium tripolyphosphate* are to increase the ability to bind water, prevent drip loss and act as a cryoprotectant. The purpose of this study was to find out the effect of soaking process with NaCl and STPP solution on the quality of frozen catfish fillet and to find out the best kind of food additives. The experimental laboratories method used Complete Randomized Design. The treatments in this study were soaking process with NaCl 2%, STPP 2%, NaCl 1% + STPP 1% and control solutions. The parameters of frozen catfish fillet tested were organoleptic, weight gain, WHC, texture, drip loss, protein solubility and color. Non-parametric data were analyzed by Kruskal Wallis, and parametric data were analyzed by variant test and Honest Significant Different. The result of sensory data showed the treatments had no significant effect (P>0,05). The result of parametric data such as weight gain, WHC, texture, drip loss, protein solubility and color showed the usage each treatments had a significant effect (P<0,05). The best results on all parameters were obtained in the STPP 2% treatment with weight gain treatment is 11,38%, total weight gain 34,6% and shrink save -7,55%, WHC 20%, drip loss 3,54%, protein solubility 0,87% and color L -45,29, a* 2,58, b* 5,33.

Keywords: catfish fillet, cryoprotectant, NaCl, STPP

Ethanol Extract of Nagasari Leaves (*Mesua Ferrea* L.) Nanoemulsion Dosage form with Virgin Coconut Oil (VCO) as the Oil Phase

Annisa Muslimah Anna Dhafah[a)], Tuti Sri Suhesti, Sunarto

Faculty of Pharmacy, Jendral Soedirman University, Jl. dr. Soeparno, Karangwangkal Campus, North Purwokerto 53123, Banyumas, Central Java, Indonesia

[a)] nailyfa@gmail.com

Abstract. Nanoparticle formulations have many advantages over traditional dosage forms, such as enhanced dissolution properties and the potential for intracellular drug delivery. The aim of this work was to develop a formula of a nano emulsion determine the effect of the concentration of virgin coconut oil (VCO) oil phase on the nano emulsion preparation of the ethanol extract of Nagasari leaves (Mesua ferrea L.). Nagasari leaf simplicia was extracted by maceration method. Concentration of VCO that used in this study were 1%; 2% and 3 %. The nano emulsion was prepared using the emulsification method with a magnetic stirrer and sonicator.The parameters of physical properties and stability observed were organoleptic, emulsion type, pH, viscosity, percent transmittance, particle size, and zeta potential. The results showed that nano emulsions with 1% VCO had the best physical properties with particle size is d=23.137±7.63 nm and polydisperse index (PDI)= 0.203±0.013 and is stable during storage. The results indicated that VCO affects the particle size of the nano emulsion preparation. The higher VCO concentration increases the particle size and decreases PDI value of the nano emulsion preparation. Based on the results of the parameters of physical properties and other stability, there is no significant effect.

Food Processing and Engineering | **FP – 018 – 2021**

Evaluation of Colour and Physicochemical Properties of Aquadest Extract in the Variation pH of Solvent

Isti Handayani[1, a)], Aisah Tri Septiana[1, b)], Budi Sustriawan[1, c)], Pepita Haryanti[1, d)], and Susanto Budi Sulistyo[2, e)],

[1]Department of Food Technology, Faculty of Agriculture, Universitas Jenderal Soedirman. Jl. Dr. Soeparno, Karangwangkal Purwokerto, 53123, Central Java, Indonesia
[2]Department of Agricultural Engineering, Faculty of Agriculture, Universitas Jenderal Soedirman. Jl. Dr. Soeparno, Karangwangkal Purwokerto, 53123, Central Java, Indonesia

[a)] Corresponding author: isti.handayani@unsoed.ac.id
[b)] aisyah.septiana@yahoo.com
[c)] budi.sustriawan@unsoed.ac.id
[d)] pepita.hanyanti@unsoed.ac.id
[e)] susanto.sulistyo@unsoed.ac.id

Abstract. The *Bixa orellana* seeds (Annatto) have been used in food coloring and cosmetics. The main commercial processes to extract the pigment from annatto seeds were direct extraction into oil or aqueous alkali and indirect extraction using organic solvents. This research was held to determine the color and physicochemical properties of annatto extracts using aquadest as a solvent. The extraction was carried out by maceration at various pH of aquadest (4, 7, and 9) at 80°C for 10 minutes. Color property of brightness (L), redness (a), and yellowness (b) was determined using a color reader. Physicochemical characterization was conducted by observing pH value, total titrated acid, total dissolved solids, and total solids. The results showed that the varying pH of aquadest influences the color and physicochemical properties of annatto extract. Extraction using pH 7 of aquadest produced the highest brightness (43.8), redness (9.4), yellowness (42.5), and total soluble solid (1.67° Brix), while pH 4 produced the highest of total titrated acid (4.2%) and total solids (226 mg/ml) of extract. The lowest pH of the extract (4.83) was resulted in extraction using aquadest pH 4. The different pH of aquadest used to extract annatto seeds resulted in various color intensities and physicochemical properties.

Keywords: annatto, extraction, pH, color, physicochemical

Food Processing and Engineering | **FP – 019 – 2021**

The Chemical Composition of Coconut Sap at Different Tapping Condition

Pepita Haryanti[1, a)], Karseno[1, b)], Isti Handayani[1, c)], and Susanto B. Sulistyo[2, d)]

[1]*Food Technology Study Program, Faculty of Agriculture, Jenderal Soedirman University, Purwokerto, Indonesia.*
[2]*Agricultural Engineering Study Program, Faculty of Agriculture, Jenderal Soedirman University, Purwokerto, Indonesia.*

[a)] Corresponding author: pepita.haryanti@unsoed.ac.id
[b)] karseno@unsoed.ac.id
[c)] isti.handayani@unsoed.ac.id
[d)]susanto.sulistyo@unsoed.ac.id

Abstract. Coconut sap is sweet, oyster-white, and translucent liquid which can be obtained by tapping coconut inflorescent. This tapping process is commonly conducted twice a day, i.e., during night and in the daytime for about 15 and 9 hours, respectively. Since it contains sugar with nearly neutral pH, coconut sap is highly susceptible to spontaneous fermentation. In order to maintain the quality of the sap during the tapping process, coconut farmers usually add preservative substances. In this paper, a proximate analysis of coconut sap obtained during night (CTN) and in the daytime (CTD) were measured. The reducing sugar and amino acid profiles of coconut sap were also measured using High Performance Liquid Chromatography. This research aimed to determine the chemical composition of coconut sap at different tapping condition and variations of mangosteen peel powder concentration. The results showed that the optimum preservative concentration of mangosteen peel powder was 0.84 g/L of coconut sap which was tapped during daytime. This treatment yielded sap with chemical characteristic i.e., water content of 84.21%; ash content of 3.51% (db); protein content of 2.69% (db); total lipid of 0.10% (db) and total carbohydrate content of 94,62% (db). The CTN contained glucose and fructose of 0.85 and 1.04 g/100 g, respectively, higher than the CTD were 0.52 and 0.58 g/100 g. The CTN contained 14 amino acids which was lower than CTD.

Food Processing and Engineering | **FP – 020 – 2021**

Characteristics of Arabic Coffee (Coffeaarabica) Local Leksana Banjarnegara on Various Levels of Roasting and Brewing

Ali Maksum[1, a)], Munasib[2], and Ike Sitoresmi Mulyo Purbowati[1]

[1]*Food and Nutrition Laboratory, Food Technology Study Program, Jenderal Sudirman University, Indonesia.*
[2]*Nutrition Studies Program, Jenderal Sudirman University*

[a)] ali.maksum@unsoed.ac.id

Abstract. The taste of coffee drinks was influenced by the quality of roasting and the method of brewing. The purpose of this study was to determine the effect of variations in roasting, brewing temperature, and the interaction of the two treatments and to determine the best treatment for the physicochemical and sensory characteristics of Leksana Banjarnegara Arabica coffee. This research was conducted experimentally using a completely randomized design (CRD) method which was arranged in a factorial manner with 9 treatment combinations and was repeated 3 times so as to produce 27 experimental units. Factors studied include variations in roasting level (R) consisting of light (R1), medium (R2), dark (R3) and brewing temperature (B) consisting of 75ºC (B1), 85ºC (B2), 95ºC (B3). The results showed that the local Arabica coffee roasting process Leksana Banjarnegara gave a significant effect on the water content and pH value. The lowest water content in dark roasting is 3.01% and the lowest pH in light roasting is 5.34. In the brewing process, the brewing temperature significantly affects the total phenol, coffee brewed at 95°C produces a total phenol of 87.46 mg/100gr. The interaction between the roasting and brewing treatments gave a significant effect on the caffeine content and total phenol, the lowest caffeine content was produced by the R3B2 treatment of 0.62%, the highest total phenol was the R2B3 treatment of 87.46 mg/100gr. The best treatment combination was at medium level roasting (R2) and brewing temperature 95°C (B3) which had the following physicochemical and sensory characteristics: caffeine content 0.78%, total phenol 87.46 mg/gr, pH value 5.5, color 4 (like), aroma 4 (like), taste 4 (like), bitterness 3 (slightly like), and acidity 3 (like slightly).

Food Processing and Engineering | **FP – 021 – 2021**

Physicochemical Characteristics of Milk Fermented with Powdered Kefir Starter

Juni Sumarmon[a)], Triana Setyawardani[b)], Agustinus H.D. Raharjo[c)], Anggita N.F. Astuti[d)], and Nopva Agustina[e)]

Faculty of Animal Science, Universitas Jenderal Soedirman, Purwokerto, Central Java 53123 Indonesia

[a)] Corresponding author: juni.sumarmono@unsoed.ac.id
[b)] triana.setyawardani@unsoed.ac.id
[c)] agustinus.raharjo@unsoed.ac.id
[d)] anggitafitri22@gmail.com
[e)] nopagustin29@gmail.com

Abstract. Fermentation of milk using kefir micro flora is one of the ways to produces fermented milk beverages. The milk composition and kefir starter are among other factors that determine the characteristics of the products. In this study, the effects of milk on the physicochemical characteristics of fermented milk (milk kefir) were investigated. Fresh cow's milk, ultra-high pasteurized (UHT) full-fat milk, UHT low-fat milk, fresh goat's milk, and mixes of fresh cow's and goats' milk were fermented by adding commercially powdered (lyophilized) kefir starter. Fermentation was conducted at room temperature for 24 hours. Variables measured included pH, viscosity, syneresis, whiteness index, water holding capacity, and total titratable acidity. Data analyses were performed using ordinary one-way analysis of variance. Results showed that the kind of milk has a significant contribution to the physicochemical characteristics of milk kefir, except on water holding capacity. Based on this study, one can produce milk kefir from a different kind of milk by adding powdered kefir starter as sources of kefir micro flora.

Food Processing and Engineering | **FP – 022 – 2021**

Dissimilarity Analysis of Breads of Different Final Thermal Processing Techniques Based on the Chemical Composition and Starch Hydrolysis

Setya Budi Muhammad Abduh[1, a)], Valentinus Priyo Bintoro[1, b)], Sri Mulyani[1, c)] and Ahmad Ni'matullah Al-Baarri[2, d)]

[1]*Laboratory of Food and Agricultural Products Engineering, Department of Agriculture, Faculty of Animal and Agricultural Sciences, Universitas Diponegoro Jl. Prof Sudarto Tembalang, Semarang 50275 Indonesia*
[2]*Laboratory of Food Chemistry and Nutrition, Department of Agriculture, Faculty of Animal and Agricultural Sciences, Universitas Diponegoro Jl. Prof Sudarto Tembalang, Semarang 50275 Indonesia*

[a)] Corresponding author: setya.abduh@live.undip.ac.id
b) vepebe@yahoo.com
[c)] srimulyani@lecturer.undip.ac.id
[d)] albari@live.undip.ac.id

Abstract. Due to technical availability, different thermal processing techniques have been adopted to finalise the preparation of wheat-based breads in Indonesia. This study aimed to compare breads that have been prepared using different final thermal process namely baking, frying, and steaming. Chemical composition and starch hydrolysis of the breads were used as the basis of the comparison. The chemical composition comprising solid, protein, and lipid were analysed in triplicate by mean of gravimetry, Kjeldahl, and solvent extraction methods respectively. Subsequently, breads were subjected to hydrolysis in a mixture of alpha-amylase and glucoamylase for 60 min at 37 °C at an optimum pH and enzymes ratio. At the end of reaction, glucose release was assayed by mean of glucose oxidase to indicate the degree of hydrolysis. The starch hydrolysis was conducted in triplicate. Pattern recognition analysis was then conducted by mean of principal component analysis (PCA) on the chemical composition and the starch hydrolysis to observe the similarity and dissimilarity among the products. As results, the first and the second principal components were able to explain 88% of variances determining the dissimilarities of the three products. Briefly, fried product was found to be associated with solid, lipid, and starch hydrolysis and is distinct compared to the other products. Furthermore, baked product was found to be associated with protein. Thus, breads prepared under baking, steaming, and frying as final processes do have dissimilarities in chemical composition and starch hydrolysis.

Keywords: principal component analysis (PCA), baking, steaming, frying, solid, protein, lipid, starch hydrolysis

Food Processing and Engineering | **FP – 023 – 2021**

Leaves as Eco-Friendly Traditional Food Packaging: A Case Study in Traditional Markets in Magelang, Indonesia

Setiyo Prajoko[a)], Clarisa Febri Prastiwi, Indria Arganingtias, Ira Dian Melawati, Nafis Ayyada Affa, and Syahrul Ramdhani

Tidar University, Jl. Kapten Suparman 39 Potrobangsan, North Magelang, Central Java, Indonesia 56116

[a)] setiyoprajoko@untidar.ac.id

Abstract. The purpose of this study was to study the leaves as an environmentally friendly traditional food wrapper. The study included finding out the types of leaves used and what traditional foods were found at the Traditional Market in Magelang, Central Java, Indonesia. In addition, this research also reveals the practices of changing traditional food wrappers from leaves to plastic. This research uses the survey method, which was conducted in December 2019 in some Traditional Markets in Magelang. The traditional markets in question are the Merapi Valley Market, Bandongan Market, Kebon Watu Gede Market, and Rejowinangun Market. Data were obtained through field observation sheets, questionnaires, and interviews. The data was then analyzed descriptively qualitatively. The results showed that the majority of the leaves used were from banana (*Musa paradisiaca*), Teak (*Tectona grandis*), Coconut (*Cocos nucifera*), Pandan (*Pandanus amaryllifolius*), and Bamboo (*Bambusa sp*). In addition, some changes in food packaging from leaves to plastic. This needs attention, especially on the use of plastics that are not eco-friendly and microplastic contamination as a result of errors in traditional food processing.

Keywords: traditional food, traditional market, packaging, eco-friendly, leaves

Characteristic of *Cymbopogon nardus* L. Extract with Variations in Leaf Withering Time

Purbowati ISM[a)], Maksum, A, Wijonarko, G, and Wicaksono, R

Food Processing Technology Laboratory, Department of Agriculture Technology Faculty of Agriculture, Universitas Jenderal Soedirman. Dr Suparno Street, Karangwangkal, Purwokerto 53123, Indonesia

[a)] ikesitoresmi@yahoo.co.id

Abstract. The focus of this study was to evaluate the effect of variation level of withering leaf on the bioactive compounds of fragrant lemongrass (*Cymbopogon Nardus* L.) as antioxidant and antibacterial agents. The study was conducted with 4 levels of leaf withering times, namely: fresh, 24, 48, and 72 hours. The observed parameters were colour, pH, leaves phytochemical, and free radical trapping capacity (DPPH). Antibacterial tests were done against *Staphylococcus aureus* and *Escherichia coli*. The data obtained were analyzed using analysis of variance (ANOVA) and further test DMRT (Duncan Multiple Range Test). The best results from this study were the 48 hours of withering time which have value for color (L, a*, b*), and antioxidant activity in respective order were 21.633; 6.80; 4.53; 3.22mg/100g; 74,63%. The extract had antibacterial activity, showed by inhibitory zone 7.7 $\pm$ 2,01^{b} mm and 7,53 $\pm$ 2,19^{b}mm for S aureus and 13.28 $\pm$ 3,30^{b} mm, 12,35 $\pm$ 3,13^{b} mm against to *E coli*

Ozonated Chili Paste from Second Grade Quality against a Week Storage on Uncontrolled Temperature in the Aluminium Based Packaging

Ahmad Ni'matullah Al-Baarri[1, a)], Anang Mohamad Legowo[1], Muhammad Nur[2], Kusmiyati[3], Teuku Sabrina[4], and Ailsa Afra Mawarid[4]

[1]*Food Technology Department, Faculty of Animal and Agricultural Sciences, Universitas Diponegoro, Indonesia*
[2]*Physics Department, Faculty of Science and Mathematics, Universitas Diponegoro, Indonesia*
[3]*Agronomy Department, Faculty of Agriculture, Universitas Padjadjaran, Bandung, Indonesia*
[4]*Faculty of Agriculture, Universitas Sumatera Utara, Medan, Indonesia*

[a)]albari@live.undip.ac.id

Abstract. Second grade chili has received huge attention to consumer in the traditional market due to its less expensive while the first grade has distributed to the first class of consumer. The problem is its shelf live during the room storage; therefore, this research was done to identify the appearance of chili in the paste form during the storage after treatment with ozone as this treatment has well recognized to preserve the food. The dip with 6 ppm ozone was applied after the three days of chili harvesting. The paste production was conducted with a twostep of maceration until it is completely finished with the final appearance in the commercial chili paste in commonly found in the food vendor. The final product was then packaged in the aluminum packaging for each 25 grams. The product was stored in the room temperature for a week. The lightness, the redness, and the yellowness. Browning index was then calculated and the change in the visual properties, i.e., shininess and water drip. Results showed no remarkable change on the yellowness and redness; however, the significant level of lightness decrease was detected from 55±3 to 42±1 indicating the rapid physiological change of chili during storage. The final shininess was less remarkable detected on its decrease but the water drip from chili was significantly found. The treatment of ozone showed better in its overall value providing the 30-33% improvement on its lightness and shininess. As conclusion, a week storage provided the quality decrease on chili, but the treatment of ozone may help the rapid deterioration of chili.

Keywords: second grade chili, paste, storage, room temperature, ozone, physical determination

Food Processing and Engineering | **FP – 026 – 2021**

Less Premium Chili Paste using Hypoiodous Treatment after a Week Storage in Aluminium Packaging

Ahmad Ni'matullah Al-Baarri[1, a)], Setya Budi Muhammad Abduh[1], Anang Mohamad Legowo[1], Muhammad Nur[2], Mulyana Hadipernata[3], and Ailsa Afra Mawarid[4]

[1]*Food Technology Department, Faculty of Animal and Agricultural Sciences, Universitas Diponegoro, Indonesia* [2]*Physics Department, Faculty of Science and Mathematics, Universitas Diponegoro, Indonesia*
[3]*Indonesian Agency for Agricultural Research and Development, Ministry of Agriculture, Republic of Indonesia*
[4]*Nutrition Department, Faculty of Medicine, Universitas Diponegoro, Indonesia*

[a)]albari@live.undip.ac.id

Abstract. More than half of total chili production has recognized as middle-low quality of chili but still in the range of acceptable standard. This chili will highly loss its quality in short time during the room storage, therefore most of them directly to consume or was minimum processed as secondary product, i.e., chili paste. To prolong the shelf life, preservation is needed. This research was done to extend shelf life of chili paste using hypoiodous acid or HIO. Dipping to 10 mM of HIO produced from hydrogen peroxide and kalium iodide was applied after chili maceration. Chili paste production was conducted with grinder using low speed. The final product was set similar to commercial chili paste commonly found in the food vendor. The chili paste was then packaged in the aluminium packaging for each 15 grams. The chili paste without HIO treatment was also analysed as control. The chili paste was stored in the room temperature for a week. L* a* b* analysis was conducted each every day. Browning index was calculated from L*a*b* value. Visual properties analysis for shininess and water drip was also detected. Based on the results, no significant changes were detected in the chili paste with HIO treatment in a* and b* value while remarkable changes in L* was detected. L*a*b* analysis on control showed significant changes during storage indicating rapid physiological change of chili. The HIO treatment was able to hinder the shininess and water drip from chili while the chili without treatment showed remarkable changes. HIO treatment showed better in its overall with the 20-28% improvement. As conclusion, HIO treatment might provide less quality decrease on chili while no treatment showed the rapid deterioration of chili.

Keywords: less premium chili, paste, a week storage, hypoiodous, physical analysis

Abstract Collection: Food Safety, Food Security and Food for Well-being

Developing Agribusiness for Meeting Demand of Quality Foods During and Post Covid-19 Pandemic

Taslim Sjah[1, a)], and Zainuri[2]

[1]*Study Program of Dryland Agriculture, Posgraduate Studies, University of Mataram, Jl. Majapahit No.62, Gomong, Kec. Selaparang, Kota Mataram, Nusa Tenggara Bar. 83115*
[2]*Faculty of Food Technology and Agroindustry, University of Mataram, Jl. Unram, Gomong, Kec. Selaparang, Kota Mataram, Nusa Tenggara Bar. 83126*

[a)] taslim.sjah@unram.ac.id

Abstract. Covid-19 Pandemic has negatively impacted several aspects the life of people and businesses. Agribusiness is no exception in receiving impact of the pandemic. To survive and further develop, agribusiness needs to redirect its activities to provide products in accordance with market demand at the times and the futures. This paper has two objectives: first is to describe the current conditions of agribusiness implementation, and second, is to prescribe what needs to be carried out by and in agribusiness for meeting products, particularly quality foods, that are currently and in futures demanded in people efforts to survive from the attack and sickness of Covid-19 and carry on the living of the people. Data for this study are obtained from secondary and primary sources, capitalizing available data from others and author own research and extension activities, especially in Lombok Island. The study found that the implementation of agribusiness system and its subsystems have not been operating in its full potentials, and therefore some activities are recommended to be done to improve the conditions of the agribusiness itself, as well as to fill in the demand for quality foods for consumers, who are in the needs of protection and curing from diseases caused by Covid-19.

Keywords: agribusiness, covid-19, food demand, quality food

Electronic Morphology of Acrylamide in Roasted Coffee and Cocoa Products by Cyclic Voltammetry

Hasim Munawar[1, a)], Harmoko[2], Budi Yarsi[3], Amalia Rakhmawati[3], Luis André L. Fernandes[4], and Ireng Darwati[5]

[1]*Toxicology Department, Indonesian Research Centre for Veterinary Science, IAARD-Ministry of Agriculture*
[2]*Directorate of Standardization and Quality Control, Ministry of Trade, Republic of Indonesia*
[3]*Academy of Metrology and instrumentation*
[4]*Zimmer Peacock, As*
[5]*Indonesian Spice and Medicinal Crops Research Institute, IAARD-Ministry of Agriculture*

[a)] seemunawar@gmail.com

Abstract. Acrylamide (AA) monomer is a carcinogenic toxin for human and animal. The current technologies to detect AA such GCMS, LCMS or LCMSMS are unfortunately laborious and costly although the methods have high selectivity and sensitivity. The electrochemical sensor would be useful as alternative method for AA determination because this method is fast, less chemical, and inexpensive. This study aims to investigate the morphology of electronic signal of AA by cyclic voltammetry as a preliminary study for AA biosensor and its application in roasted coffee and cocoa products (n = 19). Herein, the standard solutions of AA 0.02 – 200 ppb in [Fe(CN)6]3-/[Fe(CN)6]4- 25mM were measured by cyclic voltammetry (CV) with potential range -0.5 to +5.0 V and scan rate 25mV/s, using hyper value screen printed carbon electrode and potentiostat. The solutions were also analyzed by validated LC-MS/MS (LOD = 5 ppb, LOD = 10 ppb, Recovery = 70 – 97%, and linear regression 0.9983 with concentration interval 5-500 ppb of AA). Then, the AA signals were investigated in 19 samples by CV. As results, AA did not give any significant electronic duck peak signal (voltammogram) because of lack of electron source. [Fe(CN)6]3-/[Fe(CN)6]4- was therefore added in AA solution to increase the voltammogram signal. From here, the AA interference to electron transfer was signed as AA existence. Similarly, 19 samples showed the AA contaminants compared to those of CRM. In conclusion, the cyclic voltammogram could investigate AA in the coffee and cocoa samples even though the results cannot be quantified. This study would be continued to produce AA biosensor as a promising tool for supporting food safety program.

Keywords: acrylamide, cocoa, coffee, cyclic voltammetry

Digital Communication Media and Healthy Food Consumption Behavior: A Structural Model and Extension Strategy Implication

Sik Sumaedi[1, a)], Sumardjo[2], Amiruddin Saleh[2], and Agus Fanar Syukri

[1]*Indonesian Institute of Sciences, Jl. Jend. GatotSubroto 10, Jakarta 12710.*
[2]*IPB University, Kampus IPB, Jl. Raya Dramaga, Babakan, Kec. Dramaga, Kota Bogor, Jawa Barat 1668.*

[a)] sik_s_01@yahoo.com

Abstract. Healthy food consumption behavior is a serious issue in Indonesia. Considering the development of the internet and information technology, one of the efforts to solve this issue is to perform extension by utilizing digital health communication media. This study aimed to develop and tested a structural model of healthy food consumption behavior that involved digital health communication media usage, social influences, e-health literation, healthy food access, digital health communication media access behavior, and education. This research also aimed to formulate the extension strategy to change people's consumption behavior using the digital health communication media. Data was collected through a survey in the Regency and City of Tangerang, Banten. The research samples were 400 fifteen-years-old and over digital health communication media users. This study analyzed the data using SEM. The results showed that the healthy food consumption behavior is positively and directly influenced by digital health communication media usage. The healthy food consumption behavior is positively and indirectly influenced by e-health literation, healthy food access, digital health communication media access behavior, and education. The healthy food extension strategies were proposed based on the healthy food consumption behavior structural model.

Keywords: healthy food, extension, consumption behavior, digital communication media, strategy

Characteristics of Virgin Coconut Oil (VCO) Based On Change Of Polarization Angle With Treatment Of Dose, Disposal And Ozonation Duration

Heri Sugito[1, a)], Faridl Muhammad Abidin[1], Fajar Arianto[1], Much Azam[1], and Ketut Sofjan Firdausi[1]

[1] *Department of Physics, Faculty of Science and Mathematics, Diponegoro University, Jalan Prof. H. Soedarto, S.H. Tembalang Semarang, Indonesia 50275.*

[a)] herinuha@gmail.com

Abstract. Research on the characteristics of virgin coconut oil (VCO) based on changes in the angle of polarization with ozonation treatment has been carried out. This study aims to determine the effect of discharge and ozonation time on the magnitude of the change in the transmission polarization angle of the VCO. The method used is transmission polarization. The sample used is ozonated VCO with a fixed volume with varying discharge and ozonation time, as well as ozone dose. The parameter tested on the VCO is the change in the transmission polarization angle, with the light source coming from a green diode laser with a power of 5 mW. The results showed that ozonation affects the value of the change in the polarization angle. The ozonated sample (B, C and D) had an average change in polarization angle of 1.10° ± 0.07°, which was greater than that of the sample without ozonation (A) of 0.60° ± 0.05°. The dose of ozone in the sample affects the value of the change in the polarization angle, the greater the dose of ozone, the greater the change in the polarization angle.

Keywords: polarization, ozonation, VCO

Production Performance of Broilers Supplemented with Water Extract of Turmeric Rhizome and Tamarind Fruit

Ni Wayan Sudatri[1, a)], Gusti Ayu Mayani Kristina Dewi[2], I Gede Mahardika[2], and I Gusti Nyoman Gde Bidura[2]

[1] *Laboratory of Animal Physiology, Department of Biology, Faculty of Mathematics and Natural Sciences, Udayana University, Jl. Raya Kampus Unud Jimbaran, Kec. Kuta Sel., Kabupaten Badung, Bali 80361.*
[2] *Faculty of Animal Sciences, Udayana University, Jl. Raya Kampus Unud Jimbaran, Kec. Kuta Sel., Kabupaten Badung, Bali 80361.*

[a)] wayan_sudatri@unud.ac.id

Abstract. The phytochemicals contained in the rhizome of turmeric and tamarind fruit such as flavonoids, saponins, tannins act as antioxidants, antibacterial, anticancer, and so on. The purpose of this study was to determine the effect of the water extract of turmeric rhizome and tamarind fruit on broiler production performance. This study used a completely randomized design (CRD) using water extract of turmeric rhizome 2%, water extract of tamarind fruit 2%, a mixture of 1% turmeric rhizome water extract and 1% tamarind fruit water extract and controls. The observed production performance variables include initial body weight (BB), final weight, weight gain, consumption of drinking water and feed/day, FCR, slaughter weight, carcass weight, carcass percentage and feed digestibility. The results showed that initial body weight, final body weight, body weight gain, feed consumption, drinking consumption and FCR were not significantly affected by supplementation of water extract of turmeric rhizome and tamarind fruit. While the control broiler slaughter weight was the lowest compared to the three treatments. Likewise, the carcass weight between the control and treatment was significantly different, while the carcass percentage between the control and the three treatments was not significantly different. And the digestibility of broiler feed that was given a mixture of turmeric rhizome and 1% tamarind water extract was the best compared to the other three groups. Giving water extract of turmeric rhizome and tamarind fruit tends to have no significant effect on broiler production performance.

Keywords: broiler, production performance, tamarind, turmeric

Food Safety, Food Security, and Food for Well-being | **FS – 006 – 2021**

Horticultural Commodity Supply Chain Sustainability in Facing the Covid-19 Pandemic

Novi Haryati, Neza Fadia Rayesa, and Febriananda Faizal[1]

[1] *Faculty of Agriculture, Universitas Brawijaya, Jl. Veteran, Ketawanggede, Kec. Lowokwaru, Kota Malang, Jawa Timur 65145.*

[a)] noviharyati@ub.ac.id

Abstract. The Covid-19 pandemic in the agricultural sector in Indonesia has had a great impact. In the supply chain of agricultural products, for example, the major impacts are supply disruptions, decreased demand for agricultural products, the threat of a food crisis, and restrictions on global food exports. Food security is threatened, especially in food access due to regional restrictions. This study aims to determine the mapping of supply chain actors, supply chain performance of horticultural commodities and their sustainability. The research method is descriptive quantitative with judgment sampling according to the research objectives, namely 6 key informants. Primary data were obtained through semi-structured interviews with research respondents in Malang Raya. Malang Raya is a horticulture center consisting of fruits and vegetables. The results show that supply chain mapping focuses on farmers, traders and manufacturers indicating the flow of money, information, and goods. Supply chain performance during COVID-19 shows that horticultural farmers are in a parity gap with the most affected conditions compared to traders and manufacturers. To see the sustainability of the need for digitalization and strategic policies that benefit related parties in the vegetable and fruit agribusiness.

Keywords**:** Horticulture, Covid-19 Pandemic, Supply Chain

Food Safety, Food Security, and Food for Well-being | FS – 007 – 2021

Growth Performance, Serum Biochemical, Physical and Sensory Evaluation of Broiler Chickens Supplemented with Leilem (*Clerodendrum minahassae* Teijsm & Binn) Leaves Juice in Drinking Water

Jet Saartje Mandey[1, a)], Meity Sompie[2], Cherly J. Pontoh[1], and Christina Junus[2]

[1]*Animal Nutrition Department, Animal Husbandry Faculty, Sam Ratulangi University Bahu, Malalayang, Manado City, North Sulawesi.*
[2]*Animal Production Technology Department, Animal Husbandry Faculty, Sam Ratulangi University, Bahu, Malalayang, Manado City, North Sulawesi*

[a)] jetsm_fapet@yahoo.co.id

Abstract. This feeding trial was conducted to investigate the effects of leilem leaves juice in drinking water on growth performance, serum biochemical, and physical and sensory quality of broiler chickens. Two hundred broiler chicks were assigned to 4 dietary treatments for 5 weeks. The birds were randomly allocated into four treatments with five replicates, and each replicate containing 5 broiler chicks. The treatments contained 0 ml/L drinking water, 10 ml/L drinking water, 20 ml/L drinking water, 30 ml/L drinking water inclusion levels of leilem leaves juice to broiler chicks, respectively. The based diet consisted of commercial diet 70%, yellow corn 27%, and coconut oil 3%; and the chemical composition of based diet were crude protein 19.47%, crude fiber 3.18%, fat 2.94%, Ca 5.07%, P 0.55%, and gross energy 4101.0 Kcal/kg. The variables were growth performance, carcass profile, giblet, serum biochemical, and physical and sensory quality of meat. Data were analyzed by one-way analysis of variance. The treatment means were compared using Duncan's multiple range tests. Results showed that birds on the leilem leaves juice had similar feed intake, BWG, FCR, abdominal fat percentage, carcass percentage, giblet, and sensory evaluation though that of control, however had significantly different on SGR, GE, serum biochemistry, WHC and tenderness of meat. It can be concluded that leilem leaves juice can be included up to 30 g/L in the drinking water of broiler chicken for improved the performance of broiler chickens.

Keywords: Broiler chicken, Drinking water, Growth performance, Juice, Leilem leaves

Changes in Protein Properties of Pasteurized Liquid Whole Egg with Added Sugar

Antonius Hintono[1], Nurwantoro[1], Anang Mohamad Legowo[1], Sri Mulyani[1] and Casriyati[1, a)]

[1]*Food Technology, Faculty of Animal and Agricultural Science, Diponegoro University, Jalan Prof. H. Soedarto, S.H., Tembalang, Semarang, Indonesia 5027.*

[a)] casriyati0117@gmail.com

Abstract. This study aims to determine the effect of adding sugar with a certain concentration on changes in protein in pasteurized liquid whole egg. The material used is eggs weighing between 58-62 grams aged 1 day from ISA Brown strain brown chickens aged 48 weeks and granulated sugar. The experimental design used was a completely randomized design (CRD) with 4 treatments and 5 replications. The treatment given was the addition of sugar with a concentration of 0%, 5%, 10% and 15%. Parameters observed were protein content, level of coagulation, foaming power and protein electrophoresis pattern. The data analysis used was Analysis of Variance (ANOVA) at a significance level of 5% while the electrophoretic pattern was analyzed descriptively. The results showed that the addition of sugar had no significant effect ($p>0.05$) on the parameters of foaming power and the level of coagulation, while the addition of sugar had a significant effect ($p<0.05$) on the parameters of the protein content of pasteurized liquid whole egg, where the protein content decreased, as the concentration of added sugar increases. Electrophoresis pattern using SDS-PAGE method showed the protein profile of liquid whole egg, which could be identified as ovomucin (223.23 kDa), β ovomucin (121.54 kDa), Ovo transferrin (82.14 kDa), ovalbumin (42.72 kDa), ovomucoid (28.85 kDa) and lysozyme (13.55 kDa).

Keywords: Liquid whole egg, Pasteurization, Protein, SDS-PAGE, Sugar.

Lead Content of Human Milk in Lowland and Highland Agricultural Areas

Dina Rahayuning Pangestuti[1, a)], Apoina Kartini[1], Suhartono[1], Budiyono[1], Naintina Lisnawati[1], and Sulistyawati[1]

[1]*Department of Public Health Nutrition, Faculty of Public Health, Diponegoro University, Jalan Prof. H. Soedarto, S.H., Tembalang, Semarang, Indonesia 5027.*

[a)] dinapangestuti@lecturer.undip.ac.id

Abstract. Human milk is a golden source of nutrition for infants, especially at the age of 0-6 months. The risk of food contamination at this age will have an impact on the health of the baby, both in the short and long term. Currently, the presence of lead in agricultural areas is a contaminant from agricultural activities. Human milk containing lead can cause tissue damage, inhibit the formation of red blood cells, and also inhibit growth. This study aims to compare the lead content of human milk from breastfeeding mothers in agricultural areas in the highlands (43 mothers) and lowlands (28 mothers). Anthropometric measurements were performed on the mother. Blood lead level (BLL) was analyzed using atomic absorption spectrophotometry (AAS), while human milk lead (HML) used ICP OES. The average age of the mother was 26±5 years, weight 60.5±15.7 kg, height 158.2±70.7 cm, Hemoglobin (Hb) level 12.5±1.9 µg/dL, HML 19.27±15.9 µg/dL, and BLL (highland) 32.34±13.3 µg/dL. The mean age of babies was 99 days and 40% of babies were boys. It was found that there are differences in infant age, Hb level and HML of breastfeeding mothers. In conclusion, there is a significant difference in the lead content of human milk from agricultural areas in the lowlands compared to the highlands.

Keywords: agriculture, contamination, human milk, lead

Food Safety, Food Security, and Food for Well-being | **FS – 010 – 2021**

Anthocyanin Production and Eating Quality of Tropical Purple Corns

Arifin Noor Sugiharto[a)], Azeri Gautama Arifin, and Damanhuri

Faculty of Agriculture, Brawijaya University, Jl. Veteran, Ketawanggede, Kec. Lowokwaru, Malang, East Java 65145.

[a)] arifin.fp@ub.ac.id

Abstract. To meet based requirements of functional food acceptability, commodities should have high nutritional contents and good enough eating quality aspect as well. Purple corn and sticky corn provide high nutritional sources in term of protein, vitamin, anthocyanin content and somehow color and taste attractiveness. The objectives of the study were to evaluate anthocyanin content and eating quality in several line genotypes of purple x waxy corns. Our research would provide information and acknowledge proper choice of prospective purple corn genotypes to achieve high yield production as well as good eating quality in tropical condition. The Research has been conducted in three different places i.e., Batu, Malang and Kediri regency, East Java Indonesia. Ten lines originated from purple-waxy corn arranged in Random Complete Block Design (RCBD) with three replications have been applied in this study. Cob and kernel yield, carbohydrates and anthocyanin content, approach of anthocyanin productivity per hectare were measured. The results showed that there is interaction between lines and places and significant difference of anthocyanin and eating quality characters between lines in in the young kernel. Although in some cases likes Biomass and brix of young kernel in Batu is slight lower than in others, this place was leading in anthocyanin and kernel production for almost all genotypes. The highest anthocyanin production was potentially reached by purple corn line UBUP01 with approximately 181 kg anthocyanin per hectare in Batu.

Keywords: anthocyanin, eating quality, functional food, purple corn, waxy corn

Food Safety, Food Security, and Food for Well-being | **FS – 011 – 2021**

Formaldehyde Adulteration in Meatball Is Still Prevalent and Consumers Cannot Differentiate The Product by Its Physical Properties

Yoga Pratama[a)], Asri Astuti, and Bhakti Etza Setiani

Department of Food Technology, Faculty of Animal and Agricultural Sciences, Diponegoro University, Jl. Prof. Soedarto Tembalang Semarang 50275, Indonesia.

[a)] yogapratama@live.undip.ac.id

Abstract. Human carcinogenic compound formaldehyde (alternative name, formalin) addition in food is inappropriate and deemed as illegal. However, its simple and cheap procedure in giving desired food preservation effect becomes the factor of its prevalence. Our current study focuses on the usage of formaldehyde in meatball products sold as bulk without refrigeration in traditional market set up. 80 packages of meatballs were collected following accidental sampling method from food vendors in Tembalang, Semarang, Central Java. Samples were characterized for its formaldehyde content (AOAC 931.08), total plate count, moisture, and organoleptic properties. Formaldehyde is found in 1 sample at the level of 176.2 ppm. Whereby, it is among only 4 % samples that meet the maximum microbial limit 105 cfu/g. The particular sample is characterized with pale color, rather slimy surface, springy and weak meatball aroma. Note, this characteristic is not unique and are shared by several other samples. Therefore, this study brings update that formaldehyde adulteration is still prevalent. The adulterated product has hardly distinctive sensorial properties which makes self-evaluation difficult, thus exposes consumers to potential food safety risk.

Keywords: formalin, formaldehyde, meatball, food safety, TPC

Food Safety, Food Security, and Food for Well-being | **FS – 012 – 2021**

The Use of Several SAP Preservatives on Quality Characteristics of Coconut Sugar in Nusawungu Districs, Cilacap Regency

Karseno[a)], Tri Yanto, and Pepita Haryanti

Department of Food Technology, Faculty of Animal and Agricultural Sciences, Diponegoro University, Jl. Prof. Soedarto Tembalang Semarang 50275, Indonesia.

[a)] karsenounsoed@gmail.com

Abstract. Coconut sap is raw material for making coconut sugar. Coconut sap is easily damaged by microbial activity and have an impact on the low quality of the sugar. To prevent sap damage, either natural or synthetic sap preservatives are used. The use of different sap preservatives will affect the quality of coconut sugar produced. This study aims to determine the effect of various sap preservatives on quality characteristic of coconut sugar. The study used experimental methods with randomized block design. Four types of sap preservatives are sodium metabisulfite, lime - jackfruit wood, lime - mangosteen peel, and lime-mangosteen peel - jackfruit wood (called TANGKIS) was tested. 50 mL solution of sap preservatives in the concentration of 3% were put in sap container before being tapped by farmer in Nusawungu district, Cilacap regency. Collected sap was filtered, then heated until it become coconut sugar, and finally the quality characteristic of the sugar (browning intensity, texture, moisture content, ash, total insoluble solid, reducing sugar, and sucrose) were determined. The data is analyzed using F test at 5%, and if the result show significant different, then followed by the Duncan's Multiple Range Test at 5%. The results of the study showed that different types of sap preservatives resulted in significant effect on texture, browning intensity, moisture content, reducing sugar, and total insoluble solids of coconut sugar. In the other hand, no significant effect on the sucrose and ash content of coconut sugar. The sap preservative of TANGKIS produces better quality characteristic of coconut sugar than other types of sap preservatives.

Keywords: coconut sugar, coconut sap, sap preservatives, quality of coconut sugar

Food Safety, Food Security, and Food for Well-being | **FS – 013 – 2021**

The Correlation of Food Literacy and Nutritional Status among Adolescent Girls in Central Java

Siti Masfiah [1, a)], Arrum Firda Ayu Maqfiroch[1], Windri Lesmana Rubai [1], Siwi Pramatama Mars Wijayanti [1], Dian Anadari[1], Arif Kurniawan [1], Saryono [2], Budi Aji [1]

[1]*Public Health Department, Faculty of Health Sciences, Jenderal Soedirman University*
[2]*Nursing Department, Faculty of Health Sciences, Jenderal Soedirman University*

[a)] siti.masfiah@unsoed.ac.id

Abstract. Adolescent girls in developing countries are vulnerable groups in term of nutritional status, including Indonesia. One in seven of adolescents in Indonesia were being overweight or obese, according to the 2018 national Basic Health Research Survey. Food literacy as individual factor predicted has important role on developing lifestyle and behavior related to food intake and choice which will lead to nutritional status. Aims of this research was to assess the correlation between food literacy and nutritional status among adolescent girls in Central Java. This study was observational research, involved 195 adolescent girls from 18 high schools in 2 districts in Central Java, i.e., Banyumas and Purbalingga Districts. Food literacy was assessed by 26 questions related to food and nutritional knowledge, and nutritional status was measured by body mass index (BMI). Data was analyzed by using logistic regression. Ethical clearance was approved by Medical Faculty Ethics Committee, Jenderal Soedirman University. Study showed that about one third of adolescent's girls (34,4%) were obese, overweight, and underweight, while approximately half of adolescent's girls (65,7%) had normal BMI. It was significantly proved that adolescent girls with good food literacy have 2,8 times higher possibility to have normal BMI compared to adolescent girls with poor food literacy. Study suggests that it is essential to increase the food literacy in order to improve nutritional status among adolescents' girls using local channel exist close to them such as organization in school.

Keywords: adolescent girls, body mass index, food literacy, nutritional status

Food Safety, Food Security, and Food for Well-being | **FS – 014 – 2021**

The Role of Carbohydrates in Teenage Biomotor Abilities

Topo Suhartoyo[a)], Neva Widanita, and Pramesthi Widya Hapsari

Jurusan Pendidikan Jasmani, Fakultas Ilmu-Ilmu Kesehatan, Universitas Jenderal Soedirman Jl. dr. Soeparno Kampus Karangwangkal Purwokerto Utara 53123 Banyumas, Jawa Tengah, Indonesia

[a)] topo.suhartoyo@unsoed.ac.id

Abstract. Biomotor is a physical component that has to do with speed, flexibility, strength, and endurance. Carbohydrates are a type of energy that can be transformed into other forms of energy. The goal of the study was to see how carbohydrates affected adolescents' physical and biomotor abilities in rural settings. The descriptive correlational approach was applied in this study. Carbohydrates are the dependent variable, whereas biomotor ability in teenagers is the independent variable. A total of 100 youths between the ages of 18 and 20 were employed in the study. Purposive sampling was employed as a sample strategy. The data was analyzed using the SPSS version 25 calculator. The relative contribution of carbs to speed was 43.2 %, flexibility 35.6 %, strength 25.6 %, and endurance 6.7 %, according to the findings. The researchers concluded that carbs have a good impact on biomotor abilities in rural teenagers.

Food Safety, Food Security, and Food for Well-being | **FS – 015 – 2021**

The Effects of the Early Oral Feeding on Preterm Infants Length of Hospital Stay

Amanda Candraning Pratiwi[1], Haryatiningsih Purwandari[1,2, a)] Meivita Dewi Purnamasari[1]

[1]*Department of Nursing, Faculty of Health Sciences, Jenderal Soedirman University, Jl. Dr. Soeparno, Karangwangkal, Purwokerto, Indonesia*
[2]*IDPN student, Department of Nursing, NCKU, Tainan, Taiwan*

[a)] haryatiningsih.purwandari@unsoed.ac.id

Abstract. The nutrition value of breastmilk gives positive benefits for preterm infants such as improving infants' immunity, reducing infants' morbidity, and may affect preterm infants' length of hospital stay. However, lack of evidence that supported a correlation between early oral feeding using breast milk and preterm infants' length of hospital stay. Therefore, this study was intended to investigate the correlation between early oral feeding using breast milk with preterm infants' length of hospital stay. A correlational method was used as the study design. Data retrieved from RSUD Prof. Dr. Margono Soekarjo Indonesia medical records using a self-designed data collection sheet. The sample involved a convenience sample of 96 preterm infants who were treated in level 2 and 3 neonatal cares. Univariate analysis, Kolmogorov-Smirnov test, Spearman's Rank were used as statistical analysis in this study. This study found that early oral feeding had a significant correlation with preterm infants' length of hospital stay (r=0.618, *p*=<0. 01). Further, preterm infants' gestation age and preterm infants' birth weight had a significant correlation with preterm infants' length of hospital stay (r=-.563, r=-.634, p <0.01 respectively). Therefore, healthcare professionals can support a shorter length of stay for premature infants by giving oral breast milk as early as possible for preterm infants who have shown readiness to feed.

Food Safety, Food Security, and Food for Well-being | **FS – 016 – 2021**

Implementation of Statistical Quality Control (SQC) As A Defective Quality Product Control of Chinese Tofu

Yoyok Budi Pramono[1, a)], Clarisa Gunawan[2], and Ahmad Ni'matullah Al-Baari[1]

[1]*Food Technology, Faculty of Animal and Agricultural Sciences, Prof. Sudarto, S. H. Tembalang, Diponegoro University, Semarang, Indonesia*
[2]*Komplek DKI Sunter Jaya 1 Blok E No. 16, DKI Jakarta, Indonesia*

[a)] yoyokbudipramono@lecturer.undip.ac.id

Abstract. Tofu is a plant-based food product made in small industries, with a lack of quality control in the production process, so the amounts of the defective product are relatively high. This research aims to identify the causes of the defective product, analyze the application of Statistical Quality Control (SQC) methods, determine actions to minimize defective products, and how to improve product quality. The research method used is data collection followed by data processing using seven tools of SQC consist of check sheet, histogram, Pareto diagram, p - control chart, and fishbone chart. The results of Chinese tofu product quality obtained size, dirt, and crack defects with the numbers recorded on the check sheet sequentially are 33, 58, and 60 units. The percentage of Chinese tofu defects analyzed using the Pareto diagram was 39.74% for crack, 38.41% for dirt, and 21.85% for size defects. Factors that caused defects are shown in the fishbone chart: humans, machines, raw materials, environment, and methods. P – control chart indicates central line (CL) that is 0.260; upper control limit (UCL) is 0.554, and the lower control limit (LCL) is -0.334. Thus, this research can conclude that the production process of Chinese tofu is in control because no variation lies outside the control area. The main factor causing defects in Chinese tofu is the inaccuracy of workers. One of the steps to minimize defects is to implement a Standard Operating Procedure (SOP).

Food Safety, Food Security, and Food for Well-being | **FS – 017 – 2021**

Quality Control with Scoring Methods in The Production Process of Peas in The Bean Industry

Yoyok Budi Pramono[1, a)], Risma Novita Sari[1)], Hari Wibowo C[2)], Sri Mulyani[1)], and Setya Budi Muhammad Abduh[1)]

[1]*Food Technology Department, Faculty of Animal and Agricultural Sciences, Diponegoro University, Semarang, Indonesia*
[2]*Faculty of Agricultural Technology, Semarang University, Indonesia*

[a)] yoyokbudipramono@lecturer.undip.ac.id

Abstract. This study aims to determine the production process of peas, by observing the quality control management in the production process running well. The design of this research was carried out by observing and interviewing each process which was assessed according to the quality control aspect using the scoring method. Furthermore, the data obtained is interpreted in the form of a histogram which is then compared with company standards, if it does not meet the standards, improvement efforts are made. The results showed that the implementation of quality control in the production process of peas in the pea industry greatly affected the quality of the product produced quite well with a score of 87.63% and the production process was carried out with good sanitation and hygiene.

Food Safety, Food Security, and Food for Well-being | **FS – 018 – 2021**

Household Food Availability, Maternal Nutritional Knowledge, and Stunting in Elementary Students, Bekasi Indonesia

Alfi Fairuz Asna[1, a)] Mayang Erianti[2)], Muh. Nur Hasan Syah[3)], Arindah Nur Sartika[2)]

[1]*Faculty of Public Health, Universitas Diponegoro, Semarang, Indonesia.*
[2]*Nutrition Program, STIKES Mitra Keluarga, Bekasi, Indonesia*
[3]*Nutrition Study Program, Faculty of Health Sciences, Universitas Pembangunan Nasional Veteran Jakarta, Indonesia,*

[a)] fairuzasna@gmail.com

Abstract. Childhood stunting is one of the most significant impediments to human development, globally affecting approximately 162 million children under the age of 5 years. Stunting, or being too short for one's age is defined as a height that is more than two standard deviations below the World Health Organization (WHO) Child Growth Standards median. Indonesia, based on Indonesian Basic Health Research (Riskesdas 2018) has a 30.8% prevalence of stunting. The available food is one of the strategies to meet the nutritional needs of children so that malnutrition can be prevented. To determine the relationship between household food availability and maternal nutritional knowledge with the incidence of stunting in elementary school-age children. This research will be conducted at SDSN Jati Rahayu V Bekasi City which will be held from March to May 2019. The research sample used is 105 respondents. This research used a cross-sectional design. The independent variables in this study consisted of food availability and maternal nutritional knowledge. While the dependent variable is Stunting. Data were collected using a questionnaire. The results of this study were analyzed by Fisher's exact test. The results showed that there was no relationship between maternal nutritional knowledge and the incidence of stunting in school age children ($p = 0.441$) and there was no relationship between household food availability and the incidence of stunting in school-age children ($p = 0.307$). It was found that there was no relationship between maternal nutritional knowledge and the incidence of stunting in school-age children and there was no relationship between the household food availability and the incidence of stunting in school-age children at SDSN Jati Rahayu V Bekasi City.

Keywords: Food Availability, Knowledge of maternal nutrition, School-age children, Stunting

Food Safety, Food Security, and Food for Well-being | **FS – 019 – 2021**

Characteristics of Array MOS Gas Sensors in Detection of Adulteration on Patchouli Oil with Candlenut Oil

Arief Sudarmaji[a)], Agus Margiwiyatno, and Susanto Budi Sulistyo

Department of Agricultural Engineering, Faculty of Agriculture, Jenderal Soedirman University, Jl. Dr. Soeparno, Karangwangkal, Purwokerto 53132 Indonesia

a) arief.sudarmaji@unsoed.ac.id

Abstract. The high price of essential oils, especially Patchouli Oil, leads to adulteration by mixing with cheaper oils. The similar color and viscosity make it difficult to be recognized or distinguished by human sensing. In general, a technique for measuring essential oils is to use capillary Gas Chromatography/Mass Spectrometry (GC/MS). However, GC/MS is high cost, time-consuming (requires sample preparation), and requires adequate skill. This study aims to determine the characteristics of gas sensors made from Metal Oxide Semiconductor (MOS) which is used to detect adulteration of patchouli oil with candlenut oil. The measurement uses 9 MOS to capture gas/aroma from samples in a chamber. The output of MOS is acquired in a PC. The sample tested is pure Patchouli Oil, pure Candlenut Oil, 1% mixture, 5% mixture, 10% mixture, 15% mixture, and 20% mixture. The mixture is Patchouli Oil with Candlenut Oil. The individual response characteristics and the MOS series were analyzed using box plot graphs and Principal Component Analysis (PCA). It is found that modulation on MOS led the sensors more sensitive and PCA results showed that the system is adequate to distinguish mixing of in Patchouli Oil.

The Consumption of School Children's Snacks as Potential Risk Factor for Obesity in Children Elementary School

Sulistiyani Sulistiyani[a)], and Bagoes Widjanarko

Public Health Faculty, Diponegoro University

[a)] sulistiyani@live.undip.ac.id

Abstract. The incidence of obesity in children is increasing. According to Riskesdas data in 2013 obesity (overweight and obesity) reached 18%. This is a serious problem considering that obesity in children is a risk factor for degenerative diseases in adulthood, namely diabetes, coronary heart disease, hypertension, most school children (98,8%) buy snacks at school. The research method was observational, data from measurements and interviews using questionnaires to school children, analyzing the content of processed foods and food additives in school children's snacks that are often consumed. The results showed that 29% of school children were overweight. Most (76%) snacks consumed by elementary school children were included in the processed food group. All types of snack foods contain flour, and all types of snack drinks contain sugar.

Keywords: Children, Elementary School, Obesity, Snacks

Food Safety, Food Security, and Food for Well-being | **FS – 021 – 2021**

The effect of different habitats and postharvest treatments of Catfish (*Clarias gariepinus*) on Escherichia coli abundance: A Study in Brebes, Central Java Indonesia

Nur Endah Wahyuningsih[1, a)], Yusniar Hanani Darundiati[1], Deny Ardi Lourina[2]

[1]*Department of Environmental Health, Faculty of Public Health, Diponegoro University, Jl. Prof. Soedarto, SH. Tembalang, Semarang – 50275, Indonesia*
2 Health Office Regency of Brebes, Central Java, Indonesia

[a)] nurendahwahyuningsih97@gmail.com

Abstract: Catfish (*Clarias gariepinus*) is one of the fishery nutritious commodities that is quite popular in the community because it is cheap and easy to serve. It can be used as an alternative source to substitute protein from land source. Some of fish species, including catfish, contain higher and better protein than animal meat. Catfish are often grown in ponds in a sanitary manner because to the strong market demand. Due to the high bacteriological content of fishpond water, it is essential to identify the appropriate treatment for catfish. The aims of this study were to compare the impact of natural and artificial habitat and effect of different postharvest treatment on *E. coli* abundance. The study examined the bacteriological quality of 36 catfish from three distinct habitats and three different postharvest treatment methods. The result showed that there were no significant different (p = 0.234) of the *E. coli* abundance among three different habitats. The number of MPN faecal *coli* varied based on the postharvest treatment of catfish which included washing, cleansing overnight in a water flow, and frying (p = 0.001). Of the three post-harvest treatments, frying treatment resulted in significantly different MPN faecal *coli*. However, the frying treatment could not kill the *E. coli* completely. Hence the further study is needed to investigate the appropriate postharvest treatment which can control and reduce pathogenic bacteria spore in catfish.

Keywords: catfish (*Clarias gariepinus*), *Escherichia coli*, habitat, MPN, processing

Food Safety, Food Security and Food for Well-being | **FS-022-2021**

Comparison of Antibacterial Activity of Young and Old Leaves of Nagasari (*Mesua ferrea* L.) Ethanol Extract Against *Staphylococcus aureus*

Adam Hamid, Tuti S. Suhesti, and Sarmoko

Jenderal Soedirman University, Jl. Dr. Soeparno, Karangwangkal, Purwokerto, Indonesia

[a)] nailyfa@gmail.com

Abstract. Nagasari (*Mesua ferrea L.*) has been used as traditional medicine for generations. The ethanol extract of Nagasari leaves has been shown to have antibacterial activity on Staphylococcus aureus. Leaf age affects the levels of the active compounds in it, this can cause differences in the activity given by the leaf. The purpose of this study was to determine the effect of leaf age on the antibacterial activity of Nagasari. Young and old leaves of Nagasari (Mesua ferrea L.) macerated with 96% ethanol. The ethanol extract was made at concentration of 1 mg/mL and 2.5 mg/mL. Antibacterial activity test was performed using the disc diffusion method with 10% DMSO as negative control and 30µg Chloramphenicol as the positive control. The inhibition zone was analyzed using One-way ANOVA followed by an LSD test. The results showed that the ethanol extract of the young leaves of Nagasari 1 mg/mL and 2.5 mg/mL resulted in an inhibition zone diameter of 8.7 mm and 9.3 mm, while the ethanol extract of the old leaves of Nagasari resulted in an inhibition zone diameter of 9.7 mm. and 11.3 mm. There were differences in the antibacterial activity of the ethanol extract of young leaves and the ethanol extract of old leaves of Nagasari on Staphylococcus aureus. The ethanol extract of the old leaves of Nagasari has higher antibacterial activity than the ethanol extract of the young leaves of Nagasari.

Keywords: Ethanol extract, Nagasari leaf, antibacterial, Staphylococcus aureus

Food Safety, Food Security and Food for Well-being | **FS-023-2021**

The Effect of Maternal Infant-Feeding Style on the Portion of Food Consumed by Infant Aged 6 to 12 Months in Indonesia

Dian Susmarini[a)], Made Sumarwati, and Atyanti Isworo

Nursing Department, Jenderal Soedirman University Jl. Dr. Soeparno, Karangwangkal Purwokerto 53123, Central Java, Indonesia

[a)] dian.susmarini@unsoed.ac.id

Abstract. Nutritious food is needed for optimal growth in the early years. Baby-led weaning is a novel approach of introducing food in babies aged six to 12 months besides traditional weaning, which has been practiced for ages. In feeding babies, the maternal infant-feeding style represents how mothers manage food, feeding periods and feeding pace. A study involving maternal infant-feeding style is needed to discover the difference in mothers following baby-led weaning and traditional weaning as a basic assessment of the field. This research aims to evaluate the effect of maternal infant-feeding style on the portion of food consumed by infants aged 6 to 12 months in Indonesia. This study was comparative research. The population was mothers of 6 to 12 months old infants in Indonesia. Respondents (n=316) were recruited using consecutive sampling techniques through an online questionnaire in one month period. There was a significant difference in maternal infant-feeding style among mothers following baby-led weaning and traditional weaning (p=0.000). Almost all traditional weaning groups were categorised as authoritative and authoritarian, indicating mothers had more control over feeding the babies. Meanwhile, most mothers following baby-led weaning were in the authoritative category. Authoritative is stated as mothers have less control and concern about babies eating. It was found that infants with traditional weaning consumed more food compared to those with baby-led weaning. This research confirms the prevailing idea that mothers adopting baby-led weaning give babies more independence during solids introduction than the traditional weaning method. The traditional weaning method results in more portions of food consumed by infants.

Keywords: baby-led weaning, maternal infant-feeding style, traditional weaning

Food Safety, Food Security and Food for Well-being | **FS-024-2021**

Analysis of Influencing Factors Food Security of Fishermen's Households in Tayu District, Pati Regency

Lu'lu'a Ulyn Ni'mah[1, a)], Wulan Sumekar[1], and Anang M. Legowo[1]

[1]*Fakultas Peternakan dan Pertanian, Universitas Diponegoro, Semarang, Indonesia*

[a)] ulynlulua@gmail.com

Abstract. Food security is a condition of the fulfillment of everyone's food that is reflected in the availability of sufficient food. Household food security is influenced by many factors and varies between individuals or households. Animal food needs in Indonesia come from several types of main products, namely ruminant meat, fish, and poultry. Public awareness of the importance of healthy and nutritious animal protein consumption has driven the increase in national fish consumption to 50 kg / capita / year in 2019. The study aims to identify food consumption patterns, calculate the share of food expenditure, and identify the condition of household food security levels and analyze the influence of factors in the education level of households, household age, household income, number of household members, climate change and the amount of fish consumption to household food security levels. The method used in this study is an observational method with a survey approach. The research was conducted from March 2021 to May 2021 in Tayu District of Pati Regency. Sampling of respondents in this study was conducted with purposive sampling techniques in accordance with the researcher's intent or purpose. The number of fishermen respondents was determined by a proportional random sampling approach of 125 respondents. The data in this study is primary and secondary data with data collection methods using survey methods and literature tracing. The results showed that the average energy consumption of fishermen's households in Tayu District of Pati Regency amounted to 1,976.51 kcal/ person/day and the average protein consumption was 51.03 grams/person/day with an average energy consumption obtained from fish of 162.56 kcal/person/ day and protein of 11.19 grams/person/day. The average total expenditure of fishermen's households in Tayu District of Pati Regency amounted to Rp 2,855,721.00 every month with details of the average total food expenditure of Rp 1,405,686.00 or 49.2% and the average non-food expenditure of Rp 1,450,035.00 or 50.8% every month. The food security condition of fishermen's households in Tayu District is included in the food resistance category which consists of 54.4% of the total number of respondents. While the food vulnerable category by 6.4% and lack of food by 39.2%. Factors that affect the level of household food security significantly are household income, number of household members, climate change and the amount of fish consumption while the level of education of housewives and the age of households did not significantly affect the food security of fishermen's households in Tayu District in Pati Regency.

Food Safety, Food Security and Food for Well-being | **FS-025-2021**

Indonesian Food Law Politics in the Era of the Covid-19 Pandemic in the Order to Realize Food Security

Rani Pajrin[1, a)], Jamal Wiwoho[2], Moch Najib Imanullah[2] and Pujiyono[2]

[1] *Universitas Tidar Magelang, Central Java Indonesia*
[2] *Universitas Sebelas Maret, Surakarta, Indonesia*

[a)] ranipajrin@ymail.com

Abstract. The purpose of this study is to examine the politics of Indonesian food law in the Covid-19 Pandemic Era in order to realize food security. Food itself is the most basic human need to be able to live and develop. The COVID-19 pandemic has hampered the amount of food supply to countries due to locking policies or restrictions on human or goods activities. The research method used in this study is a normative legal research method, which is a process to find a rule of law, legal principles, and legal doctrines in order to answer the legal issues faced. The results of this study are the food production and marketing sector to stop the covid-19 pandemic. Legal Politics Efforts through policies carried out by the Government are to maintain food availability in the community (food security). However, there is a contradiction in the political aspect where the total budget in 2020 will experience a refocusing or reallocation of the budget.

Keywords: Covid-19 Pandemic, Food Security, Politics of law

Food Safety, Food Security and Food for Well-being | **FS-026-2021**

Changes Value of Starch, Amylose, and Amylopectin in Ciherang Rice for Eight months Storage

Mulyana Hadipernata[1, a)], Nikmatul Hidayah[1], Ridwan Rachmat[1], Eka Rahayu[1], and Ahmad Ni'matullah Al-Baarri[2]

[1] *Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian, Badan Penelitian dan Pengembangan Pertanian, Kementerian Pertanian*
[2] *Teknologi Pangan, Fakultas Peternakan dan Pertanian, Universitas Diponegoro*

[a)] mulya_nata@yahoo.com

Abstract. The decline in rice quality can be in the form of a decrease in quantity or quality. The study was conducted to determine changes in the value of amylose, starch, and fat in Ciherang rice varieties. The study was carried out for 8 months by storing rice in 3 different packaging, namely Vacuum polypropylene (PP) plastic, non-vacuum PP plastic and sack packaging. The storage room consists of 2 conditions, namely room temperature 28-31ºC, RH 65-75% and cold temperature 18-20ºC, RH 52%. The results showed that the starch content in Ciherang rice after 8 months of storage had a value of 60-70% compared to the initial storage conditions. The starch content in rice stored at cold temperatures of 18-20ºC tends to have a higher value than rice stored at room temperature of 28-31ºC. The amylose content in Ciherang rice increased after 8 months of storage with a value range of 25%. Rice stored at cold temperatures has lower amylose content than rice stored at room temperature. The amylopectin value in Ciherang rice after 8 months of storage tends to decrease slightly which causes the texture of the rice become less fluffier rice.

Food Safety, Food Security and Food for Well-being | **FS-027-2021**

Utilization of Kersen Leaves (*Muntingia Calabura* L.) for Diabetes Mellitus Patients: A Systematic Review

Lentera Firdausi[1, a], Nur Indahsari[1, b], Nur FadillahWati[1, c], Saryono Saryono[2, d]

[1]*Department of Nutrition, Faculty of Health Sciences, University of Jenderal Soedirman*
[2]*Department of Nursing, Faculty of Health Sciences, University of Jenderal Soedirman*

[a)] lantera.firdausi@mhs.unsoed.ac.id
[b)] nur.indahsari@mhs.unsoed.ac.id
[c)]nur.wati@mhs.unsoed.ac.id
[d)] Corresponding author: saryono2016@unsoed.ac.id

Abstract. Diabetes Mellitus (DM) is a heterogeneous group of disorders characterized by increased blood glucose levels caused by insufficient production and activity of the insulin hormone. There is a significant increase in DM cases every year in Indonesia, therefore it is necessary to develop better alternative drugs. Kersen leaves (Muntingia calabura L.) are traditionally used as an alternative medicine because they contain flavonoids which have anti-diabetic properties. This systematic review aims to examine the working mechanism of cherry leaves in reducing blood glucose levels in people with diabetes mellitus. Journal articles were obtained from the electronic database Google Scholar published from 2011 to 2021. Keywords used: Kersen leaves (Muntingia Calabura L.) and Diabetes Mellitus. Based on the results of 5 selected journals, it shows that cherry leaves (Muntingia Calabura L.) can reduce blood glucose levels for diabetes mellitus sufferers because they contain flavonoids, chalcones, and tannins in cherry leaves. The content of flavonoids provides a hypoglycemic effect. Chalcone can increase insulin sensitivity, reduce gluconeogenesis and also increase levels of the hormone Glucagon-like Polypeptide-1. The tannin content has the effect of increasing glucose uptake. So, it can be concluded that there is an effect of the use of cherry leaves (Muntingia Calabura L.) for people with diabetes mellitus.

Keywords: Kersen Leaves (Muntingia Calabura L.), Diabetes Mellitus, hypoglycemic

Abstract Collection: Agricultural Biotechnology

Agricultural Biotechnology | **AB – 001 – 2021**

Formulation and Evaluation of "Nata de Curcuma"

Annisa Auliya Rahmah[a)], Atika Putri, Felicia Ivena, Monica Ramadhanti, and Harwoko

Universitas Soedirman, Jl. Profesor DR. HR Boenyamin No.708, Dukuhbandong, Grendeng, Kec. Purwokerto Utara, Kabupaten Banyumas, Jawa Tengah 53122

annisa.rahmah@mhs.unsoed.ac.id

Abstract. Turmeric (Curcuma longa L.), a well-known spice, often used as an Indonesian traditional medicine or jamu ingredient which possesses immunostimulant effect as it contains curcumin. During the COVID-19 outbreak, the consumption of "jamu" tends to be increased recently. However, the millennial consumers as one of the target markets do not like jamu due to its bitter taste. Accordingly, turmeric should be formulated as nata, namely "nata de curcuma" to become "friendly consumed". The study aimed to formulate nata obtained from the water juice of turmeric, to evaluate the physical properties, to identify the curcuminoids, and to test the hedonic. Four formulas of "nata de curcuma" consisting of turmeric, coconut water, sucrose, ammonium sulphate (ZA), vinegar, and those fermented with *Acetobacter xylinum* as a starter. Then, the physical properties of nata including organoleptic, thickness, and water content were evaluated. Moreover, curcuminoids in this formula was identified by using thin layer chromatography (TLC) method. Furthermore, hedonic test was performed to evaluate the color, odor, and taste of "nata de curcuma" by consumers. The best formula of "nata de curcuma" contains the mixture (1:2) of water juice of turmeric and coconut water added with 30 g of sugar, 3 g of ZA, and 60 mL of starter. This formula exhibits the thickness of 0.5 cm and the diameter of 3 cm after 20-day-incubation. The organoleptic properties show yellow with the mixed odor of fresh turmeric and slightly coconut, a chewy texture with the specific taste of fresh turmeric but bitter less. The water content of this nata is 84.4 % and it contains curcumin based on the TLC profile. Turmeric is able to be formulated into "nata de curcuma" which has a potential as functional food for immunostimulant.

Keywords: Curcuma longa, curcumin, immunostimulant, nata de curcuma, turmeric

Agricultural Biotechnology | **AB – 002 – 2021**

The Effect of Dietary Peanut Flour (*Arachis hypogeae* L.) on The Quality of Chicken Eggs

Florencia Sompie, Jein Rinny Leke [a)], Jacqueline Laihad, Linda Tangkau, and Malcky Telleng

Sam Ratulangi University, Bahu, Malalayang, Manado City, North Sulawesi.

[a)] rinileke@yahoo.com

Abstract. The aims of this study are to determine the effect of dietary peanut flour (*Arachishypogeae L.)* on the quality of chicken eggs. Total of 100 laying hens were used in this study with 5 treatments, and 4 replications each occupied by 5 laying hens. Research design used was completely randomized design if there was a very significant difference followed by Duncan's multiple distance test. Treatments were given peanut flour with levels of 0%, 1%, 3%, 5% and 7% and the length of research was 8 weeks and every week the egg quality test samples were examined. Variables include egg weight, egg yolk index, egg white index, egg yolk color, eggshell weight, eggshell thickness. Results showed that egg white index, egg yolk index, were not significantly different ($P > 0,05$), but egg weight, egg yolk weight, egg yolk color, shell weight, shell thickness showed a very significant difference ($P < 0,01$). Conclusion: Peanut flour can be given up to a level of 7% can produce good egg quality.

Agricultural biotechnology | AB-003-2021

Antibacterial Activity of Mudskipper (*Boleophthalmus boddarti*) Mucus Extract Against Pathogen Bacteria

Riviani Riviani[1, 2, a)], Maria Dyah Nur Meinita[1, 2, b),] Nuri Fitria[1], Nadhila Salwa[1], and Dewi Wisudyanti[1]

[1]*Fisheries and Marine Science Faculty, Jenderal Soedirman University, Indonesia*
[2]*Center for Marine Bioscience Studies, Institute for Research and Community Service, Jenderal Soedirman University, Indonesia*

[a)] riviani@unsoed.ac.id

Abstract. The fish mucus covers the body surface of fishes contains a variety of secretions from epidermal goblet cells and epithelial cells. The mucus has important physiological functions such as against parasites and microorganisms. And mucus of mudskipper is needed to protect themselves when walking in the mud or climbing mangrove roots. The present work aimed to evaluate the antibacterial activity of fish mucus extract against pathogen bacteria. Fish mucus is obtained from live and frozen mudskipper. The antibacterial activity of the extract used the agar plate diffusion method with concentrations of 65.5, 125, 500, 1000, 2000 µg/mL against *Escherichia coli*, *Staphylococcus aureus*, *Aeromonas hydrophila*, and *Vibrio harveyi*. All tested extracts showed antimicrobial properties, but their biological activity was relatively low. Bacterial growth was most strongly inhibited by a 2000 µg/mL concentration of extract. These extracts are generally more active against human pathogen bacteria: E. coli and S. aureus than fish pathogen bacteria ones: *A. hydrophila*, and *V. harveyi.*

Keywords: Antibacterial activity, *Boleophthalmus boddarti*, Mudskipper, Pathogen bacteria

Abstract Collection: Agricultural Economics

Agricultural Economics | **AE – 001 – 2021**

Farmers' Behavior in Facing Soybean Production Risks in Grobogan Regency, Central Java, Indonesia

Wiludjeng Roessali [a)], Kustopo Budiraharjo, and Suryani Nurfadillah

Faculty of Animal and Agricultural Science, Diponegoro University, Jl. Prof. H. Soedarto, S.H., Tembalang, Semarang, Indonesia 5027.

[a)] wilroessali@live.undip.ac.id

Abstract. The purpose of this study was to analyze the behavior of farmers in facing the risk of soybean farming production. The research was conducted in Pulokulon District, Grobogan Regency, Central Java Province, Indonesia. The survey method was used to gather information from 60 soybean farmers as randomly selected respondents. The analysis used the risk aversion model. Research results showed that the most significant factors affecting soybean production were land, pesticides, labor wages, and the rental of thresher machines. The risk function of soybean farming production is indicated by labor wages as a determining factor for soybean farming. Farmers' behavior in dealing with risk was categorized as risk aversion as much as 51.67 percent, risk-neutral, and risk lover respectively by 35 percent and 13.33 percent.

Keywords: behavior, risk aversion, risk farming, soybeans

Agricultural Economics | **AE – 002 – 2021**

Analysis of Factors Affecting Customers Decision in Buying Imported Apples (Case Study in Transmart Modern Market, Semarang)

Ilham Dwipa Brahmantyo Aji[1, a)], Mukson[2], and Wiludjeng Roessali[2]

[1]*Undergraduate Student of Agribusiness, Faculty of Animal and Agricultural Science, Diponegoro University, Jl. Prof. H. Soedarto, S.H., Tembalang, Semarang, Indonesia 5027.*
[2]*Lecturer at Agribusiness, Faculty of Animal and Agricultural Science, Diponegoro University, Jl. Prof. H. Soedarto, S.H., Tembalang, Semarang, Indonesia 5027.*

[a)] ilhamdwipa7@gmail.com

Abstract. Fruit is one of the agricultural products that can be found in traditional markets and modern markets with different prices and quality levels. Imported apples are commodities that contain complete substances that are useful for the human health. Currently, along with Indonesia's economic growth, people are starting to buy fruit in the modern market. Understanding fruit consumer behavior is very important market information for the agribusiness sector. Consumer behavior will always change according to social and cultural influences that develop so that sellers must try to find new innovations so that their products can be purchased by consumers. The purpose of this study is to analyze the factors that influence consumer decisions in buying imported apples in the Transmart modern market Semarang. The population of this research is all residents of Semarang City. The method used in sampling was the accidental sampling technique. As many as 100 respondents for 3 Transmart modern markets were used as samples in this study. Data were analyzed using descriptive analysis and logistic regression analysis. The results showed that the decision-making process for buying imported apples consisted of needs recognition, information search, alternative evaluation, purchasing decisions and post-purchase evaluation. Factors of motivation, income, lifestyle, location, product display and price simultaneously affect the decision to purchase imported apples. Partially, motivation, income, product appearance and price have a significant effect on purchasing decisions of imported apples.

Keywords: buying decision, customers decision, imported apples, modern market

Agricultural Economics | **AE – 003 – 2021**

Financial Risk of Smallholder Dairy Based on Farm-scale at Malang, Indonesia

Hari Dwi Utami [a)], Umi Wisaptiningsih, and Hary Nugroho

Faculty of Animal Science, Brawijaya University, Jl. Veteran, Ketawanggede, Kec. Lowokwaru, Kota Malang, East Java 65145.

[a)] hrdwutami4@ub.ac.id

Abstract. Research was conducted at Malang District, Indonesia. It aimed to investigate dairy farmer profiles, farming profit, and the financial risk. Respondents were divided into three scales, scale-1 (owning ≤ 3), scale-2 (having 4-7 AU), and scale-3 (controlling > 7 AU). Primary data were collected by survey method with structured questionnaire and secondary data obtained from related sources. Data analysis employed descriptive technique with applying economic formulation namely profit, Debt to Asset Ratio (DTAR) and liquidity. Results found that smallholder dairy farming was the profitable venture with the high profit per AU occurring in the scale-3 (IDR 5,713) than those on scale-1 (IDR 5,526) and scale-2 (IDR 2,864). This farm also exhibited free from financial risk based on the solvency percentage about 13.70% in comparison with13.40% and 10.23% for scale-2 and scale-3, respectively. The smallholder dairy in the scale-2 however, exhibited the quite good in liquidity ratio (3.28) compared to scale-3 (3.18) and scale-1 (3.16).

Keywords: DTAR, liquidity, profit, solvency, venture

Agricultural Economics | **AE – 004 – 2021**

Strategy and Policy of Local Beef Cattle Development

Femi Hadidjah Elly[a)], Zulkifli Pol, Agustinus Lomboan, Deasy Soeikrimo, and Meiske Rundengan

Faculty of Animal Husbandry, Sam Ratulangi University, Manado, North Sulawesi, 95115

[a)] femihelly@unsrat.ac.id

Abstract. Local beef cattle were one of the community's mainstay commodities because it had various strategic roles in livestock development. Its development was through the use of available local resources. Local beef cattle were a serious concern because they produce meat products to support domestic production. The problem was the extent of strategies and policies in encouraging the development of local beef cattle farms. The purpose of this study was to analyze internal and external factors and strategies for developing local beef cattle farms in North Sulawesi. The research method used was a survey method and a review of published data. The data collected were primary data and secondary data. Analysis of the data used was the analysis of carrying capacity index, evaluation of internal and external factors and SWOT analysis. The results showed that beef cattle were spread across 15 regencies and cities in North Sulawesi, with the largest population in Minahasa Regency (18.61 percent). The results of the analysis show that 5 regencies and 1 city had an LQ value > 1. The carrying capacity index value in North Sulawesi was 2.36 and in Minahasa District was 0.91, North Minahasa was 2.09, South Minahasa was 2.97 and Bolaang Mongondow was 1.46. Based on the results of the study, it can be concluded that the resulting strategy in the development of local beef cattle farms was an aggressive strategy. Suggestions submitted were policies that were carried out through optimizing land potential in supporting the development of local beef cattle farms.

Keywords: strategy, policy, beef cattle, local

Agricultural Economics | **AE – 005 – 2021**

Resilience of the Bromo Tengger Semeru Tourism Village Community through Optimizing Agricultural Resources During the Covid Pandemic

Kliwon Hidayat and Mas Ayu Ambayoen[a)]

Brawijaya University, Malang, Indonesia

ayoen_maa@yahoo.co.id

Abstract. The COVID-19 pandemic, which has been running for more than a year, has become a global shock. Many sectors are affected, including tourism. The tourism community becomes a vulnerable group when the tourism closure rules are enforced. One of their efforts to remain resilient during the covid pandemic is to optimize the agricultural resources they have. The objectives of this study are: (1) Identifying groups of tourism actors who are vulnerable due to the COVID-19 pandemic and (2) Analyzing agriculture-based resilience strategies carried out by the community in order to be able to withstand economic shocks. This research uses a qualitative approach with a case study research design. The research location is in the village of Gubugklakah as one of the buffer villages in the Bromo, Tengger, Semeru area. Data was collected by means of in-depth interviews with research informants who are tourism actors. Data analysis uses the interactive model of Miles and Huberman. Meanwhile, the validity of the data is done by triangulation of sources and methods. The results of the study show that many tourism actors are vulnerable during the covid pandemic, namely: homestay managers, transportation service managers (jeeps), tour guides, culinary entrepreneurs, citrus picking agrotourism farmers, and so on. The strategy used by the tourism community in dealing with the pandemic is to re-manage agriculture. This is because before becoming a tourist village, the community relied on the agricultural sector, especially horticulture. Land management is carried out not only on private land, but also on Perhutani land (Komplangan) so as to increase their productivity. In addition, the culture of the local community which is still strong with the nature of mutual cooperation is able to help each other to face the crisis together.

Keywords: resilience, vulnerability, covid pandemic, agricultural resources, tourism village

Agricultural Economics | **AE – 006 – 2021**

Source of Finance and Factors Considered by Banks in the Provision of Credit for Cattle Fattening in East Java Province, Indonesia

I Gusti Ayu Putu Mahendri[1, a)], Scott Waldron[2], Rob Cramb[2], and Malcolm Wegener[2]

[1]*Indonesian Centre for Animal Research and Development, Indonesian Agency for Agricultural Research and Development, Bogor, Indonesia*
[2]*School of Agriculture and Food Sciences, The University of Queensland, Brisbane*

[a)] igapmahendri@yahoo.com

Abstract. Access to capital is one of the major constraints in developing of cattle fattening in Indonesia. This paper aims to identify the types of financial services and factors affecting the flow of credit for cattle fattening operation. About 54 fatteners as well as fourteen staffs from bank in Tuban and Lamongan Districts, East Java Province, Indonesia were interviewed regarding to sources of credit taken and factors considered by banks to lend to farmers. The result showed that finance for fattening is mostly by formal finance (bank, government and company) both subsidized credit with 6% interest rate or commercial rate; while less percentage fatteners involved in sharing cattle arrangement. Even though a low interest rate credit is less favorable for banks, but this contributes in retaining the customers or attract new borrowers; also expanding the sectors' scope of banks including in cattle fattening. In addition, participating in farmer group, technical supports by livestock agencies, the availability of certain market; predicting profit in budget analysis; government policy; and the availability of money from banks are indicated as factors affecting supply for cattle credit. In conclusion, banks are likely to have incentive to lend cattle fattening as a profitable investment with both subsidized and non-subsidized rate.

Keywords: Cattle fattening, Determinants' factors for supplying credit, Financial Services

Agricultural Economics | **AE – 007 – 2021**

Characteristics of Sheep Businesses Owned by Farmers in North Sumatera Province in order to Access Program Credit

I Gusti Ayu Putu Mahendri[a)], and Ismeth Inounu

[1]*Indonesian Centre for Animal Research and Development, Indonesian Agency for Agricultural Research and Development, Bogor, Indonesia*

[a)]*igapmahendri@yahoo.com*

Abstract. To accelerate the sheep development, Indonesian Government has established the Program to increase Export up to three times (Gratieks Program) with sheep as one of export commodity. This paper aims to analyze the characteristics of the sheep business managed by farmers in North Sumatra Province in order to meet export needs financed by the People's Business Credit Program (KUR) from the Bank. A total of 35 farmers in North Sumatra Province under Goat Sheep Farmer Association were interviewed using a semi-structured questionnaire to obtain information related to current sheep production, including increasing scale of production plan through KUR program. The interview data were analyzed descriptively and also statistically to determine the feasibility of the business i.e., R/C ratio to convince bank in credit disbursement. The results showed that farmers have their own sheep as well as sheep raised in groups both for fattening and breeding purposes. The number of sheep kept for the fattening business is 100 sheep for a period of three months, while those number for the breeding business is about 50 sheep. With additional capital through the KUR program of around Rp. 200 million per group, it is estimated that the profits obtained by farmers will reach IDR.66,090,000 per year per group with an R/C ratio of 1.22, while for the breeding business, profits of Rp. 115,665,800 can only be obtained in the 4th period with an R/C ratio of 2.37. It can be concluded that the sheep business carried out by farmers in North Sumatra Province is quite feasible if it is carried out with a combination system of fattening and breeding, with a certain price from exporter who accommodate the production as well as an off-taker in accessing program credit loans from banks.

Keywords: Sheep fattening-breeding, R/C ratio, Program Credit

Agricultural Economics | **AE – 008 – 2021**

Influence of Price Volatility to Regional Production of Yellow Corn

Yumna Raisa Noor[a)], Putri Budi Setyowati, Rosihan Asmara, and Arifin Noor Sugiharto

Faculty of Agriculture, Brawijaya University, Malang, East Java, Indonesia

a) yura.yumina@gmail.com

Abstract. The imbalance between the production and consumption of yellow corn can cause the price to be volatile. Farmers who are unable to predict and anticipate the volatility of commodity prices would switch to planting other commodities that has stable price. Based on such problem, the purpose of this study was to analyze price volatility and analyze its influence on yellow corn production in East Java Province in the long and short term. Data collected between the year period 2009-2018 were analyzed with historical volatility. The result showed that the highest price volatility of yellow corn occurred in 2012 at 41.77% and the lowest price volatility occurred in 2014 at 4.31%. Based on co-integration test analysis, the price had a negative relation to yellow corn production in long term, while the ECM test resulted positive relation in the short term. The correction factor needed to achieve balance in the short term was 1.9%.

Keywords: Cointegration, Corn Production, ECM, price volatility, yellow corn

Agricultural Economics | **AE-009-2021**

Bringing the Spices Yoghurt "Yompimpah" to the Market: A Feasibility Study

Vania Fauziyah Kembang Rohmadi[1], Sherina Audry Hendrostuti[1], Khairunnisa Nur Ar Royani[1], Yasmine Zahra Shabira[1], Muhammad Irfan Rafif Pratama[2], and Harwoko Harwoko[1, a)]

[1]*Department of Pharmacy, Faculty of Health Sciences, Universitas Jenderal Soedirman, Purwokerto, Indonesia*
[2]*Deparment of Management, Faculty of Economy and Business, Universitas Jenderal Soedirman, Purwokerto, Indonesia*

[a)] harwoko@unsoed.ac.id

Abstract. Yoghurt in combination with spices including ginger, turmeric, cinnamon, and honey is an innovation of functional food targeted to millennial generation. The preliminary survey reported that they are interested to try this new product called a spices yoghurt as branded "Yompimpah". This study aimed to assess the acceptability and feasibility of "Yompimpah" in the market. This research was conducted by collecting data from 152 respondents in the market study, followed by the organoleptic test involving 30 respondents. Moreover, we analyze business aspect emphasizing on financial performances such as the total cost, revenue, business efficiency (R/C ratio), benefit cost ratio (B/C ratio) and break-even point (BEP). Surprisingly, the market analysis exhibits that no one knows the innovation of "Yompimpah", however all respondents accept the organoleptic properties of this spice's yoghurt. The financial analyses show that the total cost is 12.5 million and a revenue is 18 million, while an R/C ratio of 1.43, B/C ratio is 0,43 and the BEP unit is 12 units/month. In summary, this business is profitable and feasible as the BEP has been accomplished.

Keywords: Feasibility study, functional food, spices, yoghurt, yompimpah

Agricultural economics | **AE-010-2021**

Halal's Influence on the Continuity of the Traditional Food Industry in Magelang Regency

Endang Kartini

Tidar University, Jl. Kapten Suparman No.39, Tuguran, Potrobangsan, Magelang Utara, Jawa Tengah 56116

endangkartini2504@gmail.com

Abstract. Halal is one of the conditions for people to believe that the food consumed is worth eating and has fulfilled Islamic rules. However, to get halal label is not easy and cheap. In some MSME communities they are home-cooked food industries that make a variety of foods both wet and dry. They are often deterred from putting their products in stores or supermarkets because they do not have the halal label of MUI on their products. Why is that? Because to get halal label is not cheap and includes expensive in most MSME communities in the village whose turnover is not much. So, they only market their products around where they live only. Therefore, it is necessary to assess what efforts must be done by the relevant government and MSME managers to lift MSME products in order to enter modern stores. This research is a case study in Magelang using an exploratory qualitative approach. Respondents to this study are MSMEs who have processed food products but do not have halal label. Researchers also get sources from the relevant government about the government's efforts to help MSMEs. The results of this study are the numbers of policies/programs of the relevant government and MSME managers to be able to lift MSMEs to get halal label as one of the product requirements in order to be able to enter modern stores around Magelang and outside Magelang. This research advice is that MSMEs still need a helping hand from various parties. MSME products are not halal, so their products are hindered from entering modern stores or markets, but lack of sufficient requirements that belong to, especially halal labeling from MUI, lack of knowledge, skills, and capital in terms of packaging and product operations, so that MSMEs are only satisfied to market products locally only with Turnover is not much. In addition, it takes a wide network and mutual cooperation to lift their products so that they are suitable for consumption by people of any class.

Keywords: Halal label, MSME, policy program, mechanism, mutual cooperation

Agricultural Economics | **AE-011-2021**

Coconut Bonsai Decoration Plants with Batik Patterns in the Modern Era

Yhenis Apriliana[1, a)], Putri Mega Lestari[2], Aldi N. Fadilah[3], and Indah Setiawati[2]

[1]*Faculty of Mathematics and Natural Science, Jenderal Soedirman University*
[2]*Faculty of Agriculture, Jenderal Soedirman University*
[3]*Faculty of Science and Culture, Jenderal Soedirman University*
Jl. DR. Soeparno, Karangwangkal, Purwokerto Utara, Banyumas, Central of Java, Indonesia, 53122

[a)] yhenisapriliana@gmail.com

Abstract. The Covid-19 pandemic has limited people's mobility which has led to increased interest in gardening at home. One type of ornamental plant that is being discussed a lot is the coconut bonsai ornamental plant which has its own uniqueness, its resistance to environmental conditions is quite high, and its maintenance method is easy. The innovation of coconut bonsai with batik motifs is not only profit-oriented but also as an effort to preserve batik, which is the culture of the Indonesian nation. This study aims to determine the criteria of consumers who are interested in coconut bonsai and its innovations and the state of competitors of batik coconut bonsai. This study uses a descriptive approach to explain the study. The data in this study came from Facebook, Instagram, and Google Trends. The results showed that consumers who are interested in coconut bonsai and its innovations, the majority are male, with an age of over 30 years. The top 5 regions based on the large number of coconut bonsai enthusiasts and their innovations are Palembang, Medan, Semarang, Surabaya, and Jakarta. Content related to how to make and care for coconut bonsai on social media attracts coconut bonsai enthusiasts to buy. Meanwhile, the majority of batik coconut bonsai competitors are on the islands of Java and Bali. They sell coconut bonsai with various innovations, but they have not made batik coconut bonsai innovations. The price of coconut bonsai that they offer is above 200 thousand rupiah, with a bonsai age of 8 months - 1 year.

Agricultural Economics | **AE-012-2021**

The Export Potential of Araceae Ornamental Plants From Indonesia Based on Trend and Consumer Character Analysis

Lestari Gayuh[1, a)] Majid Afah Khofifah[1], Pangestu Agung Sugeng[1], Indah Setiawati[2]

[1]*Agrotechnology student, Agriculture Faculty of Jenderal Soedirman University, Indonesia*
[2]*Agribusiness lecturer, Agriculture Faculty of Jenderal Soedirman University, Indonesia*

[a)] gayuhlestari9@gmail.com

Abstract. The objectives of this research are to determine the export potential of Araceae ornamental plants and the dominant factors on the consumer's buying decision of ornamental plants. The research was conducted by a survey and google trend analysis. There were 116 respondents of both men and women that met the inclusion samples criteria, such as having at least an experience in buying ornamental plants. The results showed that the Araceae ornamental plants have high export potential based on behavior of consumers in their purchase decision on ornamental plants through the introduction needs, information searching, alternative evaluation, and purchase decision.

Agricultural Economics | **AE-013-2021**

Untilization of Bitter Gourd for Hair Treatment

Nur Annisa Wulandari[1, a)], Naila Rukhil Azizah[2], Lusi Setiawati[3], Sandra Novitasari[4], and Indah Setiawati[5]

[1]*Department of Sosiology, Faculty of Social and Political Science, University of Jenderal Soedirman*
[2]*Department of Nursing, Faculty of Health Sciences, University of Jenderal Soedirman*
[3]*Department of Nursing, Faculty of Health Sciences, University of Jenderal Soedirman*
[4]*Department of Chemical, Faculty of Mathematic and Natural Science, University of Jenderal Soedirman*

annisawulan89@gmail.com

Abstract. Indonesia's tropical climate presents such problems as dandruff and hair loss, especially for women who use hijab and outdoor activities during the day. But costly and impractical hair treatment makes most of them reluctant to administer hair treatment. Therefore, it is necessary to provide hair-care products that meet the needs and desires of women. The purpose of this study is to make good use of pare to address hair loss and dandruff. A kind of weaver is quantitative. The data taking technique is by using a questionnaire with populations in the study, a mature female hijab user using an impressive sampling. Based on the study, 93 respondents with 63.6% said they had loss of hair and 54.5% of those who complained about dandruff. As many as 86% were attracted to using the hair mask by 58.1 percent of respondents wanted the hair mask to reduce hair loss. The product has a chance to excel on the market because it has what it needs and will match consumer satisfaction.

Keywords: bitter gourd, dandruff, woman, hijab, hair mask

Agricultural Economics | **AE – 014 – 2021**

The Difference between Knowledge and Attitude of Jendral Soedirman University Students in Consuming Halal Food

Qisti Lativa Wardani, Atikah Proverawati, and Munasib Munasib[a)]

[1] *Department of Nutrition Science, Jenderal Soedirman University, Jl. Dr.Soeparno, Karangwangkal, Purwokerto, Indonesia*

[a)] munasib@unsoed.ac.id

Abstract. Students are one of the Muslim consumers who tend to emphasize the consumption of practical, fast food, and affordable food. Nevertheless, he is an individual who has the intelligence to think and act, so that knowledge can be used as a basis for determining attitudes in consuming food. Moreover, food is one of the basic needs that can support the process of human life. For this reason, comprehensive knowledge is needed from both an Islamic perspective and nutritional science about food. In the perspective of nutrition science, healthy food is food that contains nutritional imbalances and meets the hygiene and sanitation standards of the food administration system. Whereas in Islam it is halal and thayyib food, namely good, healthy, delicious food, protected from danger, dirt (najis), and forbidden substances so that sharia law allows supervision to consume it because it contains benefits and virtues for the body. The integration of knowledge from the two disciplines above is important for students, because it is possible to determine attitude in choosing food. The level of student knowledge about halal food is certainly diverse, regardless of educational background. Knowledge of halal food can be obtained by students through general and religious education (Islamic boarding school). However, it is possible for students to obtain it through other media, such as the internet, given the advanced and sophisticated technology so that knowledge is very easy to access.

Agricultural Economics | **AE – 015 – 2021**

The Influence of Environmental, Economic, Government and Income Factors on Sustainability of Porang (*Amorphophallus muelleri* Blume) in Madiun Regency, East Java

Mohammad Rizki Ridhanto, Mukson, and Anang M. Legowo

[1] *Fakultas Peternakan dan Pertanian, Universitas Diponegoro, Semarang, Indonesia*

[a)] rizkiridhanto85@gmail.com

Abstract. Porang plant (*Amorphophallus muelleri* Blume) is one of the foodstuffs of the tuber class. Apart from being a food ingredient, the glucomannan content in porang tubers is commonly used for pharmaceutical raw materials, cosmetics, adhesives, and others. The development of porang agribusiness in Indonesia has been going on for a long time, especially for export commodities, one of which is in the Madiun Regency area. The high economic value of porang commodities has made farmers more interested in running porang agribusiness in recent years. The vast potential of land and the government that supports the development of porang are factors that affect the income of farmers in running the agribusiness of the plant. The purpose of this study was to analyze environmental, economic, government and income factors in influencing the sustainability of porang agribusiness. This research is survey research with clustered random sampling method and obtained 100 respondents. Data analysis uses path analysis with SPSS 23 software. The results of path analysis show that environmental factors affect sustainability through income with a regression coefficient of 0.217, but it has no direct significant effect. Economic factors affect sustainability through income with a regression coefficient of 0.528. Meanwhile, the government factor has an effect on sustainability through income with a regression coefficient value of-0.215, while the direct effect has a coefficient value of 0.455. The income factor has an effect on sustainability with a coefficient of0.830. Based on these data, it can be concluded that the three factors, namely the environment, the economy and the government, affect the sustainability of porang agribusiness through the income factor. While the factors that directly affect the sustainability of porang agribusiness are income and government.

Agricultural Economics	AE – 016 – 2021

Farmers' Preferences of Agricultural Insurance Product's Attributes in Pati Regency

Wahyu Dyah Prastiwi[1, a)], Tutik Dalmiyatun[2, b)], and Wiludjeng Roessali[c)]

[1] *Laboratory of Agribusiness Management, Department of Agriculture, Faculty of Animal and Agricultural Sciences, Universitas Diponegoro Jl. Prof Sudarto Tembalang, Semarang 50275 Indonesia*
[2] *Laboratory of Extension and Community Empowerment, Department of Agriculture, Faculty of Animal and Agricultural Sciences, Universitas Diponegoro Jl. Prof Sudarto Tembalang, Semarang 50275 Indonesia*

[a)] Corresponding author: wdpustea@gmail.com
[b)] tutik.apriyadi@yahoo.com
[c)] wilroessali@live.undip.ac.id

Abstract. Personal interviews with a structured questionnaire were conducted with paddy farmers who joined an agricultural insurance called Asuransi Usaha Tani Padi (AUTP) program in Pati Regency to determine their preference to the product's attributes. Conjoint analysis was utilized to determine the importance of selected attributes of such insurance policies for these farmers. Research found that the premium insurance cost attribute is the most important factor and coverage attribute is the least important one. The results showed that the preference's utility of premium cost more than IDR180000, coverage less than 1 year, compensation of crop failure greater than 75% land area, and claim process more than 14 working days are the best option according to AUTP participants. This paper underlines the importance of designing premium cost and its subsidy to fully support the development of agricultural insurance.

Keywords: AUTP, consumer preference, product attributes, conjoint Analysis

Agricultural Economics | **AE – 017 – 2021**

Strengthening the Network of Halal Centers to Support Indonesia's Halal Mandatory System

Poppy Arsil[a)], Rumpoko Wicaksono, Hety H. Hidayat, Dian Novitasari, and Rahajeng Aina Nurrahmah

Universitas Jenderal Soedirman

[a)] poppy74arsil@gmail.com

Abstract. The Halal Center is staffed by halal supervisors and functions as an educational work unit that facilitates the registration process for MSME halal certification through "tridharma"-education, research, and community service-activities. Collaboration between Halal centers and other organizations, agencies, and authorities is vital to ensuring the effective implementation of Law 33 of 2014 on Halal Product Guarantee. The purpose of this study is to develop the strategy for halal center cooperation with other institutions using the Analytical Hierarchy Process (AHP). The Analytical Hierarchy Process (AHP) is a technique for determining the relative importance which value is between 0-1 of each element in a complex hierarchical structure. This procedure is divided into four stages: decomposition, comparative judgement, priority synthesis, and logical consistency. The research sample consisted of 40 respondents, including MSME actors, slaughterhouse managers (RPH), and connected agencies or companies that assisted in the implementation of the Halal Product Guarantee Act in Banyumas Regency. According to the study's findings, the elements that most significantly influence the development of halal center cooperation in the Banyumas area are capital (0.617), agency/institutional policies (0.3200). BPJPH (0.33), the government (0.31), and private companies (0.11) all had a significant influence in the establishment of Halal Center collaboration in the Banyumas area. The primary objectives of developing halal center collaboration in the Banyumas area are to assist MSMEs in speeding the process of halal certification (0.67), and to strengthen inter-institutional performance (0.22). Alternative techniques for expanding Halal Center collaboration with relevant authorities/agencies include the utilization of government assistance funds (0.46), partnership with private institutions to accelerate halal certification (0.34), and collaboration with certification organizations professions involving the halal certification of products such as halal auditors, halal supervisors, halal slaughterers) (0.20). This alternate strategy can be implemented as a Halal Center policy to assist the halal industry's growth through collaboration with other institutions.

Keywords: AUTP, consumer preference, product attributes, conjoint Analysis

Agricultural Economics | **AE – 018 – 2021**

The Popularity of Food Souvenirs in Palangkaraya, Indonesia

Ervina Mela[a)], Laeli Budiarti, Mustaufik, and Dian Novita

Universitas Jenderal Soedirman, Jl. Profesor DR. HR Boenyamin No.708, Dukuhbandong, Grendeng, Kec. Purwokerto Utara, Kabupaten Banyumas, Jawa Tengah 53122

[a)] ervina.mela@unsoed.ac.id

Abstract. Giving gifts to family or relatives has become a culture that is deeply rooted in Indonesian society. This is supported by the diversity of food souvenirs in each region in Indonesia. Therefore, regional souvenirs are potential products to be developed. However, not all souvenirs are known by the public, so efforts are needed to increase the popularity of regional food souvenirs. The purpose of this study is to identify regional food souvenirs and determine their level of popularity. The research was conducted in the capital city of Central Kalimantan Province, namely Palangkaraya. Data collection was done by questionnaires to 100 people via google form. The data processed based on the average and grouped by the class range method. The results showed that in each city there were souvenirs that were classified as very popular, popular, quite popular, less popular, and not popular. Mackerel Fish Amplang is a very popular product in Indonesia, while Singkah Sawit Chips are unpopular souvenirs.

Agricultural Economics | **AE – 019 – 2021**

Addition of Azolla Microphyla to Feed on the Digestive Tract of Magelang Ducks

Faishal Rizqy Setyawan

Universitas Tidar

faishalrizqysetyawan28@gmail.com

Abstract. This study aims to determine the effect of supplementary feeding *Azolla microphylla* on the digestive tract of Magelang Ducks. This research was conducted in the experimental cage of Tidar University. The experiment was conducted using a completely randomized design with 4 treatments P0 (0% *Azolla microphyla*), P1(10% *Azolla microphyla*), P2 (15% *Azolla microphyla*) P3 (20% *Azolla microphyla*) with 5 replications. The livestock used were 40 male Magelang ducks. The parameters observed were the length and weight of the digestive tract of Magelang Ducks. Data were analyzed using a completely randomized design (CRD) then continued with Duncan's test. Analysis of variance showed that supplementary feeding *Azolla microphyla* had no significant effect (P>0.05) on the percentage of crop length, jejunum, caecum, colon, cloaca, liver and esophageal weight, crop, proventiculus, gizzard, jejunum, cloaca, liver, but had a significant effect (P<0.05) on the percentage of the length of the esophagus, proventricular, gizzard, duodenum, ileum, and weight of the duodenum, ileum, caecum, and colon.

Keywords: Magelang ducks, *Azolla microphyla*, Digestive tract

Agricultural Economics | **AE – 020 – 2021**

Experience Shocks of Strategic Food Consumers in Indonesia during COVID-19 Pandemic

Fitrotul Laili, Wiwit Widyawati, and Dian Islami Prasetyaningrum

Socio-Economics Department, Faculty of Agriculture, Universitas Brawijaya

[a)] Corresponding author: laili.fl@ub.ac.id
[b)] wiwit23@ub.ac.id
[c)] dianislami@ub.ac.id

Abstract. COVID-19's negative externalities disrupted the supply of several commodities. Meanwhile, to combat the spread of COVID-19, various countries have implemented a lockdown policy, which impacts the economy's balance. Consumers' risks are increasing due to economic changes caused by the COVID-19 pandemic, which has an impact on the higher level of volatility of various agricultural commodities in Indonesia, particularly strategic commodities. Thus, this research designed to examine the experience shock of strategic food consumers during Covid-19 pandemic. The ARCH/GARCH model was used to describe the pattern of strategic food price movement using a set of weekly consumer price data from March 2020 until August 2021. This study found a specific trend in price volatility toward a declining term, resulting in a low level of uncertainty for consumers during the COVID-19 pandemic. This is due to a drop in demand caused by a decline in people's purchasing power and the government's price stabilization policy during the COVID-19 pandemic. It demonstrates that strategic food consumers experience low shocks in terms of price movement. Still, during the high COVID-19 case, strategic food consumers experienced shocks due to food shortages caused by movement restrictions during the lockdown period.

Agricultural Economics | **AE – 021 – 2021**

Effect Of The COVID-19 Pandemic On Demand For Goat's Milk In Central Java

Danang Mahendra, Agus Setiadi, and Rudi Hartanto

Faculty of Animal and Agricultural Sciences, University of Diponegoro

danangmahendra3@gmail.com

Abstract. COVID-19 is a respiratory disease caused by the SARS-Cov2 virus. In Indonesia, the first reported case of COVID-19 was on March 2, 2020. This disease then spread, including to the province of Central Java. In Central Java, various groups use goat's milk for therapy and to maintain respiratory health. This Research aims to analyze the difference in demand for goat's milk between before the pandemic and during the COVID-19 pandemic. This is important to know to see business opportunities during the COVID-19 pandemic. The Research was conducted using a purposive sampling survey method involving a population of 3,464 dairy goats in the Central Java region. Data collection techniques were carried out by direct survey. The data used is the collective demand for goat's milk each month for 12 months before the pandemic (March 2019-February 2020) and 12 months during the pandemic (March 2020-February 2021). Data analysis using Wilcoxon test. The results show that demand for goat's milk before the COVID-19 pandemic for 12 months was an average of 7,844 liters/month, while demand for goat's milk during the pandemic for 12 months was an average of 39,865 liters/month, thus increasing 408% during the COVID-19 pandemic. Based on the Wilcoxon test, it shows that 12 months are in the positive ranks, meaning that the demand of goat's milk for 12 months has increased from before the pandemic to the time of the COVID-19 pandemic in Central Java. Based on the "Statistics test" it is known that Asymp.Sig. (2-tailed) is worth 0.002. A value of 0.002 < 0.05, it's shown a significant difference between the demand for goat's milk before and during the pandemic, so there is an effect of the COVID-19 pandemic on the demand for dairy goat's milk in Central Java.

Keywords: Central Java, COVID-19, Goat's Milk

Abstract Collection: Agricultural and Food Waste

Utilization of Egg Yolk as an Alternative Fat Liquoring Agent for Fur Tanning of Rabbit Skin

Raden Lukas Martindro Satrio Ari Wibowo, Tutik Maryati, and Ragil Yuliatmo[a)]

Politeknik ATK Yogyakarta, Yogyakarta, Indonesia

[a)] ragilyuliatmo@atk.ac.id

Abstract. Rabbit skin, which is by-product of rabbit meat, has a high potential as a source of raw material for fur skin that can be used as leather products, such as jacket, bag, and wallet. Rabbit skin has special characteristics, which is soft but not strong enough and a little stiff. These properties can limit the use of the product, especially for products with high strength softness such as shoes and gloves. Currently, the use of fat liquors from oils and synthetic materials has been able to increase the strength and softness of the skin. Eggs are a good source of fat, which can be used as a natural fat liquor agent. This study aims to determine the effect of egg yolk concentration on the fat liquoring process on the physical characteristics of tanned rabbit skin. Several concentrations of egg yolk (8, 10, and 12%) was used to fat liquoring process for tanned rabbit fur. Data were analyzed by analysis variance followed by Duncan s Multiple Range Test. Increasing the concentration of egg yolk as a fat liquoring agent for tanned rabbit fur caused an increase physical characteristic, such as in tensile strength, elongation, sewing strength, and tear strength.

Keywords: egg yolk, rabbit skin, fur tanning, physical characteristics, by product

Understanding Consumers Food Waste Reduction Intention: A Conceptual Framework

Sih Damayanti[a)] and Tri Rakhmawati

Indonesian Institute of Sciences, Jakarta, Indonesia

[a)] sihdamayanti@gmail.com

Abstract. Food waste is a critical problem around the world. The significant increase in the accumulation of food waste and its impact should receive serious attention. The main contributor to the increases in food waste is household food waste. Therefore, reducing household food waste is one solution to overcome the food waste problem. This study aims to develop a comprehensive conceptual framework of consumer behavioral intentions to reduce food waste. The conceptual framework developed using an extended theory of planned behavior and religiosity. Understanding consumers food waste reduction intention will provide insights into the factors that influence consumer's intention to reduce food waste that is important to support policies for minimizing food waste.

Keywords: food waste, consumer intention, theory of planned behavior, religiosity, conceptual framework

Agricultural and Food Waste | **AF – 003 – 2021**

The Effect of Fed Maggot Flour Meal as a Supplement in the Commercial Diets on the Performance of Broiler Chickens

Winny Swastike[1, a)], Salman Alfarisy Totalia[1)], Hary Setyantoko[2)], and Rio Olympias Sujarwanta[3)]

[1]*Sebelas Maret University, Surakarta, East java, Indonesia*
[2]*Departement of Agriculture, Food Security, and Fisheries*
[3]*Gadjah Mada University, Yogyakarta, Indonesia*

[a)] winny@staff.uns.ac.id

Abstract. An experiment was conducted for 30 days to evaluate the performance of broiler chickens fed maggot meal as a supplement in the commercial diets on their performance of finisher broiler chickens. Maggot meal was analysed to contain 40.12% CP, 10.97% CF, 6.88% EE, 15.88% ash. The four treatments used in this experiment were: (1) T0: commercial ration without maggot meal; (2) T1: commercial ration with 5% maggot meal; (3) T2: commercial ration with 10% maggot meal; and (4) T3: commercial ration added with 15% maggot meal. (5) T4: commercial ration added with 20% maggot meal; (6) T5: commercial ration added with 25% maggot meal. Statistical analyses showed that the treatments did not affect ($P<0.05$) feed consumption. However, they did effect ($P>0.05$) daily weight gain and feed efficiency of the birds. Maggot supplementation could reduce commercial ration fed to broiler chickens.

Keywords: Broiler chicken, Maggot meal, Daily Weight gain, Feed Consumption

Agricultural and Food Waste | **AF – 004 – 2021**

Physical and Chemical Properties of Buffalo Skin Gelatin Extracted Using Crude Acid Protease from Goat Abomasum

Tanalyna Hasna[1, a)], Sri Mulyani[2)], Umar Santoso[3)], and Yudi Pranoto[3)]

[1]*Department of Food Science and Technology, Brawijaya University, Jl. Veteran, Malang, East java, 65145, Indonesia*
[2]*Faculty of Animal and Agricultural Sciences, Diponegoro University, Semarang, Indonesia*
[3]*Faculty of Agricultural Technology, Gadjah Mada University, Yogyakarta, Indonesia*

[a)] tanalynahasna@ub.ac.id

Abstract. The present study reports extraction buffalo skin gelatin (BSG) using crude acid protease from abomasum of goat (CAPAG). CAPAG was used for aiding gelatin extraction of buffalo skin using different levels of 0; 2.5; 5; 7.5 U/g at different levels of hydrolysis temperature i.e., 28; 37; 40˚C. CAPAG aided process increased the yield of BSG, which reached 26.15 % using 7.5 U/g. The BSG was characterized based on its chemical and physical properties. BSG had high protein content (87.96 – 96.18 %), low moisture (6.99 – 7.51 %), low ash (0,51 – 0,57 %), and low fat (0,47 – 0,55 %) contents. The pH ranged 3.90 – 4.05 and had 204.88 – 212.33 g bloom of gel strength while the viscosity was 7.34-7.69 cP and showed 90-110 KDa on SDS Page output.

Keywords: goat abomasum, crude acid protease, gelatin

Agricultural and Food Waste | **AF – 005 – 2021**

Lignocellulosic Characterization of Indonesian Cocoa Pod Husks (*Theobroma cacao* L.) based on the Degree of Maturity as a Nanocrystalline Cellulose Preparation

Heni Radiani Arifin[1, a)], Muhamad Djali[1)], and Bambang Nurhadi[1)]

[1]*Padjadjaran University, West Java, Indonesia*

[a)] heni.radiani@unpad.ac.id

Abstract. Cocoa pod husks (CPH) are lignocellulosic wastes that contain major components such as lignin, cellulose, hemicellulose, and other minor components. Utilization of CPH as a preparation for Nanocrystalline Cellulose (NCC) is still rare. The degree of cacao fruit maturity is thought to influence the lignocellulosic characteristics of the CPH. This study aims to characterize the Forastero variety of Indonesian CPH so as to obtain characteristics suitable for the raw material in the manufacture of NCC. The method used was experimental method that was analyzed by explorative description. Characterization was carried out at each degree of maturity of cocoa pods such as the half-ripe, ripe, and full ripe. Mayor component analysis was performed using the Chesson method, while minor component analysis was performed using proximate analysis. The results showed that the different amounts of percentages in the content of cellulose, lignocellulose, lignin, and minor components at each degree of maturity.

Keywords: lignocellulose, cocoa pod husk, degree of maturity, chess on method, cellulose

Agricultural and Food Waste | **AF – 006 – 2021**

Effect of Shade and Cover Pore on Development of BSF Prepupa

Laurentius J.M. Rumokoy, Ivonne Maria Untu, Geetruida J.V. Assa, Heidy J. Manangkot, and Wisje Lusia Toar

Sam Ratulangi University, Manado, North Sulawesi, Indonesia

rumokoy@msn.com

Abstract. The development of BSF insect maintenance has become an important endeavor for alternative animal feed supplies. This works aims to elucidate the effect of shade and pores covering the rearing box on the development of BSF prepupa. This experiment used a completely randomized design arranged in two factors of treatment with five replications. The treatments were Factor A and Factor B. Factor A divided in two environmental conditions consisting of direct sunlight as factor A1 and an indirect sunlight as actor A2. Factor B was the pore percentage of the cover area consisting of B1 5%, B2 15%, B3 25%. Four parameters were measured in this experiment: body weight; body length; body width and body thickness. The results of the variance analysis showed that there was an interaction between the two factors on the weight of prepupa larvae The post hoc test by using LSD showed that the comparison between B1_B2 and B2_B3 was different at the level of P <0.01 however this was not the case in three other parameters in this study. Through these results, we concluded that the prepupa weight was influenced by the shade treatment and the percentage of the pore covering the rearing container.

Keywords: BSF, development, prepupa

Agricultural and Food Waste	AF – 007 – 2021

Effect of Mono Sodium Glutamate (MSG) and Liquid Fertilizer on Leaf Area and Tuber Weight of *Canna edulis* Kerr.

Mahdalina Mursilati[a)], Agus Suprapto, and Esna Dilli Novianto

[1] *Tidar University, Jl. Kapten Suparman No.39, Tuguran, Potrobangsan, Kec. Magelang Utara, Kota Magelang, Jawa Tengah 56116*

[a)] mahdalina25@gmail.com

Abstract. Canna (Canna edulis Kerr.) are local plants that rich in starch so that can be used as staple food as alternative for rice. Leaf area and tuber weight are indicators of Canna growth. The aim of study was to investigation the effect of monosodium glutamate and liquid organic fertilizer (LOF) on the leaf area and tuber weight of Canna edulis Kerr. A randomized complete block design with two factors was used. The first factor was the LOF level, namely:0 L/1000 m2, 1L/1000 m2,1,5 L/1000 m2, and 2 L/1000 m^2. The second factor was MSG level: 0 g/plant, 3 g/plant, 6 g/plant, and 9g/plant. Canna was cultivated for six months from October 2020 to April 2021in Plumbon Village farmland, Selopampang District, Temanggung Regency with an altitude of 460 m above sea level. The treatment of fertilization was conducted fortnightly. The result show that LOF at the level of 1,5 L/1000 m2without MSG and LOF of 1,5 L/1000m2combined with MSG 6 g/plant resulted in tuber weight of 750,7 g and 825,8 g respectively that are higher ($p<0,05$) than those of other treatments. However, leaf area was not influenced by any of the treatments.

Agricultural and Food Waste | **AF – 008 – 2021**

Agricultural Byproducts in Lamb's Diet Can Subtitute Napier Grass without Decreasing Lambs' Products

Retno Adiwinarti, Christina Maria Sri Lestari, Endang Purbowati, Vita Sestrisnani, Sri Mawati, Agung Purnomoadi and Edy Rianto

[1] *Department of Animal Sciences, Faculty of Animal and Agricultural Sciences, Diponegoro University Campus Drh. Soejono Koesoemowardojo, Tembalang, Semarang 50275, Indonesia*

[a)] retnoadi@yahoo.co.id

Abstract. Agricultural by-products are costless or cheaper than Napier grass (*Penniesetum purpureum*) that is scarcely and more expensive in dry season. Therefore, using agricultural by-products in lambs' diet will reduce the cost of feed and make the lamb's products more affordable. This study was set up to evaluate the use of agricultural waste as a source of crude fiber to substitute Napier grass in local lambs 'diet. The parameters observed were commercial cuts of carcass, edible portion of carcass and edible portion of non-carcass. About16 local lambs aged ± 3 months old with the average bodyweight of13,30 ± 0,85 kg (CV= 6,41%) were arranged in a completely randomized design consisted of 4 treatments and 4replications. The treatments were T0 (40% Napier grass+ 60% concentrate), T1 (20% Napier grass+ 20% corncobs + 60%concentrate), T2 (20% Napier grass+ 20% bagasse + 60% concentrate), T3(20% Napier grass+ 20% peanut shells + 60%concentrate). The concentrate was composed of rice bran, cassava waste products, soybean meal, molasses, and mineral mix. Data were analyzed by a one-way analysis of variance. The result showed that the average daily weight gain of T3was higher($P<0,05$) than those of T0, T1 and T2. In fact, the slaughtered weight, carcass weight, commercial cuts (except for rack), edible portion of carcass and non-carcass of lambs fed agricultural byproducts were similar. It can be concluded that corncobs, bagasse, and peanut shells can substitute Napier grass in the local lambs' diet without decreasing their products (commercial cuts and total edible portion of lambs).

Agricultural and Food Waste | **AF – 009 – 2021**

Growth Rate and Body Composition of Lambs Receiving Agricultural Wastes as Grass Substitutes

Nikmah Nurbaeti, Endang Purbowati, Retno Adiwinarti, Vita Restitrisnani, Agung Purnomoadi, and Edy Rianto

[1]*Faculty of Animal and Agricultural Sciences, Diponegoro University Campus Drh. Soejono Koesoemowardojo, Tembalang, Semarang 50275, Indonesia*

[a)] nikmahnurbaeti60@gmail.com

Abstract. An experimental study was carried out to investigate the effect of grass substitution with agricultural industrial wastes on body composition of lambs. This study used 20 male lambs aged 3 months, weighed 13.37±1.36 kg (CV = 10.21%). The lambs were fed diets in the form of pellets, with the fiber and concentrate balance of 40:60. The lambs were allocated into a completely randomized design with four treatments of fiber and five replications. The fiber treatments applied were T0: 100% napier grass; T1: 50% napier grass + 50% corn cobs 50% T2: 50% napier grass + 50% bagasse; and T3: 50% napier grass + 50% peanut shells. Parameters observed included dry matter intake (DMI), crude protein intake (CPI), total digestible nutrients (TDN) intake, body weight gain (BWG), feed conversion ratio (FCR) and body composition of the lambs. The results showed that the replacement of grass with agricultural industrial waste had a significant effect ($P<0.05$) on DMI and CPI. The highest DMI was found at T3 (781 g/day), while T1, T2 and T2 were not significantly different (721 g/day on average). The highest CPI was obtained at T0 (84 g/h) followed by T3 (81 g/h), T1 (77 g/day) and T2 (74 g/day). However, there was no significant effect ($P>0.05$) of treatment on TDN intake (averaged 434 g/day). Diet treatment had a significant effect ($P<0.05$) on BWG and FCR. Diet T3 and T1 rations produced the highest BWG (94 and 79 g/day) and the lowest FCR (9.08 and 9.33). Diet treatment had no significant effect ($P>0.05$) on body composition of the lambs (average water content: 58.3%; protein: 10.45 and fat: 21.04%). It can be concluded that agricultural industrial waste can be used as a substitute for grass at a level of 50%.

Agricultural and Food Waste | **AF – 010 – 2021**

Application of IAA and Bamboo Vinegar at Different Concentration to Stimulate Growth of Vine Cubeba Cuttings (*Piper cubeba* L.)

Laili Fauziatin Nikmah [a)], Tri Suwarni Wahyudiningsih [b)], and Agus Suprapto[c)]

Program Studi Agroteknologi, Fakultas Pertanian, Universitas Tidar

[a)] Corresponding author: lailylilafirza@gmail.com
[b)] trisuwarni@untidar.ac.id
[c)] agussuprapto694@gmail.com

Abstract. Research on the application of IAA and bamboo vinegar at different concentration to stimulate growth of vine cubeba cuttings (Piper cubeba L.), was done from 28th February until 3rd May 2021 in Agricultural Education and Development Garden Bandongan, Magelang Regency. The altitude is 386 m, the soil latosol, and soil pH are 6.9. The method used a factorial experiment (2x6) arranged in a randomized complete block design (RCBD) with 4 blocks. The first factors are kinds of growth regulators of bamboo vinegar and IAA. The second factor is the concentration of growth regulators0ppm, 50 ppm, 100 ppm, 200 ppm, 400ppm, and 800 ppm. The results of the analysis showed that various natural growth regulators of bamboo vinegar could increase the longest root length, dry weight of upper stover, and higher root fresh weight than synthetic growth regulator IAA. The use of growth regulator concentration of bamboo vinegar with a concentration of 100 ppm increased the fresh weight of the upper stover, the dry weight of the upper stover, and root dry weight. Bamboo vinegar concentration of 200 ppm increased shoot length, longest root length, and root fresh weight. While the ZPT IAA concentration of 800 ppm increased shoot length, longest root length, top stover fresh weight, top stover dry weight, root fresh weight, and highest root dry weight. The interaction of ZPT IAA and bamboo vinegar treatments as well as ZPT concentration of 100 ppm resulted in interactions on shoot length, longest root length, top stover fresh weight, root dry weight, and percentage of live cuttings.

Keywords: *Piper cubeba* L., IAA, bamboo vinegar, concentration of growth regulators, vine cubeba cuttings

Agricultural and Food Waste | **AF – 011 – 2021**

The Evaluation on the Quality of Lambskin Leather Originated from Lambs Fed by Different Feedstuffs

Iwan Fajar Pahlawan[1, a)], Endang Purbowati[2], Sri Mulyani[3], Retno Adiwinarti[2], Agung Purnomoadi[2], Edy Rianto[2], and Vita Restitrisnani[2]

[1] *Center for Leather, Rubber and Plastics, Ministry of Industry, Yogyakarta 55166, Indonesia*
[2] *Department of Animal Sciences, Faculty of Animal and Agricultural Sciences, Diponegoro University, Semarang 50275, Indonesia.*
[3] *Department of Food Technology, Faculty of Animal and Agricultural Sciences, Diponegoro University, Semarang50275, Indonesia*

[a)] Corresponding author: iwan.fp@kemenperin.go.id
[b)] purbowati@hotmail.com
[c)] srimulyani@lecturer.undip.ac.id

Abstract. The quality of lamb skin leather originated from lambs fed with a combination of Napier grass (*Pennisetum purpureum*) and other substitution fibers were evaluated. The study evaluated 24 wet-salted lamb skins derived from lambs which fed by a combination of feed stuffs as the treatment. Experimental design was applied in this research with a completely randomized design. Treatments in the study involved the feeding of lambs with Napier grass (P0), Napier grass and corn cobs (P1), Napier grass and bagasse (P2), and Napier grass and peanut shells (P3), while the replication for each treatment were six. The raw lamb skins, flayed from the carcass and salt-preserved, were processed into crust leather through chrome tanning operation. The evaluation of lambskin leather emphasized on physical, mechanical, and chemical properties, i.e., softness, tensile strength, elongation at break, tear strength, shrinkage percentage, and water vapor permeability. The result showed that the resulted leather had softness value in the range of 5.79±0.47 mm to 5.96 ±0.31 mm. All treatments resulted the leather in a good thermal stability with shrinkage percentage 16.44±1.32%, at maximum. Further, water vapor permeability of the lamb skin leather was 14.21±0.85-17.29±1.47 mg/cm^2·h. In term of mechanical properties, the leather with treatment P2 promoted higher tensile strength (1661.19±116.34N/cm^2) than other treatments. Meanwhile, treatment P3 resulted leather with the highest value of elongation at break (104.42±6.69%) and tear strength (189.87±4.98 N/cm). Overall evaluation proposes a conclusion that most of treatments support the resulted lamb skin leather to meet the requirement of leather for jacket in SNI 4593:2011.

Nitrogen Uptake and Soybean Yield (*Glycine max* (L.) Merril. var. dega 1) on Legin Inoculation Treatment and Cow Urine Liquid Organic Fertilizer

Kharisma Dian Nurani[1, a)] Tri Suwarni[2], and Agus Suprapto[3, b)]

Jurusan Agroteknologi, Fakultas Pertanian, Universitas Tidar,
Jl. Kapten Suparman No.39, Kota Magelang, Jawa Tengah 56116, Indonesia

[a)] Corresponding author: kharismadian98@gmail.com
[b)] trisuwarni@gmail.com

Abstract. Legin is an inoculum containing bacteria that can fix N_2 in the air. The activity of *Bradyrhizobium japonicum* in legin was influenced by the availability of macro and micro nutrients supplied from cow urine liquid fertilizer. This study aimed to determine the effect of legin inoculation and cow urine liquid fertilizer on N uptake and yield of soybean (*Glycine max* (L.) Merill. var. dega 1). The research was carried out from January to April 2021 in Ngabean Village, Secang District, Magelang Regency with an altitude of 470 m above sea level with latosol soil type. The research design was a Completely Randomized Block Design (RAKL) with 2 treatment factors and 4 replications. The first factor was legin inoculation with doses of 0, 10, 20, 30, 40 g/kg. The second factor is the treatment of cow urine liquid fertilizer 0 ml/l water and treatment of cow urine liquid fertilizer 100 ml/l water. Data were analyzed with variance and continued with Orthogonal Polynomial Test and 1 % LSD Test. The results showed that legin inoculation treatment increased the number of root nodules, N uptake, fresh weight of stover, dry weight of stover, number of pods, number of filled pods, dry seed weight of plant and seed protein content. Liquid organic fertilizer of cow urine increased the number of root nodules, N uptake, fresh weight of stover, dry weight of stover, number of pods, number of filled pods and weight of dry seeds of plant. The interaction between legin inoculation and cow urine liquid fertilizer did not affect all parameters of the observation. Inoculation of legin 20 g/kg and cow urine liquid fertilizer 100 ml/l gave the highest results for all parameters observed.

Keywords: Bradyrhizobium *japonicum*, cow urine, legin inoculation, nitrogen fixation

Abstract Collection: Agricultural Production Systems

Agricultural Production System | **AP – 001 – 2021**

Effect of Biofertilizers Application on Growth and Production of Cherry Tomatoes (*Lycopersicum cerasiforme*)

Didik Wisnu Widjajanto[a)], Sumarsono, and Endang Dwi Purbajanti

Department of Agriculture, Faculty of Animal and Agricultural Sciences, Diponegoro University, Jl. Prof. Sudarto No.13, Tembalang, Kec. Tembalang, Kota Semarang, Jawa Tengah 50275

[a)] dwwidjajanto@gmail.com

Abstract. The aim of this study was to evaluate the effect of dose and timing of application of biofertilizers on growth and production of cherry tomatoes (*Lycopersicum cerasiforme*). The experiment was carried out in the greenhouse of the Laboratory of Ecology and Plant Production, Department of Agriculture, Faculty of Animal Husbandry and Agricultural Sciences, Diponegoro University, in April-September 2019. A 3x3 factorial experiment based on a completely randomized design with 3 replications was used throughout the experiment. The first factor consisted of 0, 10, and 20 ml of biofertilizer/ha, respectively, for D0, D1, D2. The second factor was the time of application of biofertilizers at the time of planting, 20 and 40 days after planting consecutively for B0, B1 and B2. Parameters observed included number of tomatoes, yield of fresh and dried fruit, fruit diameter, and brix. The data obtained were analyzed statistically by analysis of variance and continued with Duncan's Multiple Distance Test at 5% level. The results showed that there was no significant effect due to the treatment of biofertilizer dose, time of application and the interaction between those two treatments on all parameters observed. Based on the results of the experiment, it may be concluded that the dose and time of application of biofertilizer have not been able to support the growth and production of cherry tomatoes (*Lycopersicum cerasiforme*). Further studies by increasing the dose and shortening the application interval are recommended.

Keywords: biofertilizers, cherry tomatoes, growth, production

Agricultural Production System | **AP – 002 – 2021**

The Effect of Pandan (*Pandanus amarylifolius* Roxb) Leaf Flour as Feed on the Production Content of Eggs and the Fat Profile of Laying Hens

Jein Rinny Leke[a)], Jacqueline Laihad, Endang Pudjiastuti, and Albert Podung

Sam Ratulangi University, Kampus Unsrat, Bahu, 95115, Manado, North Sulawesi, Indonesia

[a)] rinileke@yahoo.com

Abstract. This study aims to determine the effect of pandan (*Pandanus amary lifolius* Roxb) leaf flour as feed on the production content of eggs and the fat profile of laying hens. Total of 200 laying hens were used in the study, with 5 treatments and 5 replications each filled with 8 chickens. Research design used was a completely randomized design, if there were differences the Duncan's Multiple Distance was carried out. Treatments given fragrant pandan flour were 0%, 1%, 2%, 3%, and 4%. This research was conducted for 8 weeks. Parameters included: ration consumption (g/head), ration conversion, Hen Day production (%), blood cholesterol (g/dl), HDL (g/dl) and LDL (g/dl). Results showed that the use of fragrant pandan leaf flour up to 4% gave a very significant effect ($P < 0.01$) on conversion, hen day egg weight production, blood cholesterol, blood HDL and blood LDL, but not significantly different ($P > 0.05$) on ration consumption. Conclusion: The use of pandan leaf flour to a level of 4 % in the ration can increase egg production and reduce blood cholesterol, Low-density lipoprotein (LDL) and High-density lipoprotein (HDL).

Keywords: Pandan Leaf flour, egg production, Fat Profile of laying hens

Agricultural Production System | **AP – 003 – 2021**

The Effect of Intramammary Injection of Binahong and Betle Herbal Antibiotics on the Number of Bacteria and the Organoleptic Quality of Milk

Roidah 'Afro, Della Sundari, Asrofi Munir, Indah Kiky Melania, and Dian Wahyu Harjanti[a)]

Diponegoro University, Jl. Prof. Sudarto No.13, Tembalang, Kec. Tembalang, Kota Semarang, Jawa Tengah 50275

[a)] harjantidian@gmail.com

Abstract. This study aimed to examine the effect of intramammary injection of binahong and betle herbal antibiotics on the number of bacteria and the organoleptic quality of milk. The material used was 9 Friesian Holstein (FH) dairy cows with subclinical mastitis. The experimental design used was a RAL experiment with 3 treatments and 3 groups. The treatments applied were T0 = control, T1 = 2% herbal antibiotic, T2 = 4% herbal antibiotic. Parameters observed included the level of total milk bacteria and milk organoleptic tests. The data were analyzed by paired sample t-test. The results showed that there was no significant difference in the total milk bacteria, but in the group of cows receiving T2 (4%) herbal antibiotic treatment, there was a tendency to decrease by 6.5% and herbal antibiotic treatment had no effect on organoleptic milk and increased preference for milk. The conclusion of this research is that intramammary injection of binahong and betle herbal antibiotics with a concentration 4% can decrease the number of bacteria in subclinical mastitis milk of dairy cows.

Keywords: Dairy cows, Herbal Antibiotics, Binahong, Betle, Mastitis

Agricultural Production System | **AP – 004 – 2021**

Sweet Corn Performance Through Organic Farming Approach

Yugi R. Ahadiyat[a)], Okti Herliana, and Ahmad Fauzi

Universitas Jenderal Soedirman, Jl. Profesor DR. HR Boenyamin No.708, Dukuhbandong, Grendeng, Kec. Purwokerto Utara, Kabupaten Banyumas, Jawa Tengah 53122

[a)] ahadiyat.yugi@unsoed.ac.id

Abstract. Sweet corn is an adaptive plant to grow in tropical areas to produce high-marketable yields. But, the application of synthetic fertilizer to increase production indicate adverse the soil environment condition and result decline soil fertility. The objective of this study was to improve maize growth and yield by apply natural resources to reduce synthetic fertilizer. Randomized complete block design with treatments of 100% N, P, K; 50% NPK with wood vinegar (coconut shell, umbrella tree, mix both), and 100% wood vinegar (coconut shell, umbrella tree, both), and three replications were tested. Variables of growth characters i.e., plant height, leaf area, number of leaves, fresh shoot weight, and yield characters i.e., length and diameter of cob, number of seed, the weight of cob with or without husk, yield per ha, and harvest index were observed. The application of a half dose of NPK with wood vinegar resulted in the same performance on growth and yield compared to a full dose of N, P, K. To improve sweet corn performances could apply wood vinegar to reduce N, P, K synthetic fertilizer for support sustainable agriculture.

Keywords: NPK fertilizer, sweet corn, wood vinegar

Agricultural Production System | **AP – 005 – 2021**

Estimation of Varian Component, Heritability and Correlation to Determine Selection Criteria in F5 Population of Yardlong Bean

Syaiful Anwar, Florentina Kusmiyati[a)], and Dwi Retno Lukiwati

Diponegoro University, Jl. Prof. Sudarto No.13, Tembalang, Kec. Tembalang, Kota Semarang, Jawa Tengah 50275

[a)] fkusmiyati@live.undip.ac.id

Abstract. Yardlong bean pod is very popular vegetable. There are various colour of young pod such as green, whitish green and red. Each variety has different nutrient quality. Artificial crossing had already done between red and green colour of yardlong bean to get F1 population. Information on varian component, heritability, and correlation between quantitative characters with yield are important to support the selection program. The research objective was to estimate varian component, heritability and correlation on agronomic characters to determine the criteria of selection in F5 population of yardlong bean. Agronomic characters observed were plant height, number of leaves, number of branches, number of pods, pod length, number of seed and weight of 100 seeds. The results showed that number of leaves, number of pod and weight of 100 seeds had a high broad sense heritability. Only number of pods had broad genetic variability. Number of pods had correlation with number of 100 seeds. Based on genetic variabilty, heritability and correlation analysis, character that can be used as selection criteria in this study was number of pods.

Keywords: number of pods, heritability, correlation, genetic variability, yardlong bean

Agricultural Production System | **AP – 006 – 2021**

Effect of Honey-Egg Yolk Diluent on Spermatozoa Quality of Limousine Cattle

Lilis Hartati[1, a)], Muhammad Riyadhi[2, b)], and Nuur Amalia[3]

[1]*Department of Animal Science, Agriculture Faculty, Tidar University, Jl Kapten Suparman No 39 Magelang, Indonesia*
[2]*Department of Animal Science, Agriculture Faculty, Lambung Mangkurat University, Jl Ahmad Yani Km 36 Banjarbaru, Indonesia*
[3]*Alumni of Department of Animal Science, Agriculture Faculty, Lambung Mangkurat University.Jl Ahmad Yani Km 36 Banjarbaru, Indonesia*

[a)] Corresponding author: lilis.hartati@untidar.ac.id
[b)] mriyadhi@ulm.ac.id

Abstract. The aims of study to test honey-egg yolk as an alternative diluent for Limousine beef semen. This study was conducted using a completely randomized design (CRD) with four treatments and six replications. The diluent treatments were grouped into four groups of concentration, namely Lactose + Egg Yolk with a ratio of 80:20 as P0, Honey + Aquabidestilata + Egg Yolk (3:77:20) as P1, Honey + Aquabidestilata + Egg Yolk (4:76: 20) as P2, and Honey + Aquabidestilata + Egg Yolk (5:75:20) as P3. The data obtained were analyzed using a Completely Randomized Design (CRD) analysis of variance. The treatment that showed a significant effect was continued by a mean difference test using the Least Significant Difference (LSD) test. The results showed that there was no significant difference in the results of preservation using Lactose + Egg Yolk compared to Honey +Aquabidestilata + Egg Yolk on the live percentage and sperm motility of Limousine cattle. Honey can be used as an energy source in alternative diluents that can maintain the quality of Limousine beef semen during preservation and can be used as a substitute for synthetic chemical diluents.

Agricultural Production System | **AP – 007 – 2021**

The Effect of Addition of Betle Leaf Extract (*Piper betel Linn*) to the Quality of Native Chicken Sperm

Yudhistira Indra Pratama[a)], Zurriyatina Qurrota A'yun, Ginar Rosita, Laras Nur Pawestri, Umi Fadilah, and Yosephine Laura R. E. N.

Tidar University, Jl. Kapten Suparman No.39, Tuguran, Potrobangsan, Kec. Magelang Utara, Kota Magelang, Jawa Tengah 56116

[a)] yudhistiraindra68@gmail.com

Abstract. Increasing Indonesia's native chicken population is needed to make this kind of chicken as a food source. The way to make the population increase is by using artificial insemination. Artificial insemination needs sperm dilution to increase the amount of semen that can be used. In sperm dilution need various kind of materials to maintain the semen quality also to extend life period of the semen itself. Spermatozoa could not live longer without supporting elements such as glucose, sorbitol, and organic ions like Na, Cl, K and Mg. These elements support sperm live ability in semen, and it is comfort place for microorganism to grow, then it can contaminate the spermatozoa. Alternative components can be alternative to reduce the microorganism growth. Betel leaves contain eugenol that can used as antibacterial on semen's diluents. The research was objected to find the best level of addition betel leaf extract on physiological NaCl to be added on native chicken semen as diluents on 50C. Method that used was experimental method with complete randomized design of a split–plot pattern consists of 4 treatments (0%, 1%, 2,5%, and 4%) as main plot and 5 storage times (0 hours, 2 hours, 4 hours,6 hours. and 8 hours) as sub plot which was repeated 5 times. The results were analyzed by analysis of variance and followed by the DMRT test. The variables tested were motility, viability, abnormality, and pH addition of betel leaf extract doesn't have any significant effect($P>0,05$) on every variable tested. The storage time had significant effect ($P<0,05$) on motility and pH. On the other hand, there's no significant effect on abnormality and viability.

Keywords: Native chicken, Diluent, Betel Leaf Extract, Semen Quality

Agricultural Production System | **AP – 008 – 2021**

Installation and Practical Operation of Wooden Water Wheels for Sustainable Agriculture Irrigation

Arrizka Yanuar Adipradana[1, a)], Hery Teguh Setiawan[2], and Apanggi Mustakhim[1]

[1]*Civil Engineering, Tidar University, Jl. Kapten Suparman No.39, Tuguran, Potrobangsan, Kec. Magelang Utara, Kota Magelang, Jawa Tengah 56116*
[2]*Electrical Engineering, Tidar University, Jl. Kapten Suparman No.39, Tuguran, Potrobangsan, Kec. Magelang Utara, Kota Magelang, Jawa Tengah 56116*

[a)] arrizka.yanuar@untidar.ac.id

Abstract. Farmers in Magelang Regency face the distribution of irrigation water issue that never reaches the paddy fields. This poses a threat to local food security. There have been efforts made by Farmers to overcome this issue by making wooden water wheels whose design has been passed down from generation to generation from their ancestors, however, the work has no longer excellent. The performance of the water wheel is analyzed by measuring the hydraulic parameters of the river and the volume of water from the bucket of the wheel. Flow velocity, river cross-sectional area, and flow rate were measured in the field using a current meter and depth meter. The water-lifting discharge calculated by measuring the volume per unit time. The investigation was carried out in the Gending River, Bondowoso Village, Magelang Regency. As for the results of the study, the smallest flow velocity was 0.43 m/s and the largest was 0.54 m/s, the smallest flow rate was 2.38 m^3/s and the largest was 3.31 m^3/s, while the smallest water-lifting discharge was 0.000073 m^3/s. and the largest is 0.000163 m^3/s

Agricultural Production System | **AP – 009 – 2021**

Cortisol Hormones Profiles in Dairy Cows Under Repeat Breeding

Yosephine Laura Raynardia Esti Nugrahini[a)], Tholibah Mujtahidah, and Aqil Adyatama

Tidar University, Jl. Kapten Suparman No.39, Tuguran, Potrobangsan, Kec. Magelang Utara, Kota Magelang, Jawa Tengah 56116

[a)] yosephine.laura@untidar.ac.id

Abstract. Low milk production in Indonesia can cause by physiological stress that leads by nutrient deficiency in dairy cow. It is important to know the stress degree in dairy cow by evaluate the cortisol as stress hormone under repeat breeding condition. This study aims to find out whether any correlations between cortisol hormone detected from the blood and faeces of Friesian Holstein Crossbreed dairy cow from small holder livestock groups that have been exposed with long nutrient deficiency. This long and continue stress has an impact on reproductive disorders of repeat breeding. Positive correlation obtained from this study can be used as a reference for the development of non-invasive methods to determine hormone content in livestock. Forty samples of blood from eight females of Friesian Holstein Crossbreed dairy cows with repeated mating disorders were taken every morning (07.00 a.m.), the faeces also collected 24h later. Blood serum collected from blood that already preserved about 24 hand faeces was preserved in freeze dry condition about 7 days. Freeze dried faeces then extracted through maceration method with ethanol. The blood serum and faeces extraction were analyzed with Cortisol kit hormone using ELISA and analyzed by repeated measurement and correlation. Data showed that Cortisol hormone collection sample from faeces did not affect by the number of cows and repeated days but Cortisol from serum samples affected by the cows. Cortisol average from faeces sample was 634,160 ng/ml and from serum sample was 411,365 ng/ml. Correlation between Cortisol hormone from faeces and serum had positive and low correlation with coefficient correlation 0,242. It can be concluded that evaluate Cortisol profile should identify the cow condition and suggested through bloodserum.

Agricultural Production System | **AP – 010 – 2021**

Effect of Application of Types Fertilizer and Number of Seeds Per Hill on Production of Wheat (*Triticum aestivum* L.) Dewata 162 Variety

Vatjarjinanto[a)], Agus Suprapto, and Siti Nurul Iftitah

Tidar University, Jl. Kapten Suparman No.39, Tuguran, Potrobangsan, Kec. Magelang Utara, Kota Magelang, Jawa Tengah 56116

[a)] vatjarjinanto@gmail.com

Abstract. Wheat production in Indonesia is still low and has not been able to meet the needs of the community. Fertilization is an activity of providing organic and inorganic materials into the soil to replace nutrient losses from the soil, while the provision of seeds per hole can determine the right plant population. The purpose of this study was to determine the effect of the type of fertilizer and the number of seeds per hill on increasing the production of wheat (*Triticumaestivum* L.) Dewata 162 varieties. This research used a factorial experiment (4 x 2) arranged in a completely randomized block design and repeated three times. The first factor, kind of fertilizer; cow manure, chicken manure, goat manure and NPK. The second factor, number of seeds per hill; one seed and two seeds per planting hill. The results exhibited that the provision of fertilizer affects some parameters like the number of tillers, the number of productive tillers, plant height, panicle length, dry seed weight per clump, and 1,000 dry seed weight, but it has the same effect on dry seed weight per panicle and dry kernels weight perm2. The provisions of chicken manure give the highest outcome to the production of wheat on number of tillers, the number of productive tillers, panicle length and 1,000 dry seed weight. NPK gives the highest outcome on plant height and dry seed weight per clump. The treatment of number of seeds per hill gave the same effect on all observed parameters. There was no interaction between various fertilizer treatments and the number of seeds per hill in all observed parameters.

Keywords: fertilizer, seeds per hole, wheat.

Agricultural Production System | **AP – 011 – 2021**

Genetic Characterization of Soybean Lines Obtained from Pure Line Selection Based on RAPD Marker

Alice Yuniaty[a)], Salam Permadi, Ponendi Hidayat, and Agus Hery Susanto

Jendral Soedirman University, Jl. Profesor DR. HR Boenyamin No.708, Dukuhbandong, Grendeng, Kec. Purwokerto Utara, Kabupaten Banyumas, Jawa Tengah 53122

[a)] alice.yuniaty@unsoed.ac.id

Abtract. Three soybean lines resulting from pure line selection of mixture local seeds were evaluated using the RAPD technique. Two local varieties, Slamet and Grobogan were used as comparison. The aims of the study were to assess genetic diversity of three soybean lines, i.e., line No.02, No.76, and No71 as well as to determine the genetic relationship of the soybean lines with local varieties, i.e., Slamet and Grobogan. Although low level of polymorphism was observed among the five soybean samples, the RAPD technique was able to detect differences between lines and varieties used in this study.

Agricultural Production System | **AP – 012 – 2021**

Effect of Live Food, *Chaetoceros gracilis* and *Skeletonema costatum* Cultured by Washing Cell Seed Technology on Developmental and Survial Rate of Tiger Prawn (*Panaeus monodon*) Larvae

Diana Chilmawati[a)], and Suminto Suminto

Universitas Diponegoro, Jl. Prof. Sudarto No.13, Tembalang, Kec. Tembalang, Kota Semarang, Jawa Tengah 50275

[a)] dianachilmawati@yahoo.com

Abstract. The tiger prawn culture of *Penaeus monodon* in brackish water pond is a shrimp production effort that potential to be continuously developed as main export product of Indonesian fisheries. The demand production of shrimp larvae of Post Larval-12 (PL-10) from Hatchery are continuously increasing for the brackish water pond culture. Live food production of microalgae cells, *C. gacilis* and *S. costatum* are very importance in hatchery as live food for shrimp larvae at N-5/6 till M-3, but microalgae cells of diatom culture often to be contaminated by microorganisms as such bacteria coexistence. In addition, by using the washing technology of cells seed to be increasing mass production of diatom cells not only quantity but also their quality. However, the utilization of live food in the *feeding regime* with the best quality can be increase the production and quality of tiger prawn larvae. The objective of this research was to evaluate and to examine the technology application of washing cells seed of microalgae, *C. Gracilis* and *S. Costatum* in the *feeding regime* of shrimp prawn larvae, and also to know the best level of washing cell seed that was given developing and survival rate in the culture of tiger prawn larvae. Technology application of washing cell seed in the *Feeding Regime* of shrimp larvae was significantly effect($p<0,05$) on the development and survival rate of tiger prawn larvae of *Penaeus monodon*, both in stadia M-3 and stadia PL-10. Seed was hitting the diatom cells that conducted three (3) times were highest value of survival rate of tiger prawn larvae from N-5/6 till M-3 of 85,5±1,3 and from i M-3 till PL-10 of 73,8±3,3%.

Keywords: Washing cells seed, *C. gracilis*, *S. costatum*, Feeding Regimes, *Penaeus monodon*

Agricultural Production System | **AP – 013 – 2021**

Population Dynamic of Bacteria in The Diatom Mass Culture of *Chaetoceros gracilis* and *Skeletonema costatum* Using with and without Washing Technology of Cells Seed

Suminto Suminto and Diana Chilmawati

Universitas Diponegoro, Jl. Prof. Sudarto No.13, Tembalang, Kec. Tembalang, Kota Semarang, Jawa Tengah 50275

[a)] suminto57@gmail.com

Abstract. In the diatom mass culture of *Chaetoceros gracilis* and *Skeletonema costatum*, often to be contaminated by bacteria coexistences, there are the decreasing quantity and quality of diatom cells in the culture. Relation of the above, if utilization of cells diatom contaminated by bacteria that used as feeding strategy for larval fish or shrimp in the hatcheries will be affected on the growth and survival rate of fish and shrimp larvae culturing in hatchery. The population dynamic of bacteria coexistence on the mass culture of diatom cells not much information yet. However, this research was to know the population role of bacteria coexistence in the mass culture of diatom cells that use seeds with both of washing cells and without washing cells methods. Diatom cells seed of *C. Gracilis* and *S.costatum* were taken from cells culture stocks of Live Food of The Biggest Institute of Brackish water Aquaculture at Jepara Central Java. The part of those cells seed was taken and washed by planting in the agar plate containing Guilard media. Before cultivation for 3-5 days, those cells were taken by sterilized pipette and then added into the glass tub and Erlenmeyer flask for growing the diatom cells seed. Both of diatom cells seed were planted into five transparent fibre glasses containing Walne media of 10 L in volume, respectively. Those cells diatom was cultured in outdoor condition with aeration and directly of sun light. The initial density of both microalgae cells was 1 x10^4 cell/mL, and then every day was taken the water sample for calculation and identification of bacteria population. The result shown that by washing technology of cells seed in the culture were significantly different ($p<0.05$) in smallest density of bacteria in the diatom cell culture than that without by washing technology of cells seed. The population of bacteria coexistence in the diatom cell culture of *C. Gracilis* with washing technology of cell seed (105 CFU/mL) was smallest than that of without the washing technology of cell seed (107CFU/mL). In the same pattern, there was became also in the culture of cell diatom, *S. costatum*. Identification of bacteria coexistence in the diatom cells culture was dominated by 4-5 genus with namely abbreviated as *Bacillus* sp., *Alteromonas* sp., *Moraxella* sp., *Kurthia* sp., and *Flavobacterium* sp., respectively.

Keywords: washing cells, bacteria population, mass culture, *C. gracilis*, *S. costatum*

Agricultural Production System | **AP – 014 – 2021**

Enhancement of Plant Antioxidant Defense System and Rice Production

Budi Adi Kristanto, Karno Karno, Didik Wisnu Widjajanto, Endang Dwi Purbajanti, and Cindy Deviana Hariadi

Universitas Diponegoro, Jl. Prof. Sudarto No.13, Tembalang, Kec. Tembalang, Kota Semarang, Jawa Tengah 50275

[a)] budiadikrist@yahoo.com

Abstract. Global climate change, which has an impact on drought, water logging and flooding, alternately causes a decrease in rice production and changes in rice production patterns. Changes in rice production patterns lead to changes in rice supply and food security and sovereignty. Plants have a defense system against these stresses, and the ability of plant resistance can be increased through the application of silica. The purpose of this study was to examine the response of the defense system of rice plants and rice production due to the application of silica to be important as an effort to maintain soil fertility and productivity as well as rice productivity and production. The research was conducted at the Greenhouse and Laboratory of Physiology and Plant Breeding, Faculty of Animal Husbandry and Agriculture, Diponegoro University. This study used a completely randomized design with a 2x3 factorial, which was repeated 3 times. The first factor is water management which consists of 3 levels, namely always in 5 cm deep puddles (CWL), always wet, 0-2 cm deep puddles (SRI) and alternating between being inundated as deep as 5 cm and dry below field capacity, with time intervals. 5 days (AWD). The second factor is silica dose which consists of 2 levels, namely S1 (without silica application, 0 kg SiO2/ha) and(S2) silica application at 400 kg SiO2/ha. Parameters observed were length, fresh weight, dry weight and root volume, lignin content and total root phenolic, total grain amount, number of pithy grains, percentage of pithy grain, weight of grain per clump, weight of 1,000 grains. The research data were analyzed using analysis of variance and continued with Duncan's Multiple Distance Test. The results showed that the application of silica increased length, fresh weight, dry weight and root volume, total grain amount, number of pithy grains, percentage of pithy grain, grain weight per clump, weight of 1,000 grains in the three water treatments. Silica application increased the lignin content and total phenolic content of rice roots which was associated with increased resistance to oxygen loss.

Keywords: silica, water management, plant defense system, grain production

Agricultural Production System | **AP – 015 – 2021**

The Dynamics of Competitiveness of Indonesian Clove Towards Malaysia in The International Market

Yustirania Septiani, Rr. Retno Sugiharti, and Nadia Auliani Santoso

Universitas Tidar, Jl. Kapten Suparman No.39, Tuguran, Potrobangsan, Kec. Magelang Utara, Kota Magelang, Jawa Tengah 56116

[a)] retno.sugiharti@untidar.ac.id

Abstract. To be able to compete in the international market requires a competitive advantage over the products traded. As one of the top 10 spice-exporting countries in the world, Indonesia's competitive advantage is said to be one of the spices, especially cloves. Unfortunately, the quality of cloves from Indonesia has not met the quality standards of export products, this can be seen in the consistency of the trade balance deficit over the last few years. This study aims to analyze the competitiveness of Indonesian cloves against Malaysia in the international market in the 2009-2018 observation period using the RCA, EPD and ISP methods. The calculation results show that Indonesia has the prospect of competitive advantage or high competitiveness in the international market. Indonesia's clove commodity has a strong competitiveness and Indonesia tends to be an exporting country of clove commodity, compared to Malaysia which has low competitiveness and tends to be an importer of clove commodity. However, based on standard growth, Indonesia is relatively lower than Malaysia, this condition is due to traditional techniques that are still used in Indonesia so that clove growth is relatively slow.

Keywords: international trade, export, competitive advantage, cloves

www. isfa.ift.or.id

International Symposium Food Sel, 31 Agu jam 14.36

Kepada:
ikesitoresmi@yahoo.co.id

Dear fellow academia,

How are you? We hope that you are all well.
As all we are aware, ISFA is approaching to be held on 14 - 15 September 2021 via Zoom.
On 14 September, the keynote speakers will share their espertises while on 15 September, it will be your great day to present your valuable works. Please find below the agenda of the two days ISFA 2021.

AGENDA
14 September 2021
07.00 – 08.00 : Registration
08.00 – 09.00 : - Opening
- Welcome Speech by Chairperson
- Welcome Speech by Rector
09.00 – 10.00 : Keynote speaker 1 Prof Indrawati Oey
University of Otago in Dunedin, New Zealand
10.00 – 10.15 : Coffee Break
10.15 – 11.15 : Keynote speaker 2 Prof Peter Batt
Curtin University in Curtin, Australia
11.15 – 12.15 : Keynote speaker 3 Prof Shigeru Hayakawa
Kagawa University Japan
12.15 – 13.00 : Lunch
13.00 – 14.00 : Keynote speaker 4 Prof Maurice Ku
National Chiayi University, Taiwan
14.00 – 15.00 : Keynote speaker 5 Dr Hii Ching Lik
Nottingham University, Malaysia
15.00 – 15.15 : Coffee break
15.15 – 16.15 : Keynote speaker 6 Prof Joost van den Borne

International Symposium Food and Bio-Diversity
isfa@ift.or.id
+62 822-2123-8423
+ Tambah ke kontak

INTERNATIONAL SYMPOSIUM ON FOOD AND AGRO-BIODIVERSITY (ISFA) 2021
Office: Building B 3rd Floor, Department of Food Technology, Universitas Diponegoro
Jl. Prof. Soedarto, Tembalang, Semarang Indonesia – 50275
E-mail: isfa@ift.or.id Website: www.isfa.ift.or.id

Semarang, 31 August 2021

LETTER OF ACCEPTANCE

Dear Ms Purbowati, I. S. M.
Jendral Soedirman University

Thank you for submitting an abstract for presentation at the **International Symposium on Food and Agro-biodiversity (ISFA) 2021.** On behalf of the Organising and Scientific Committees of ISFA 2021, we are pleased to advise you that your abstract entitled:

Evaluation of Toxicity, Antibacterial and Antioxidant Activity of Fragrant Lemongrass Extract (*Cymbopogon Nardus L.*) (paper ID FP-012-2021)

has been accepted into the Symposium program as an Oral Presentation on **15 September 2021** via Zoom meeting. Please mention your paper ID FP-012-2021 in any communication with the committee. As we will publish a proceeding of ISFA 2021 by AIP publishing, we are expecting that you submit your article before 12 September 2021 by uploading through this link. Please make sure that you prepare an article by following the guidance and templates as provided in this link.

Please keep updated on ISFA 2021 by monitoring the symposium website at www.isfa.ift.or.id. Should you have any question regarding the symposium please do not hesitate to email us at isfa@ift.or.id.

With your valued contribution, we look forward to a successful symposium.

Kind regards,

Setya Budi Muhammad Abduh, PhD
Chairperson of ISFA 2021

Characteristics of *Cymbopogon nardus* L. extract with variations in leaf withering time

Cite as: AIP Conference Proceedings **2586**, 060014 (2023); https://doi.org/10.1063/5.0106591
Published Online: 24 January 2023

Ike Sitoremi Mulyo Purbowati, Ali Maksum, Gunawan Wijonarko, et al.

Characteristics of *Cymbopogon Nardus* L. Extract with Variations in Leaf Withering Time

Ike Sitoremi Mulyo Purbowati [1, a)], Ali Maksum[2], Gunawan Wijonarko[1], and Rumpoko Wicaksono[2],

[1]*Food Processing Technology Laboratory, Department of Agriculture Technology Faculty of Agriculture, Universitas Jenderal Soedirman. Dr Suparno Street, Karangwangkal, Purwokerto 53123, Indonesia*

[2]*Industrial Technology and Management Laboratory, Department of Agriculture Technology Faculty of Agriculture, Universitas Jenderal Soedirman. Dr Suparno Street, Karangwangkal, Purwokerto 53123, Indonesia*

[a)] Corresponding author: ikesitoresmi@yahoo.co.id

Abstract. The focus of this study was to evaluate the effect of variation level of withering leaf on the bioactive compounds of fragrant lemongrass *(Cymbopogon Nardus L.)* as antioxidant and antibacterial agents. The study was conducted with 4 levels of leaf withering times, namely: fresh, 24, 48, and 72 hours. The observed parameters were color, pH, phytochemical content, free radical trapping capacity (DPPH) and antibacterial activity. Antibacterial tests were done against *Staphylococcus aureus* and *Escherichia coli.* The data obtained were analyzed using analysis of variance (ANOVA) and further test DMRT (Duncan Multiple Range Test). The phytochemical content of the extracts from all withering times were as follows: tannins, alkaloid, flavonoid, and steroid. The best results from this study were the 2 days of withering time which have value for pH (4), color L (52), a* (60), b* (-14), and antioxidant activity (44.37%). The extract had antibacterial activity, showed by inhibitory zone 11.53±2.09 mm against *S aureus* and 20.35±1.13 mm against *E Coli* respectively for MIC 250-500 µg/mL dan MKC 300-600 µg/mL

INTRODUCTION

Citronella (*Cymbopogon nardus L.*) is one type of plant that has the potential to produce essential oils. This plant belongs to the class of grasses from the Gramineae family which in the world trade of essential oils, citronella is known as java citronella. Citronella essential oil which is the result of secondary metabolites can be obtained from the leaves and stems of the plant [1]. The need for essential oils is increasing every year along with the increasing development of modern industries such as the perfume, cosmetic, food, pharmaceutical, aromatherapy and drug industries [2].

In world trade, there are two types of citronella oil, namely the Sri Lankan type and the Javanese type. The Sri Lankan type, also called lenabatu, comes from the Cymbopogon nardus Rendle plant. The Java type called Mahapengiri comes from Java citronellal. The Mahapengiri type has shorter and larger leaves than lenabatu. In addition, the quality of the oil is better because it has higher levels of geraniol and citronellal. The use of fragrant citronella Mahapengiri is because the yield produced is more than other types of citronellas that the yield of the lenabatu variety is between 0.4 – 0.5% and Mahapengiri has a higher yield, which ranges from 0.7 – 1.6% [3].

The citronella plant produces oil in all parts of the plant, however, in this study only one part of the citronella plant was used, namely the leaf. In the citronella leaves, more oil is produced than other parts of the citronella plant. According to [4] that overall, all parts of the plant contain oil, but the leaves contain the maximum amount of oil. In addition, the oil from other parts is of lower quality.

Antioxidants and antibacterial have the potential to be developed in the pharmaceutical, beauty and food preservation industries. Antioxidants are thought to have anticancer effects [5]. The next important step that must be

The Third International Symposium on Food and Agrobiodiversity (ISFA 2021)
AIP Conf. Proc. 2586, 060014-1–060014-7; https://doi.org/10.1063/5.0106591
Published by AIP Publishing. 978-0-7354-4231-3/$30.00

taken so that citronella can be trusted to function as an antioxidant and antibacterial is to determine the toxicity, antioxidant activity, and antibacterial activity of citronella leaf extract as an initial screening test for the activity of chemical compounds in citronella leaves.

The flexibility of using citronella is still limited considering that the content of bioactive compounds in plants is usually very small based on its wet weight. For this reason, it is necessary to extract citronella leaves to facilitate its use. According to [6] Extraction of bioactive components from plant cell materials must pay attention to two important things, namely the characteristics of the bioactive components of plant cell and the extraction method used. For this reason, the factors related to the isolation of the bioactive content of the citronella leaf also play an important role in order to be efficient while maintaining its activity.

Citronella leaves are usually distilled while they are still fresh, but when the number of harvests is large, the freshly cut or pruned clumps cannot be distilled immediately, so that some of the clumps of harvest are spread out in the field or left buried in a room, which causes the clump to become half dry. or wither. This stockpiling is often carried out due to obstacles in the distillery which has a capacity that is not large or also due to the absence of a refinery that can accommodate large quantities.

Like the nature of agricultural products in general, citronella leaves are perishable. This property is due to the relatively high-water content of the material. According to [7] Citronnella's leaves have a water content of 74,70%. As the time after harvesting increases, the water content in the leaves also decreases. Withering too long can reduce the water content and oil content because the higher the temperature of the material, the more water evaporates and along with the evaporation of the essential oil.

Plant bioactive compounds are very sensitive to environmental influences such as pH, temperature, and light. The drying of roselle flowers resulted in a decrease in the antibacterial power of the material with the equation $Y = -22.93x + 122.8$ [8]. In addition, the content of bioactive compounds in the leaves also tends to decrease because it is volatile.

Distillation is a process of physically separating a mixture of two or more products that have different boiling points, by first boiling the components that have low boiling points separated from the mixture or can also be defined as the separation of the components of a mixture of two type of liquid or more based on the difference in vapor pressure of each of these compounds. The purpose of the distillation process is to obtain essential oils from aromatic plants that have etheric content that is difficult to extract under normal environmental conditions. In this study, the characterization of the citronella distillate was carried out at various times of leaf withering.

MATERIAL AND METHODS

The main ingredients used in this study were citronella leaves which were purchased at the Kedung Randu cultivation garden, Purwokerto. The test bacteria used were *Staphylococcus aureus* ATCC 25923, and *Escherichia coli* ATCC 25922., Nutrient Agar (NA) solid media, Nutrient Broth (NB) liquid media for bacterial culture propagation and maintenance.

The Extraction of *Cymbopogon nardus* L

The study begins with the preparation of tools and materials to be used in the study, followed by the extraction of citronella using the steam distillation method. The manufacturing process is citronella leaves are placed in a boiling flask and soaked with water solvent, then the top destilator and the contents of the water in the bottom destilator. Then heated desiccator and water in the distillation tank into steam. Steam passes through a pile of citronella leaves and carries the essential oil contained in the citronella leaves. The steam carrying citronella essential oil is then cooled using cooling water from the cooling water reservoir. The cooled steam turns into condensate. Cooling water from the condenser is returned to the cooling water reservoir naturally. The cooling water temperature required for the condensation process is 25°C – 30°C.

Determination of the phytochemical content of the extract

Qualitative determination of phytochemical content was carried out to determine the presence or absence of groups of active compounds contained in rosella flower petal extract, including phenolics, alkaloids, flavonoids, steroids, and tannins.

Analysis of phenolic compounds. A total of 1 mL of the sample was dripped on the spot plate and 10% NaOH was added. A red color is formed which indicates a positive test for the presence of hydroquinone phenolic compounds.

Steroid and Triterpenoid Compounds. A total of 1 mg of the dried sample was dissolved in 2 mL of chloroform. Then 10 drops of acetic anhydride and 3 drops of concentrated sulfuric acid were added to the solution. The solution was shaken slowly and left for a few minutes. A positive test is indicated by the formation of a green color (steroid compound) and a red or purple color (triterpenoids).

Alkaloids. A total of 1 mL of the sample was shaken with 10 drops of 2M H_2SO_4 and the acid layer was separated into another test tube. This acid layer is dripped on a drip plate and Mayer, Wagner and Dragendorf reagents are added which will cause white, brown and red-orange color deposits, respectively.

Tannin Compounds. A total of 1 gram of the sample was put into a beaker then added 12 mL of hot water and boiled for 15 minutes and then filtered. The filtrate was added a few mL of 1% $FeCl_3$ solution. The appearance of a dark blue or blackish green color indicates a positive tannin compound

Flavonoid Compounds. A total of 1 mL or 1 g of the sample was put into a beaker then added 100 mL of hot water and boiled for 5 minutes after which it was filtered, and the filtrate (10 mL) was added 0.5 g of magnesium powder 2 mL of alcohol chlorhydrate (a mixture of 37% HCl and ethanol). 95% with the same volume) and 20 mL of amyl alcohol. Then shaken vigorously. The formation of red, yellow and orange colors on the amyl alcohol layer indicates the presence of flavonoids.

Antioxidant activity

Testing of antioxidant activity was carried out using the Ferric Thiocyanate method [9]. A total of 0.6 mL of the extract was dissolved in 0.12 mL of 98% ethanol and 2.88 mL of a 2.51% solution of linoleic acid in ethanol. 9 mL of 40 mM phosphate buffer (pH 7) was added. The mixture was incubated in the dark at 40°C for 3 days. After incubation 0.1 mL of the solution was taken and 9.7 mL of 75% ethanol was added: 0.1 mL ammonium thiocyanate 30% and 0.1 mL 20 mM Ferrous chloride in 3.5 HCl. After incubation for 3 min, absorbance was measured at 500 nm. The degree of oxidation is measured by calculating the ratio of absorbance to blank (not with sample extract). So, the antioxidant activity is one that is reduced by the degree of oxidation. Antioxidant activity is expressed by the IC50 value, is the concentration of the extract that can inhibit the oxidation reaction up to 50%

Antibacterial activity

Determination of KHM and KBM values**.** Determination of the value of MIC (minimum inhibitory concentration) and MBC (minimum killing concentration) was carried out by the dilution method [9][10]. 1 mL of extract with various concentrations (1000 ppm to 15,000 ppm) was mixed with 1 mL of NB media containing the test bacteria. Each was put in a test tube, then incubated at 37°C for 24 hours. The concentration of the extract with no bacterial growth (clear) was visually described as the MIC value. The clear extract concentration was mixed with NA medium and poured into a petri dish, then incubated at 37°C for 24 hours. The MBC value was determined based on the smallest extract concentration where there was no bacterial colony growth in the media.

Clearance inhibitory zone**.** Twenty milliliters of sterile NA media were inoculated with 20 µL of fresh culture aged 24 hours in NB medium, shaken evenly then poured into sterile petri dishes and allowed to freeze. A total of 10 µL of rosella flower petal extract was dropped into a 6 mm paper disc, then the disc paper was placed in a petri dish containing a solid agar medium. Then the plates were incubated for 24 hours at 37°C. Observations were made by measuring the clear zone around the paper disc with a caliper which indicated the amount of antibacterial activity.

RESULT AND DISCUSSION

The qualitative composition of *Cymbopogon nardus* L as seen in Table1. The phytochemical content of the extracts from all withering times were as follows: tannins, alkaloid, flavonoid, and steroid. None of extract content with phenolic compounds. It is agreed with [11] stated that Cymbopogon have antifungal properties because of presence of secondary metabolites such as tannins, terpenes, alkaloids and flavonoids.

In extraction, the polarity of the solvent plays an important role. The polarity of the solvent is determined by the dielectric constant. The dielectric constants of water, ethanol, ethyl acetate and hexane are as follows: 80.20: 24.30; 6.02;1.89. so, the polarity of bioactive compound on extract is liked the polarity of water [12]. Tannins are phenolic compounds that tend to dissolve in water, so they tend to be polar. The tannin test showed that the tannins contained in the citronella extract were marked with a dark blue color in the citronella essential oil. Tannins function as secondary antioxidants [13]. Examination of polyphenols was negative in citronella extract.

TABLE 1 Determination of the phytochemical content of the extract

Compound	0	1 day	2 days	3 days
Phenolic	-	-	-	-
Tannin	+	+	+-	+
Flavonoid	+	+	+	+
Steroid	-	-	-	-
Alkaloid	++	++	+	+

Notes: (+) negative contains secondary metabolites, (-) negative contains secondary metabolites

The content of flavonoids in lemongrass extract with withering time of 0, 1, 2 and 3 days. Flavonoids are polar compounds because they have a number of hydroxyl groups. Flavonoids are soluble in polar solvents. The addition of concentrated hydrochloric acid during the flavonoid test serves to protonate flavonoids to form flavonoid salts. After addition of magnesium powder, positive results were indicated by a change in the color of the solution to red, yellow, orange, on the amyl layer [14].

Antibacterial activity was expressed by the diameter of the clear zone generated around the disc. Diameter <6 mm indicates the extract is inactive, while diameter >6 mm, the extract is classified as having antibacterial activity [15]. The difference in activity on bacterial growth that was tested was caused by differences in the phytochemical content in the extracts. The antibacterial activity of the extract used in this in vitro test can be higher if the active compound of the extract can be purified.

The major chemical constituents are geraniol, citral, citronellal, and citronellol [16]. Studies have demonstrated the antiviral [17], antibacterial, and antifungal activities [18] of this oil. In general, Gram-positive bacteria are more sensitive than Gram-negative bacteria [19]. So that the resulting clear zone against *S. aureus* is greater than against *E coli*. The Efficiency of *C. nardus* essential oil as an antibacterial agent was indicated by the association of citronellol and citronellal [20]. Essential oils act as antibacterial by interfering with the process of forming membranes or cell walls so that they are not formed or formed imperfectly. Essential oils that are active as antibacterial generally contain hydroxyl (-OH) and carbonyl functional groups [21].

TABLE 2. Determination of antibacterial activity

Sample	Clearance zone (mm)		MIC (ppm)		MKC (ppm)	
	S aureus	*E coli*	*S aureus*	*E coli*	*S aureus*	*E coli*
0	10.53 ± 2.19^{b}	18.35 ± 3.13^{b}	400	500	500	600
1	11.70 ± 2.01^{a}	19.28 ± 3.30^{b}	250	400	300	400
2	11.53 ± 2.09^{a}	20.35 ± 1.13^{b}	250	300	300	400
3	10.70 ± 2.0^{b}	19.58 ± 2.30^{b}	300	350	350	400
blank	0.05 ± 0.05^{c}	0.02 ± 0.04^{c}	-	-	-	-

The results showed that the withering time treatment had a significant effect on color, pH. Antioxidant activity and antibacterial activity

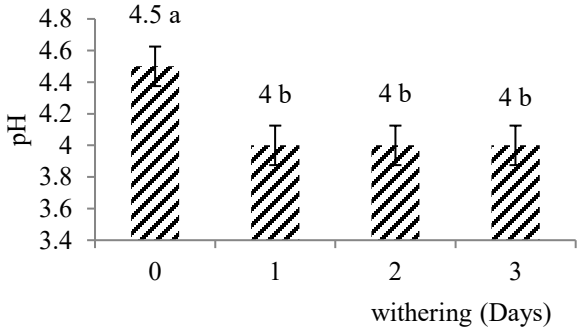

FIGURE 1. The influenced of withering time to pH value

In Figure 1 showed that the pH value of the extract looks to decrease until the withering time of 2 days and after that it rises again. Drying process preserve the sample from deterioration by microorganism and preserve its bioactive compound. It means until 2 days of withering time microorganism activities are increased [22]. The quality of the

essential oil produced can be affected by withering time or wind drying, steam pressure and the quality of the engine used [23].

Color measurement is often done with a color reader using the CIE hunter system, which is characterized by 3 parameters colors, namely the chromatic (Hue) colors of red and green which are written with notation a*, color intensity (chroma) of blue and yellow with notation b*, and brightness (lightness) with L* notation [24]. Color is an important parameter in determining oil quality. The intensity of the color is determined by how much or at least the content of certain color pigments in the oil. The color of the newly extracted essential oil is usually colorless or yellowish, but there are also reddish, green, and brown colors, depending on the type of plant extracted. If essential oils are left in contact with the air for a long time and exposed to sunlight, the oil can darken, the smell changes, over time thickens and finally resin is formed [25].

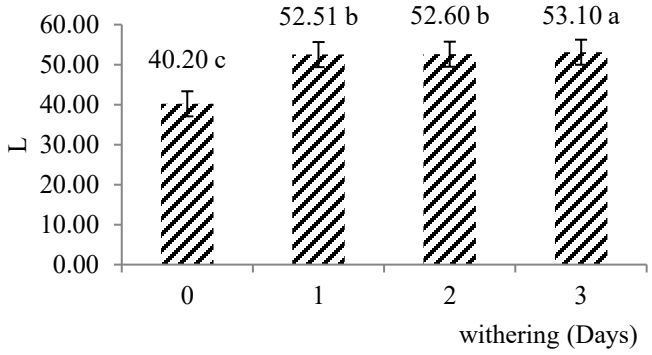

FIGURE 2. The influenced of withering time to L value (brightness)

As seen in Figure 2, L value increased with the increasing withering time. This happens because the longer the withering time, the lower the moisture content of the material. This causes bioactive compounds, especially volatile ones, to be more easily extracted because water as a binder has been reduced. After 2 days the withering time of the volatile compounds in the leaves has disappeared.

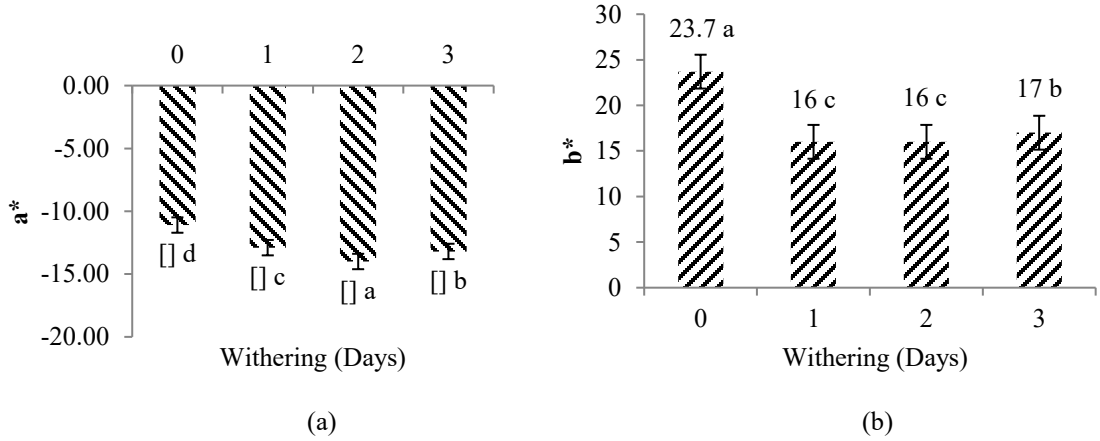

FIGURE 3. The influenced of withering time *to a** (a) and b* (b) value

CONCLUSION

Leaf withering time affects color, pH, antioxidant activity and antibacterial activity. The best result from this study was the 48 hours of withering time.

ACKNOWLEDGMENTS

Jenderal Soedirman University with research scheme: Riset Institusi Unosed 2021.

REFERENCES

1. A. Sulaswatty, M. S. Rusli, H. Abimanyu, and T. Silvester, *Tracing the Citronella Oil from Up to Downstream. In: Quo Vadis Lemongrass Oil and it's derivatives*. (Lembaga Ilmu Pengetahuan Indonesia (LIPI) Press, Jakarta, 2019), pp. 1–12.
2. Harianingsih, R. Wulandari, C. Harliyanto, and C. N. Andiani, GC-MS identification on Essential oil from Citronella (*Cymbopogon winterianus*) using methanol as solvent. Techno. **18,** 23 – 28 (2017).
3. A. G. Al-Hashimi, Antioxidant and antibacterial activities of Hibiscus sabdariffa L extract. African Journal of Food Science, Letters **6**, 506-511 (2012).
4. A. Wany, S. Jha, V. K. Nigam and D. M. Pandey, Chemical Analysis and therapeutic uses of citronella oil from *Cymbopogon winteranius*. International Journal of Advanced Research. Letters **1**, 504 – 521 (2013).
5. H. Winarsi, *Natural Antioxidants and Free Radicals*. Yogyakarta: Kanisius, (2007).
6. I.S.M Purbowati, K Syamsu, E Warsiki and HS.Rukmini. Optimizationof phenol extraction from Roselle (*Hibiscus sabdariffa*) by micrawave asissted extraction as antibacterial and antioxidant agent. J. of agricultural technologies, **26**, 9-22 (2016)
7. B. B. Sembiring, and F. Manoi, "The Effect of Withering and Refining on Citronella Oil (*Cymbopogom nardus*) Yield and Quality", in *Prosiding Seminar Nasional Swasembada Pangan Politeknik Negeri Lampung,* (ISBN 978-602-70530-2-1 447-452*,* 2015).
8. I. S. M. Purbowati, A. Maksum, and Sujiman, Antibacterial activities of phenolic compound in rosella extract (*Hisbiscus sabdariffa*) produced from variative methods and drying time, J. of agricultural technologies, **28**, 19-27 (2018).
9. M. Sharma, M. Vimal, A. Maneesha, P. J. Joshy, and K. R. Drishya, Antimicrobial screening of different extracts of south indian medicinal plants of meliacea. J Medicinal Plants Research **5**, 688-695 (2011).
10. J. H. Doughari, Antimicrobial activity of *Tamarindus indica Linn*. Tropical J Pharmaceutical Research **5**, 597-603 (2006).
11. Markom, Extraction of Hydrolysable Tannins from *Phyllantus niruri Linn*: effect of solvents and extraction methods. J. Separation and Purification Technology **52**,487-496 (2007).
12. R. Amarowicz, Tannns: the new natural antioxidants. European Journal of Lipid Science and Technology, **109**, 549–551 (2007).
13. J. B. Harborne, *Phytochemical Methods,* Bandung: Institut Teknologi Bandung (1996).
14. S. Y. Mudi, H. Ibrahim, Activity of Bryophillum pinnatum S. kurz Extracts on respiratory tract pathogenic bacteria. Bayero Journal of Pure and Applied Science **1**, 43-48 (2008).
15. S. Chanthai, S. Prachakoll, C. Ruangviriyachai and D. L. Luthria, Influence of extraction methodologies on the analysis of five major volatile aromatic compounds of citronella grass *Cymbopogon nardus* and lemongrass (*Cymbopogon Citratus*) grown in Thailand. J. AOAC Int. **95**, 763–772 (2012).
16. M.N.N. Aini,M. I. Said, I. Nazlina,M. N. Hanina, and I. B. Ahmad, Screening for antiviral activity of sweet lemon grass (*Cymbopogon nardus* (L.) rendle) Fractions, J. Biol. Sci. **6**, 507–510 (2006).
17. N. S. Nakahara, T. Alzoreky, H. T. T. Yoshihashi, Nguyen and G. Trakoontivakorn, Chemical composition and antifungal activity of essential oil from *Cymbopogon nardus (Citronella Grass*). Jpn. Agric. Res. Q., **37**, 249–252 (2013).
18. B. Welmince, M. Martosupono and F. S. Rondonuwu, "The Potential of Citronella Oil from *Cymbopogon nardus L*. as an Antibacterial Agents", In *National Seminar of Science and Technology Proceedings,* (Engineering Faculty of Muhammadiyah Jakarta University, 2015), pp. 1-8.
19. Q. Delespaul, V.G. Billerbeck, C.G. Roques, G. Michel, C. Marquier, J.M. Bessi`ere, The antifungal activity of essential oils as determined by different screening methods. J Essent Oil Res **12,** 256-266 (2000).
20. A.O. Aiyegoro, A. J. Afolayan, and A.I. Okoh, in vitro antibacterial activities of crude extracts of the leaves of helichrysum longifolium in combination with selected antibiotics. African Journal of Pharmacy and Pharmacology. Letters **3**, 293-300 (2009).

CERTIFICATE

No. 5793/UN7.5.5.2/TU/2021.

Hereby proudly presented to

Dr Ike Sitoresmi Mulyo Purbowati, S.TP, M.Sc

as a presenter in the 3rd International Symposium on Food and Agro-biodiversity (the 3rd ISFA) on 14-15 September 2021

Professor Bambang Waluyo Hadi Eko Prasetiyono

Faculty Dean of Animal and Agricultural Sciences
Universitas Diponegoro

Dr Setya Budi Muhammad Abduh

Chairperson of ISFA 2021

21. D. Ermaya, Irmayanti, N. Salfauqi, P. Sri, and Bintamat, "The Effect of Withering and Duration of Distilation on the Quality of Citronella Oil (*Cymbopogom nardus*) in Makmur Jaya Village, Terangun-Gayo Lues District" in *National Seminar of USM II*, (Serambi Mekah University, 2017), pp. 212–213.
22. N, Andarwulan, F, Kusnandar, D Herawati. Pharmacodynamic properties of essential oils from cymbopogon species. Afr. J. Pharm. Pharmacol. **5, (**2011).
23. J. Adiandasari, Wusnah, and Azhari, The effect of temperature and duration time of refining process on citronella oil (Cimbopogon nardus l.). Chemical Engineering Journal Storage **1**, 22-28 (2021).
24. J. Baggenstoss, L. Poisson, R. Kaegi, R. Perren, and F. Escher, Coffee Roasting and Aroma Formation: Application of Different Time-Temperature Conditions. Journal of Agricultural and Food Chemistry **56,** 5836–5846 (2008).
25. Putri, D.P., Wahyuningtyas, A.P., Al-Baarri, A.N., Maharani, N. Potravinarstvo Slovak Journal of Food Sciences, **15**, 1049-1055. (2021)