BOOK OF ABSTRACTS

VICSAT 1st 2021

The Virtual International Conference on Science and Agricultural Technology for students

Faculty of Science and Agricultural Technology
Rajamangala University of Technology Lanna, Thailand

BOOK OF ABSTRACTS:

THE VIRTUAL INTERNATIONAL CONFERENCE ON SCIENCE AND AGRICULTURAL TECHNOLOGY FOR STUDENTS 2021

March 24, 2021: Chiang Mai, Thailand

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Opening remarks
International academic conference
The Virtual International Conference on Science and Agricultural Technology for Students 2021

Associate Professor Silsiri Sangachit
President of Rajamangala University of Technology Lanna, Thailand

Dear Invite speaker, the committee, lecturers, students and distinguished guests who listen to the presentations.

I am delighted and honored to be in the opening ceremony of The Virtual International Conference on Science and Agricultural Technology 2021.

According to the Ministry of Higher Education, Science, Research and Innovation (MHESI) has set a vision “To be a leading organization to drive Thai higher education, science, research and innovation to international standards, and increase the competitiveness at the international level in a sustainable way by the year 2037”; causing all universities to adapt and adjust their working strategies in line with the aforementioned vision. Organizing the Virtual International Conference on Science and Agricultural Technology 2021 online through the Microsoft Team this time, it is an innovative presentation that will allow students to bring their work from conducting knowledge studies to apply in various ways on the problems of communities in term of special problems, research projects or thesis or independent study that reflect the academic competency of the learners to achieve the standard of the curriculum. It is also a good opportunity for us to building an academic network at the international level with those academic institutions from Australia, Indonesia, Japan, Sri Lanka, and Taiwan; to promote both language competencies, and the 21st-century skills from their real experiences, to strengthen international academic works among domestic and international educational institutions. This will result in the exchange of knowledge and experience of participants, as well as creating inspiration to create quality works in line with the strategy of the Ministry of Higher Education, Science, Research and Innovation to step-up to achieve the international level shortly.

Now is the right time to open the Virtual International Conference on Science and Agricultural Technology for Students 2021

Statement of reports at the opening ceremony
The Virtual International Conference on Science and Agricultural Technology for Students 2021

Associate Professor Dr. Suntorn Wittayakun
Dean: Faculty of Science and Agricultural Technology, Rajamangala University of Technology Lanna, Thailand

On behalf of the organizers of the Virtual International Conference on Science and Agricultural Technology 2021, together with the project committee; and as the dean of the Faculty of Agricultural Science and Technology, I would like to express my sincere appreciation to the President of Rajamangala University of Technology Lanna (Associate Professor Silsiri Sangachit) to preside over the opening ceremony. The objectives of the Virtual International Conference on Science and Agricultural Technology 2021 are: 1) to enhance undergraduate and graduate students to bring their research results, special problems or academic articles with the support of advisors for international presentation, 2) to provide opportunities for practical experience for students in publishing international academic works, 3) to stimulate the production of quality academic or research work to continue and publish in the Journal of Science and Agricultural Technology or other journals, and 4) to build networks and enhance cooperation among domestic and international educational institutions.

The Virtual International Conference on Science and Agricultural Technology for student 2021 are honored by four academics from both foreign and domestic educational institutions including Dr. M. Marjuki, Faculty of Animal Science, Brawijaya University, Indonesia; Dr. Julia Mayo-Ramsay, Mayo Ramsay Legal, Australia; Prof. Dr. Katsuyuki Takahashi, Faculty of Science and Engineering, Iwate University, Japan; and Dr. Sakuntala Saijai Faculty of Science and Agricultural Technology, Rajamangala University of Technology Lanna, Thailand to participate as invited speakers. We also have great contributions from the Animal Husbandry Association of Thailand, Under the Royal Patronage of H.R.H. Princess Maha Chakri Sirindhorn; Assoc. Prof. Dr.Suchon Tangtaweewipat and Asst.Prof. Dr. Tossapol Moonmanee, Faculty of Agriculture, Chiang Mai University, Thailand; Asst. Prof. Dr. Sasithon Naktong, and Asst. Prof. Dr. Patcharaporn Tinchan, Faculty of Agriculture, Kasetsart University, Kampangsaen campus, Thailand; Asst. Prof. Dr. Rachanee Nammatra, Walai-Rukhavej Botanical Research Institute, Mahasarakham University, Thailand to join us as chair persons of the conference. I would like to express my sincere appreciation to all of them for their coming and contribution. Besides, we received an excellent feedback and contribution from both Thai and international students by submitting of 33 articles for this conference consisting of: 18 articles from Thailand, 12 articles from Indonesia, 2 articles from Sri Lanka, and 1 article from Taiwan. Overall, the Virtual International Conference on Science and Agricultural Technology 2021 has a total of 37 articles presented.

The Faculty of Agricultural Science and Technology is expected that this activity will encourage students to have practical expertise in their academic work, research or innovation at the international

Again, I would like to express my deepest appreciation to the invited speakers, domestic educational institutions, international students, Thai students, RMUTL staffs, and all participants for your contribution and collaboration. The Virtual International Conference on Science and Agricultural Technology for Student 2021 would not have been possible without your supports.

Now was the right time. I would like to invite the President of Rajamangala University of Technology Lanna (Associate Professor Silsiri Sangachit) for opening remarks of the Virtual International Conference on Science and Agricultural Technology 2021.

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07.30 am - 08.30 am	**Registration**
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	Opening address: Assoc. Prof. Seensiri Sa-Ngajit, the President of Rajamangala University of Technology Lanna, Thailand
08.45 am - 10.45 am	**Part II: Invited Speaker Presentation**
Chair person:	Assist. Prof. Dr. Ni-on Chomsri: Rajamangala University of Technology Lanna, Thailand
Secretary:	Assoc. Prof. Chiti Sritontip: Rajamangala University of Technology Lanna, Thailand
Asst. Secretary:	Miss Suchada Thichuto: Student-Rajamangala University of Technology Lanna, Thailand
08.45 am - 09.15 am	**Invited Speaker I:** Agriculture: Adapting to a Changing Climate Dr. Julia Mayo-Ramsay: Mayo-Ramsay Legal, Narooma, NSW, Australia.
09.15 am - 09.45 am	**Invited Speaker II:** Precision feeding management: New approach for better and more sustainable animal production Dr. M. Marjuki: Brawijaya University, Indonesia.
09.45 am - 10.15 am	**Invited Speaker III:** Application of microbial consortia involved in ammonification and nitrification for organic hydroponics Dr. Sakuntala Saijai: Rajamangala University of Technology Lanna, Thailand.
10.15 am - 10.45 am	**Invited Speaker IV:** Use of High Voltage and Plasma for Agriculture, Forestry and Fisheries Prof. Dr. Katsuyuki Takahashi: Iwate University, Japan.
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01.00 pm - 04.00 pm	**Part III: Paper Presentation Session II and III**

* Local time in Thailand

Part III: Paper presentation

DATE: March 24, 2021

Room I: Animal Science		
Session I:		
Chair person:	Asst.Prof. Dr. Tossapol Moonmanee: Chiang Mai University, Thailand	
Secretary:	Miss. Petnamnueng Dettipponpong, M.Sc.: Rajamangala University of Technology Lanna, Thailand	
Asst. Secretary:	Miss. Suticha Wongsa: Student-Rajamangala University of Technology Lanna, Thailand	
	Mr.Wiraphat Suerma: Student-Rajamangala University of Technology Lanna,, Thailand	
Time *	**Titles**	**Authors**
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11.20 am - 11.40 am	II. Effects of Inbred Line Crossing and Substitutional Levels of Fermented Corn on Production Performance and Carcass Quality of Black Pig	Veerayuth Thanapat, Nakarin Thongsuk, Thidarath Kantamung, Panuwat Chaiyong, and Kecha Kuha
11.40 am - 12.00 am	V. Nutritive Contents and Ruminal Degradability of Ensiled Corn Husk with Microbial Juices Determined using *in Vitro* Gas Production Techniques	Pitakchai Leepradit, Natdanai Inthagun, and Wuttikorn Srakaew
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Chair person:	Assoc. Prof. Dr. Kecha Kuha: Rajamangala University of Technology Lanna, Thailand	
Secretary:	Mr. Kritsanatorn Sintala, M.Sc.: Rajamangala University of Technology Lanna, Thailand	
Asst. Secretary:	Mr. Tripob Tika: Student-Rajamangala University of Technology Lanna, Thailand	
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* Local time in Thailand

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Chair person:	Asst. Prof. Dr. Rachanee Nammatra: Mahasarakham University, Thailand	
Secretary:	Asst. Prof. Dr. Rattanaporn Norarat: Rajamangala University of Technology Lanna, Thailand	
Asst. Secretary:	Miss Indah Wahyunningsih: Student-Rajamangala University of Technology Lanna, Thailand	
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Secretary:	Dr. Sutjaritpan Boonmee: Rajamangala University of Technology Lanna, Thailand	
Asst. Secretary:	Miss.Rattikal Sanchuepaiboon: Student-Rajamangala University of Technology Lanna, Thailand	
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Secretary:	Dr. Tanapoom Laojunta: Rajamangala University of Technology Lanna, Thailand	
Asst. Secretary:	Miss.Rattikal Sanchuepaiboon: Student-Rajamangala University of Technology Lanna, Thailand	
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* Local time in Thailand

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Room III: Food Science and Technology		
Session I:		
Chair person:	Dr. Sutthida Panya-in: Rajamangala University of Technology Lanna, Thailand	
Secretary:	Dr. Sekson Wongsiri: Rajamangala University of Technology Lanna, Thailand	
Asst. Secretary:	Miss Palida Wongsuwan: Student-Rajamangala University of Technology Lanna, Thailand	
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Secretary:	Asst. Prof. Dr. Patcharaporn Tinchan: Kasetsart University, Thailand	
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Secretary:	Dr. Tunyaluk Bouphun: Rajamangala University of Technology Lanna, Thailand	
Assist. Secretary:	Mr. Surakiat Khumphanalaisathit : Student-Rajamangala University of Technology Lanna, Thailand	
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Chair person:	Dr. Paweeya Raknim: Rajamangala University of Technology Lanna, Thailand	
Secretary:	Asst.Prof. Rung Mulom: Rajamangala University of Technology Lanna, Thailand	
Asst. Secretary:	Miss.Thanyaret Thammachat: Student-Rajamangala University of Technology Lanna, Thailand	
Time *	**Titles**	**Authors**
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Secretary:	Miss Wiraiwan Sanchana: Rajamangala University of Technology Lanna, Thailand	
Asst. Secretary:	Mr. Jakkri Muangsan : Student-Rajamangala University of Technology Lanna, Thailand	
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Invited Speaker

Agriculture: Adapting to a Changing Climate

Dr. Julia Mayo-Ramsay[1],
[1]*Mayo Ramsay Legal, PO Box 263, NAROOMA, 2546, AUSTRALIA*
Corresponding email: jpmayo@bigpond.com

Abstract

Climate change is having a severe effect on agriculture around the world. The seasons are shifting, droughts are increasing and heavy rains and storms intensifying. Australia as a leading agricultural nation is suffering severely from the impacts of climate change. The past few decades have seen Australia ravaged by prolonged droughts, damaging storms, forest fires, and severe flooding. Farmers, many of who were once skeptical, are now searching for answers. Yet agriculture, through anthropogenic greenhouse gas emissions and by the conversion of non-agricultural lands, such as forests, into agricultural land is a large contributor towards climate change. Land cleared for agriculture and stock can no longer support or sustain the heavy stocking of sheep and cattle it once did. Crops are failing and liberal water use crops, such as cotton and rice, need to be reassessed or shifted to alternate areas. The immense irrigation areas, where the bulk of Australian fruit is grown, may no longer be sustainable. The tillage of soil and planting of broadacre crops like barley, wheat, and oats, also needs to be managed differently in the future. If farmers are to remain viable in the next decade and beyond, traditional farming practices must change and farmers need to find ways to mitigate the effects of climate change. Whilst this may be problematic for some, it also opens up exciting new ventures and infinite possibilities. This paper looks at the effects of climate change on Australian agriculture along with possible alternatives to help survive the challenging years ahead.

Keywords: climate change, agriculture, mitigation, Australia.

Precision Feeding Management: New Approach for Better and More Sustainable Animal Production

M. Marjuki[1] and S. Wittayakun[2]

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[2] *Faculty of Science and Agricultural Technology, Rajamangala University of Technology Lanna, 200 Mu 17 Pichai district, Muang, Lampang 52000, Thailand.*
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Abstract

The demand for livestock products increases continuously and can not be avoided, on another side the total livestock production is still lower than the demand. The problem of livestock production has recently become more complex, as the demand for livestock is not only for its quantity but requires also high quality and healthy products for the consumers, safely and friendly for the environment, and highly sustainable for our next generation. All of these demands must be strongly related to the efficiency of feed utilization by livestock, as feed is the most major input for the livestock to maintain life and to do activity for production processes. Hence, precision feeding management must become a good approach and take very important roles to overcome all of the problems. Precision feeding is an attempt to maximize the efficiency of feed utilization by livestock by supplying the most appropriate nutrients to the livestock. Those higher efficiencies of feed utilization by livestock must consequently give some advantages including 1) minimize the amount of feed offered and reduce refusal feed by the livestock, hence the available feeds can be used to rear more livestock to multiply livestock products, 2) increase livestock productivity with less feed cost, hence increase income and benefit, 3) reduce livestock waste including feces, urine and also ammonia and methane gas, hence make a better of environment, and finally all of those advantages must lead to more socially, economically, and environmentally sustainable animal production systems.

Keywords: precision, farming, environment, sustainability

Application of Microbial Consortia Involved in Ammonification and Nitrification for Organic Hydroponics

Sakuntala Saijai[1]*

[1] *Faculty of Science and Agricultural Technology, Rajamangala University of Technology Lanna, 128 Huay Kaew Road, Muang, Chiang Mai, 50300, Thailand*
**Corresponding email: Sakuntala.saijai@gmail.com*

Abstract

Hydroponic has been widely used for vegetable cultivation. Its advantage includes the easy control of nutrients in the hydroponic solution. The application of hydroponic also helps prevent soil-borne diseases, pests, and weeds, which leads to reduced use of herbicides. However, in conventional hydroponics, organic fertilizers have phytotoxic effects that lead to poor plant growth and are difficult to use because of the lack of a microbial community that degrades and mineralizes organic nitrogen compounds into nitrate ions (NO_3^-). Recently, a novel method for organic nitrogen compounds-mineralization in a hydroponic solution using enriched soil microorganisms with high nitrifying activity was established. Organic hydroponic is one of a soilless crop cultivation technique and expected to be used instead of traditional agricultural practices. Organic hydroponics consist of the nitrification process which is the enrichment process of the microbial community for mineralizing organic compounds and the crop cultivation process with maintaining the enriched nitrifying microbial community. The analysis of microbial consortia involved in ammonification and nitrification is required to enable us to develop microbial consortia useful for organic hydroponics. The organic hydroponic system includes the following two processes. The first is an enrichment process of nitrifying microorganisms. The second process is crop cultivation which maintaining the enriched nitrifying microbial consortia by the addition of organic fertilizer. For successful organic hydroponics, it is necessary to efficiently produce nitrate from organic fertilizer. Therefore, the analysis of the enriched microbial consortia involved in ammonification and nitrification is required to develop efficient tools for organic hydroponics.

Keywords: organic hydroponics, microbial consortia, ammonification, nitrification

Use of High Voltage and Plasma for Agriculture, Forestry and Fisheries

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[2] *Agri-Innovation Center, Iwate University, 3-18-8 Ueda, Morioka Iwate 020-8551, Japan*
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Abstract

Applications of high voltage and plasma generated by a pulsed power technology to agriculture, forestry, and fisheries are investigated. This study has been conducted for three purposes; to improve productivity of plants in pre-harvest applications, to keep freshness of fruits and vegetables in post-harvest applications, and to improve safety and productivity in food processing applications. We will introduce some applications using high voltage and plasma with fundamental mechanisms. Plant pathogenic bacteria are inactivated and organic compounds which inhibit the growth of plants are decomposed through oxidation reactions by hydroxyl radicals and ozone produced by plasma, which reduces the infection risk during plant cultivation. Mushroom hypha molded to wooden log is stimulated by electrostatic forces induced by the high voltage pulse, and mushroom production increases approximately 1.3 times higher than control groups. Ethylene is decomposed through oxidation reactions by oxygen and hydroxyl radicals produced by the plasma. A compact and high efficient ethylene removal system is developed using a compact AC high voltage power supply and a catalyst for decomposition of ozone, a toxic by-product of plasma. Polyphenol is extracted by the destruction of anthocyanoplast, a cell membrane in which polyphenol is contained, in the grape skin by electric field induced by high voltage pulses. As same manner, membrane in the leaf of vegetables is destructed and moisture permeability of membrane can be improved, which enhances a drying speed of vegetables. Conformation of enzyme is changed by pulsed electrostatic forces and the enzyme is inactivated.

Keywords: high voltage, electric field, plasma, radical, agriculture

Animal Sciences

Pigmentation in Egg Yolk – Review

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Abstract

The Egg yolk color is created by different types of carotene pigments and egg yolk color is one of the most important factors affecting on consumer preference. Major carotene types in egg yolk are carotene a and b, zeaxanthin, cryptoxanthin, and Lutein. The consumer preference over the egg yolk color varies considerably among different geographical areas of the world. Europe and Asia prefer yolk coloration between 10 and 14 μg on the Roche Yolk color fan (RYCF) and egg yolk color play a major role in hotels and bakery industries. The major carotene types and their adsorption ratios are 50% to 60% apo-ester, 30% to 48% canthaxanthin, 17 to 28% lutein and zeaxanthin, 10 to 15% citraxanthin, 7.5% capsanthin, and 4% beta carotene. Natural or synthetic pigments are added to the hen diets to achieve the desired yolk color. Although synthetic feed pigments are abundantly available, they can cause serious health issues to consumers. Hence, the use of synthetic pigments in poultry diets is prohibited in some countries, by government regulations. natural carotene sources are more healthful, the local feed industry faces the problem of unaffordable cost to import them. Therefore it is a timely requirement to find an appropriate local and abundant carotene source. This paper reviews the scientific evidence in pigmentation sources for egg yolk color development.

Keywords: yolk color, development, pigmentation, natural, synthetic

Effects of Inbred Line Crossing and Substitutional Levels of Fermented Corn on Production Performance and Carcass Quality of Black Pig

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Abstract

The research aimed to investigate the effect of inbred line crossing of black pig and levels of substitutional fermented corn with yeast (FCY) to commercial feed on its production performance and carcass quality. The crossing line breed of black pig was DM x DM (L_1L_1), DM x PN (L_1L_2), and DM x DPYM (L_1L_3). Substitutional level of FCY was 0, 0.5, 1.0, and 1.5% of pig body weight. The 12 experimental units consisted of one male and one female of black pigs each. Pigs were feeding fully as they require and freely accessed to water nozzle all the time. The data were collected bodyweight of pig individually and weighted feed intake every week at the same time through 16 weeks of the experiment. All males after finished fattening were taken to a Municipal slaughterhouse in Nan province for studying carcass quality. Data were analyzed using a generalized linear model and tested different mean using Duncan's multiple range test. The result found that L_1L_3 black pig was a higher productive performance than those of L_1L_1 and L_1L_2 ($p<0.05$), respectively. Substitution of 1.5% FCY was affected to body weight gain, an average daily gain, and feed intake higher than those of other substitution levels significantly different ($p<0.05$). Carcass characteristics of L_1L_3 trended to have a more lean percentage than that of other line breeds ($p=0.07$) by following b-value and LSQ indexes. However, the substitutional level of FCY can be affected by carcass characteristics not significantly different. These concluded that L_1L_3 black pig should be a line of choice for fattening and can be feed FCY for 1.5% BW substitution to commercial feed.

Keywords: inbred line, crossing, black pig, performance, carcass

Nutritive Contents and Ruminal Degradability of Ensiled Corn Husk with Microbial Juices Determined using In Vitro Gas Production Techniques

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Abstract

The objective of this experiment was to conduct the effects of ensiled corn husk with microbial juices on chemical composition, ruminal degradability, and gas production kinetic. Four treatments were arranged in completely randomized design (CRD) following, T1 = non-ensiled corn husk, T2 = ensiled corn husk with 2% yeast juice (YJ) (6.90 x 10^7 CFU/ml), T3 = ensiled corn husk with 2% lactic acid bacteria juice (LBJ) (2.02 x 10^8 CFU/ml) and T4 = ensiled corn husk with 1% YJ and 1% LBJ (YJ+LBJ). The results showed that ensiled corn husk with LBJ and YJ+LBJ were the lowest pH value ($P<0.01$). CP content in all ensiled corn husks was higher than non-ensiled with showed highest in YJ and YJ+LBJ ($P<0.05$) while NDF and ADF content were trended to low in all ensiled corn husks ($P<0.01$). Gas production kinetic including b and d, and DM degradability showed highest in YJ+LBJ and slightly higher in YJ and LBJ when compared with non-ensiled corn husk ($P<0.05$). In conclusion, ensiling of corn husk with microbial juices can improve protein content and ruminal degradability.

Keywords: nutritive contents, ruminal degradability, ensiled corn husk, microbial juices

Effect of Chicken Feather Keratin on Physical Quality of Edible Film Porang

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Abstract

The purpose of this study was to determine the optimum addition of chicken feathers keratin which can provide the best physical quality of the edible film. The method in this study was a laboratory experiment with a completely randomized design (CRD) consisting of 4 treatments and 4 replications. The treatments for using chicken feather keratin in making the edible film were P1 (0.5 g), P2 (1 g), P3 (1.5 g), and P4 (2 g keratin). Data analysis was performed using Analysis of Variance (ANOVA). If there was a significant difference, it was followed by the Least Significant Difference Test (LSD). The results showed that the use of keratin in different amounts had a significant effect ($P < 0.05$) on thickness, Water Vapor Permeability (WVP), and Water Activity (Aw) but did not show a significant effect ($P > 0.05$) on the solubility of edible film. Thickness value generated in this study was 0.03125 - 0.04563 mm, solubility 20.9594 - 23.1097% , Water Vapor Permeability (WVP) 0.01579 - 0.017167 g / mm2.hours, and Water Activity (Aw) 0.75475 - 0.767. The best results were the addition of keratin as much as 2 g (P4) with a thickness value of 0.04563 mm, solubility 23.1097%, WVP 0.017167 g / mm2 hr, and Aw 0.767.

Keywords: physic, edible film, keratin

The Use of Broken Riceberry and Mulberry Leaf Meal in Semi-Free Range Layer Diets

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Abstract

This research aimed to investigate the appropriate percentage of mulberry leaf meal mixed with broken riceberry in semi-free range laying hen diets. A randomized complete block experimental design was conducted in this experiment, which block was housing model (sunshine and shade). One hundred sixty laying hens (59 weeks of age) were divided into 4 groups in each house (20 birds of each group) The laying hens in each group were randomly assigned to 4 dietary treatments as follow: Diet 1 (control group), 2, 3 and 4 which were used broken riceberry as an energy source and mixed with 0, 2, 4 and 6 percent of mulberry leaf meal respectively. There were 2 periods (28 days per period) to collect data on egg production and egg quality. In the last period, the feces of each group were randomly collected to determine the number of microorganisms (total plate count, coliform, salmonella, and lactic acid bacteria). The results showed that there was no statistical difference among the 4 groups on egg production percentage, daily feed intakes, feed conversion ratio per 1 kilogram of egg weight, feed cost per 1 kilogram of egg weight, egg weight, albumen height, haugh unit, eggshell thickness, and the number of coliforms and lactic acid bacteria in feces ($P>0.05$). However, the egg yolk color scores the highest followed by diet 3, 2, and 1 respectively ($P<0.05$).and the number of total plate count and salmonella in feces of the bird group fed with diet 4 was the lowest. ($P<0.05$). Besides, feed cost per 1 kilogram of egg weight of the group fed with diet 4 was slightly lower than other groups.

Keywords: semi-free range layer, broken riceberry, mulberry leaf meal

The Use of Broken Riceberry and Yanang (*Tiliacora triandra*) Leaf Meal in Semi-Free Range Layer Diets

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Abstract

This research aimed to investigate the appropriate percentage of yanang (*Tiliacora triandra*) leaf meal mixed with broken riceberry in semi-free range laying hen diets. A randomized complete block experimental design was conducted in this experiment, which block was housing model (sunshine and shade). One hundred ninety-two laying hens (32 weeks of age) were divided into 4 groups in each house (24 birds of each group) The laying hens in each group were randomly assigned to 4 dietary treatments as follow: Diet 1 (control group), 2, 3 and 4 which were used broken riceberry as an energy source and mixed with 0, 2, 4 and 6 percent of yanang leaf meal respectively. There were 2 periods (28 days per period) to collect data on egg production and egg quality. In the last period, the feces of each group were randomly collected to determine the number of microorganisms (total plate count, coliform, salmonella, and lactic acid bacteria). The results showed that there was no statistical difference among the 4 groups on egg production percentage, feed conversion ratio per 1 kilogram of egg weight, feed cost per 1 kilogram of egg weight, egg weight, albumen height, haugh unit, eggshell thickness, albumen percentage, egg yolk percentage, eggshell percentage and the number of total plate count, coliform, salmonella and lactic acid bacteria in feces ($P>0.05$). However, daily feed intakes of the bird group fed with diets 3 and 4 were lower than diets 1 and 2 ($P<0.05$). In addition, the egg yolk color score of the group fed with diet 4 was the highest, followed by diet 3, 2, and 1 respectively ($P<0.05$). The number of coliform in feces of the bird group fed with diet 4 was slightly lower than other groups.

Keywords: semi-free range layer, broken riceberry, yanang leaf meal

Plant Science

Soybean (*Glycine max* L.) as a Vitamin Rich Food to Boost Immune System for Post-pandemic Era

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Abstract

The immune system of the human body plays a significant role in preventing Covid-19. Gibson et. al. (2012) stated that the consumption of vitamin-rich and functional foods could boost the immune system to suppress the virus, especially in this pandemic era. This pandemic also affects the agricultural sector in Indonesia especially in food security, supply, and chain. Coping with this problem, Indonesia's government has introduced *Gerakan Ketahanan Pangan* (GKP) program to support the agricultural sector. The program focuses on primary and functional food, particularly soybeans (*Glycine max* L.). The nutrition in soybeans may become the substitute for red meat, fish, and egg that considered expensive for several people. This situation may enhance soybean farmers, specifically in Indonesia, to face the post-pandemic period anticipating the return of similar viruses or conditions. This study was a qualitative analysis using a constructivist paradigm and the data used were secondary data from literature and narrative review. The results of this study highlighted the need for immune-boosting food especially soybeans. Shortly, soybeans consider as a long-term commodity that helps the food security as well as improving the economy of the Indonesian during the Covid-19 pandemic situation.

Keywords: immune system, food security, pandemic, soybeans, agriculture

Plant Seedling Classification with Leaf Augmented Technique in Pre-Trained Deep Learning

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Abstract

The weed infestation control in cultivated crops is significant to the effectiveness of the cultivation. Consequently, the weeds restrain while they are still seedlings during the first six to eight weeks is an optimal reduction of weed infestation. The challenge of weed infestation control is to identify and classify by automated computer vision systems. Following a public image database for a benchmark of plant seedling classification algorithms provided by the engineering department, Aarhus University has adopted to train and test the model in our research. The dataset is an image of approximately 5,539 unique plants at several growth stages. The photographs belonging to 12 species have consisted of Maize, Common wheat, Sugar beet, Scentless Mayweed Common, Chickweed Shepherd's Purse, Cleavers, Redshank, Charlock, Fat Hen, Small-flowered Cranesbill, Field Pansy, Black-grass, and Loose Silky-bent. Therefore, this research had improved the classification with the pertained deep-learning model. The Xception, Resnet, Nasnet, and MobileNet have nominated to benchmarking model. This paper had proposed an augmented technique based on color segmentation and edge detection to improve the as-mentioned pre-trained deep learning model. The result of our process for plant seedlings classification in average f-1 accuracy score is 91.75%, besides the baseline at 87.5%.

Keywords: plant seedlings dataset, deep-learning, pre-trained model, image augmented, artificial neural network

Responses of Chili Pepper (*Capsicum annuum* L.) Derived from PBC80 and PBC932 Resistant Varieties to Anthracnose Disease (*Colletotrichum accutatum)*

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Abstract

Anthracnose is the major problem of postharvest diseases of chili, affected by qualities. Using chili cultivar resistance to anthracnose is prevalent in the disease. Therefore, this study aimed to evaluate the 21 chili progressive lines derived from two genetics resistant sources, and two chili fruit stages (mature green and ripe) with different inoculation methods (microinjection and spraying methods) to anthracnose *C. accutatum_Ca_KK* isolate. The experiments were designed by randomized complete block design (RCBD) with three replications and three plants per each. The disease scores were recorded and calculated to a percentage of the disease index (DI%). All chili genotypes exposed different responses to *Ca_KK* in both green and ripe fruit stages and both inoculation methods. Progressive lines derived from both genetic resistance sources found segregated resistant and susceptible responses, while susceptible check showed highly susceptible. At green fruit showed a number of resistant phenotypic responses more than the ripe fruit stage in both inoculation methods. In addition, inoculation by microinjection method found resistant variety more than spraying. Therefore, we can be grouping the chili genotype into four groups. The first group was five chili genotypes showed disease resistance with spraying inoculation method at green fruit stage. In comparison, the second one contained two chili genotypes that showed resistance in the red fruit stage. Eight and seven chili genotypes were placed in the third and fourth groups based on their led resistance response by microinjection method in green and ripe fruit. However, all groups showed a correlation ranging from 0.29-0.56.

Keywords: *Capsicum baccatum, C. chinense,* conventional plant breeding, Fungi, molecular marker

Identified Tomato Germplasms Resistance to Fusarium Wilt Disease Race 2 in Tomato

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Abstract

Fusarium wilt disease caused by *Fusarium oxysporum* f.sp. *lycopersici* (Fol). It is a major problem for tomato production in Thailand. To controlling the disease, improving resistance is a sustainable tactic way (safe and environmentally friendly). Therefore, the objective of this study was to evaluate 32 tomato germplasms (phenotypes and genotype) resistant to Fol race 2isolates KK6 (aggressive isolate). All tomato germplasms were inoculated at the seedling stage (21 days after sowing) by the root dip method and used spore suspension at the concentration (1×106 spores/ml-1). The disease progression was evaluated for 6 times, 1-week interval after inoculation. The disease score was 0-4 levels (from plant no symptoms (0) to dead plant (4)), the score was converted to the percentage of disease index (DI%). The resistant reaction of CLN3670F and CLN3078C was a high level of resistance (HR) by shown the percentage of disease incidence at the 6 weeks after inoculation as 19.27 and 23.44%, respectively. While the rest genotypes were grouping as intermediate resistance (IR) (DI% 25-50) included 8 accessions, intermediate susceptibility (IS) (DI% 50-75) groups are 19 accessions, and high level of susceptibility (HS) (DI% 75-100) groups are 3 accessions. The accessions in the HR and IR group were selected to use as resistant sources in the tomato breeding program for fusarium disease resistance.

Keywords: conventional plant breeding, evaluation, genetic resistant source, fungi plant disease, plant selection

Screening of Host Plant Resistance to Anthracnose Three Predominant Species in Chili Progressive Lines (*Capsicum annuum* L.)

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Abstract

Sixty-five chili genotypes derived from PBC932 (34 genotypes), PBC80 (9 genotypes), and commercial (22 genotypes) were screened against three Colletotrichum species *C. cappsici* (Cc), *C.acutatum* (Ca), and *C. gloeosporoides* (Cg). The experiments were designed by randomized complete block design (RCBD) with three replications and ten fruits per each. The screening method was challenged by the microinjection technique with spore suspension 5 x 10^5 spores/ml injected 2 ul/fruit into mature green (G) and ripe red (R) fruit stages. The disease reaction was assessed by lesion size at 5 days after inoculation. The average of disease lesions was recorded as two disease responses as the disease lesion size 0-4 mm was resistant genotype, and more than 4 mm was susceptible genotype. All 65 chili genotypes showed different disease responses in mature green and ripe fruit stages to three Colletotrichum species. Only one genotype, KM6-4-1 showed resistance to all fruit stages and Colletotrichum species. While KM6-2-1 and KM1-9-1 showed resistance to Ca-G, Ca-R, Cc-g, Cc-R, and Cg-G. However, other chili genotypes showed resistance to different Colletotrichum species, such as resistance to Ca-G (11 genotypes), Ca-R (36 genotypes), Cg-G (42 genotypes), Cg-R (29 genotypes), Cc-G (15 genotypes), and Cc-R (20 genotypes). Therefore, all resistant genotypes were selected and used for host plant resistance to anthracnose in the chili breeding program.

Keywords: *Breeding for disease resistance, C.acutatum , evaluation, genetic resistance, segregation*

The Development and Applied an Organic Agricultural System, Smart Farming, IOT to Support the Prototype of Plant Factory for Household Use in Urban Life

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Abstract

This research aim is to applied technology into organic agriculture to create a prototype of a plantfactory that allows users who have urban life to use them inside their resident. The system that we have designed must be able to take care of the vegetable by accommodating artificial light and water as needed. Another goal that we set is for our system to be a chemical-free system. So, we chose to make planting material instead of using a hydroponic method. Planting material consists of coconut coir, rice bran, and manure in the ratio of 2:1:2. We used Arduino Uno r3 as the central controller and use C++ Language for coding. The system is consisting of 3 subsystems including **1**.) Artificial light: 18hours of a light period and 2 hours of a dark period for few days. After that, we reduce a light period to 16 hours and maintain 2 hours of a dark period throughout the remaining time. **2**.) Watering works by checking the soil humidity. It actives whenever humidity goes below 30% and stops when humidity reaches 70% . **3**.) IoT, Integrating IoT into the system. Users can get notifications about air humidity and temperature using the Line application and monitor the entire system using the live streaming camera. *Lactuca scariola var. Sativa* was selected and cultivated in this prototype. All subsystems can work together automatically. 1st crop used 30 days to mature which is faster but the average weight of the product is only about 50% compared to the traditional agricultural method.

Keywords: artificial light, plant factory, urban life, smart farming, IoT

Effect of Micro/Nano Bubbles Water and Electrical Conductivity on Growth and Yield of Green Oak Lettuce in Hydroponic Systems

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Abstract

The aim of this study is to evaluate the effect of micro/nanobubbles (MNBs) water and electrical conductivity (EC) on growth and yield of green oak lettuce in hydroponic systems. Green oak lettuce plantation was established from December 2020 to February 2021 at the Agricultural Technology Research Institute, Rajamangala University of Technology Lanna, Thailand. The experimental design was factorial in CRD with given 0 and 5 minutes every week of MNB water and three levels of EC: 0.3, 0.6, and 1.2 mS/cm. The result showed that MNB water with 5 minutes had an effect on the fresh and dry weight of leaves and the total weight of green oak lettuce and the variation of EC level had significant differences in all the treatment on growth and yield of green oak lettuce. There was the interaction between the MNBs and EC found that plant height, canopy width, SPAD, the yield of fresh leave, shoot and the total weight of green oak lettuce had significant differences.

Keywords: electrical conductivity, micro/nanobubbles, hydroponic, green oak lettuce

Effects of High Voltage Plasma on Seed Germination and Growth of Sweet Corn and Melon

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Abstract

The study using high voltage plasma on seed germination and seedling growth of sweet corn and melon seeds was investigated. The experimental design was CRD, there were 2 experiments (sweet corn and melon) each of which had 4 treatments and 4 repetitions. The results showed that the use of high voltage plasma for 5-15 minutes gave in the period to the emergence of sweet corn and melon seeds faster than using tap water treatment (control). Moreover, it also affected the germination rate of sweet corn seeds and melon seeds found that high voltage plasma treatments were a higher germination rate than the use of tap water treatment. The high voltage plasma for 5-15 minutes treatments increased growth of seedling in seedling height in sweet corn and the diameter of the stem in melon. The accumulation of the fresh weight of sweet corn and melon seedlings enhanced when compared with tap water treatment.

Keywords: high voltage plasma, seed germination, seedling

Influence of Electrical Conductivity and Micro/Nano Bubbles Water on Physiological of Chinese Kale in Nutrient Solution Culture

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Abstract

The study on the effect of electrical conductivity (EC) levels and micro/nanobubbles (MNBs) water and on growth and development of Chinese kale in nutrient solution culture systems. This research was carried out a greenhouse on the experimental farm of Agricultural Technology Research Institute, Rajamangala University of Technology Lanna, Thailand from December 2020 to February 2021. The experimental design was factorial in CRD with consisted of EC levels (0.6, 1.2, and 2.4 mS/cm) and two levels of MNBs water (0 and 5 minutes). The results showed that EC levels increased plant height, canopy width, root length, leaf green color, fresh and dry weight. Moreover, MNBs treatments had affected on leaf green color of Chinese kale.

Keywords: electrical conductivity, micro/nanobubbles, nutrient solution culture

Food Science and Technology

Sustainable Packaging: Recent Materials and Technology of Smart Biodegradable Packaging

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Abstract

Plastic is widely used as product packaging. The time-consuming degradation of old plastics leads to an increase in environmental pollution. Sustainable packaging is recently developed to decrease the problem. Along with the need to identify product quality during storage and distribution, smart biodegradable packaging is developed. The packaging does not only contain and protect the product but also provides information about the rapid change of product quality. This article reviews various types of smart biodegradable materials and technology. Biodegradable materials are generally used polymer, gelatine, chitosan, and starch materials. Some packaging production technologies use extrusion, compression moulding, and film casting. The combination of materials according to utilize an abundance of natural resources of each country and affordable technology needs to be continuously developed to produce sustainable packaging that can be produced in many countries.

Keywords: sustainable packaging, smart, biodegradable

Apple Juice Probiotic Production Using *Lactobacillus plantarum* in Anaerobic Bioreactor

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Abstract

Probiotic drink is a functional food that contains a number of live bacteria that can balance the intestinal microflora. The production of non-dairy-based probiotic drinks has not been widely developed. Apples are used as raw material for probiotic drinks with the help of *Lactobacillus plantarum* cultures. Processing into probiotic drinks can increase antioxidant activity by utilizing phenolic bioconversion in apples so that they are more easily absorbed by the body. In the production process, a bioreactor is needed that is able to provide a controlled environment so that the best quality products are produced. A 3 liters capacity bioreactor with a PID-based control system equipped with DS18B20 as a temperature sensor, DFRobot pH meter as a pH sensor, Gravity oxygen meter as a dissolved oxygen sensor, Nema 57 stepper motor, and a hydrofoil impeller type mixer capable of providing optimal conditions for bacterial growth at 37ºC; pH 4.5-5.5; and agitation speed of 120 rpm. The results of this 32-hour batch-type bioreactor energy analysis require an energy of 1.687kWH with a total cost of Rp. 2490. The production of probiotic drinks using these bioreactors has been shown to result in an optimal increase in antioxidant activity at a 5% sucrose concentration and a 24-hour fermentation time. The resulting parameter values are IC50 30,181ppm; Lactic acid bacteria 1.4 x 1010 cfu/ml; reduced sugar content of 1.12%; and 0.49% total acid.

Keywords: antioxidant, bioreactor, *Lactobacillus plantarum*, PID, probiotic

The Effect of Vacuum Evaporator Pressure to Reduce Water Content on Randu Honey Based on pH, Viscosity, and Color Intensity

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Abstract

This research was conducted from October 2020 to January 2021 at PT. Kembang Joyo Sriwijaya and Laboratory of Animal Products Technology, Animal Science Faculty, Brawijaya University, Malang. The purpose of this research was to determine the effect of vacuum evaporator pressure to reduce water content on Randu honey and based on pH, viscosity, and color intensity. The research method was experimental design using Completely Randomized Design (CRD) with 4 treatments and 4 replications and continued by Duncan Multiple Range Test if there was a significant difference. The results showed that vacuum evaporator pressure gives a highly significant effect ($P<0,01$) on pH and viscosity. And no significant effect ($P>0,05$) on color intensity. It concluded that a vacuum evaporator can be increasing the value of pH and viscosity, but not reducing the quality of *Ceiba pentandra* Honey

Keywords: *Ceiba pentandra* honey, vacuum evaporator pressure, water content on honey

Halal Assurance System and Quality Management System Integration of Restructured Meat: a Review

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Abstract

As one of the countries with the largest Muslim population in the world, halal products in Indonesia are a necessity. Two crucial problems that consumers are concerned about are halal and quality. Restructured meat is a popular product in Indonesia that requires quality and halal assurance. Halal assurance of restructured meat is obtained from the implementation of the Halal Assurance System (HAS), while quality assurance is obtained from the implementation of the Quality Management System (QMS). These two assurance systems have the same basic principles that make it possible to be integrated. There are many papers shown that integration of management systems can improve the performance of a company, yet the number of research discussed the integration of HAS and QMS is still lack. In Indonesia, there are a lot of restructured meat processing companies which already implemented QMS, but the total of companies that carried out halal certification is still 52 companies. This paper discusses the implementation of HAS and QMS in the restructured meat processing industry. The similarity of basic principles and clauses in HAS and QMS will also be discussed. Based on the similarity of basic principles, the opportunity of integrating HAS and QMS in the restructured meat processing industry will be discussed in more detail.

Keywords: halal assurance system, quality management system, integration, restructured meat

Case Study on Maliban Group of Company Micro and Macro Environment

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Abstract

Organizations should be aware of the prevailing trends in their micro and macro environment. It is essential to analyze the market potentials for available opportunities and threats to obtain maximum profit. This whole chapter summarizes the market potentials, external and internal environmental factors, resources, capabilities, and marketing intermediaries; as it identifies competitive forces from differentiated or low-cost providers.

Keywords: micro, macro, environment, influences

Application of Six Sigma in Quality Control of Potato Chips Product

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Abstract

This research was conducted at small and medium enterprises Agronas Gizi Food, which is one of the potato chip producers in Indonesia. In improving product quality, companies must improve the quality of their products by minimizing defects in the production process. The defects in the quality of potato chips occurred in the indicators of color, crunchiness, wholeness, and consistency of size. The purpose of this study was to identify and analyze the factors that can cause defects in potato chips and design repair alternatives. The research method used is the Six Sigma DMAIC (Define, Measure, Analyze, Improvement, Control). The results showed a significant change in the application of the Six Sigma method in improving the quality of the potato chips production process. The results showed that for the defined stage, the main priority was improving quality with Critical To Quality. At the measuring stage, based on the process capability value, the final result is below the industry standard in Indonesia by 69.2%. The results of the DPMO value analysis indicate the need for an improvement strategy in production. The Analyze stage uses a fishbone diagram consisting of several factors that cause color change defects, such as humans, materials, machines, and the environment. At the stage of improving using 5W1H. The control stage obtained several alternative improvements to minimize product defects.

Keywords: *quality control, six sigma, potato chip*

Physical Properties and Sensory Qualities of Thai Tea Popping Boba Prepared by Reverse Spherification Technique

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Abstract

Reverse spherification is a technique for food liquid encapsulation by molecular gastronomy. This technique is used to enclose liquid containing calcium content such as milk. Thai tea is a famous beverage, it consists of tea, milk, and sugar with a unique aroma of tea. The use of the innovative method by reverse spherification enclosed in Thai tea, called Thai tea popping boba. This study aimed to encapsulate Thai tea liquid prepared from two factors: sodium alginate (0.5% and 1.0% w/w) and calcium lactate (0.5%, 1.0%, and 1.5% w/w) by factorial 2 × 3 in CRD. The results indicated that the concentration of sodium alginate and calcium lactate at 1.0% and 0.5% (w/w) respectively, were suitably formulated. Physical properties showed that the maximum size was 14.20 mm, the weight was 1.50 g, the hardness was 9.28 N and the colors of L*, a*, and b* were 49.67, 19.77, and 29.98 respectively. Sensory qualities of spherical characteristics indicated that the size of spherical, texture, and overall preference had a small liking-moderate liking score (6.6-8.0 of 9-point hedonic scale) and 100% acceptance from the consumer acceptance test.

Keywords: reverse spherification, Thai tea, popping boba, physical properties, sensory qualities

Effect of Wild Yam Root Preparation on Yield and Physiochemical Proprieties of Ready to Used Wild Yam Flour

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Abstract

Asiatic bitter yam or Kloy (*Dioscorea hispida Dennst*.) is a food plant of people in the tropics, but certain wild varieties are edible after detoxification. Detoxified of Kloy are delicious food ingredients. Thus, the effects of the preparation method on the physicochemical quality of ready-to-use Kloy flour were investigated. The glutinous Kloy roots were taken from Mae-Tha, Lampang Thailand. The Kloy were cleaned, peeled, and sliced to 0.1 mm before soaked in salt solution at 0, 10, 20, 30, 40, and 50% for 12 hours. Each treatment was washed every day for 8 days or until the sliced Kloy has a white color. The ready to use Kloy flour was produced with 3 methods; soaked in 2% salt solution for 10 min, boiling for 10 min and steaming for 30 min prior drying in tray dried at 60°C for 4 h then ground through 80 mesh screen and packed in an aluminum foil bag. The ready-to-use Kloy flour was analyzed on % production yield, moisture content, color value, gelatinization temperature, starch granule by SEM, and pasting behaviors. Results revealed that the treatment on soaked slice Kloy in 20% salt prior steam for 30 min had the highest production yield (26.8%) which was 7.70% moisture content. The color L* a* b* value were 92.98, 0.15, 7.42 respectively. The selected ready-to-use Kloy flour had low gelatinization temperature, swollen starch granules, and lowest peak viscosity, and easily soluble than the other treatments.

Keywords: table salt solution, detoxified, gelatinization temperature, viscosity behaviors

Effect of Addition Proportion Broccoli Flour (*Brassica oleracea*) and Water Yam Flour (*Dioscorea alata*) of Meatball Broiler Based on Calcium, Fat, Protein, and pH

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Abstract

The purpose of this research was to determined the effect addition proportion of broccoli flour (*Brassica oleracea*) and water yam flour (*Dioscorea alata*) based on calcium, fat, protein, and pH. The materials use meat broiler, filler, and flavours. The method used in this research was the experiment method that used the addition of broccoli flour (*Brassica oleracea*) and water yam flour (*Dioscorea alata*) to the process of broiler meatballs. The method used was a laboratory experimental using a Completely Randomized Design (CRD). The data was analyzed by analysis of variance (ANOVA) and continued by Duncan Multiple Range Test. The variable of calcium tested with the AAS method, fat, and protein tested with the FoodScan method and pH tested with pH meter method. The experimental design was used 6 treatments and 3 replications with treatment P0: without addition (control), P1: 4 % broccoli flour, P2: 3 % broccoli flour + 1 % water yam flour, P3: 2 % broccoli flour + 2 % water yam flour, P4: 1 % broccoli flour + 3 % water yam flour, P5: 4 % water yam flour. The value of calcium was 45.02-108.81 mg; the average value of fat was 2.44-3.21%; the average value of protein was 19.03-20.50%, and the average value of pH was 6.51-6.68. The result showed that broiler meatballs with the addition proportion between broccoli flour and water yam flour have no significant effect or nonsignificant difference (P>0.05) to the values on fat, protein, and pH. This research concluded that adding a proportion of broccoli flour and water yam flour increase the value of calcium.

Keywords: broiler meatball, broccoli flour, water yam flour, calcium

The Effect of Roasting in Oven on the Process of Making Cured Egg Yolk Based on Content of Water, Protein, Fat, Texture

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Abstract

This study aims to determine the effect of roasting in the oven on the process of making *cured egg yolk* on the content of water, fat, protein, and texture. The research material used is *cured egg yolk*, which is made from day-old fresh egg yolk. The treatments used are a combination of temperature and roasting time. The data were analyzed using analysis of variance (ANOVA), with 4 treatments and 4 replications which included P0 (oven for 120 minutes at 60ºC), P1 (oven for 60 minutes at a temperature of 80ºC), P2 (oven for 40 minutes at a temperature of 100ºC), P3 (oven for 20 minutes at a temperature of 120ºC). If the test results make a difference, then carried out a further test using Duncan's Multiple Range Test (DMRT). The results showed that cured egg yolk roasting in the oven had a very significant effect ($P < 0.01$) on water content, protein and texture. The water content between 16.57% to 8.95%, the protein content value was 23.77% -24.49% and the texture value was 33.94N-50.18N. The fat content between 51.04% to 56.83% which gave a significant effect. The conclusion of this research showed that cured egg yolk with roasting in the oven for 20 minutes at a temperature of 120ºC was produce products with good quality in terms of water content, protein, fat, and texture.

Keyword: *cured egg yolk*, water content, protein content, fat content, texture.

Product Development of Cake from Riceberry Flour

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Abstract

The purpose of this research was to develop the product of cake using rice berry flour substituted with wheat flour. The substitution of rice berry flour, which varied content of 0%, 30%, 50%, 70% and 100% (w/w). Test of cake quality included color, specific volume, density, and sensory evaluation. It was found that when the percentage of rice berry flour use increase, the level of L-value, a-value, and b-value, a specific volume of cake also decreased, while the cake's density increase ($p<0.05$). Sensory Acceptance (9-point Hedonic Scale Test) Appearance, color, texture, flavor, and overall. By 30 testers, it was found that the acceptance of 100% rice berry flour. The result shows that rice berry cake had a linking score of appearance, color, texture, flavor, and overall content were 7.53, 7.33, 7.40, 7.56, and 7.93 respectively. There is 309 kcal for 1 serving of rice berry cake which contains 0.68 grams of dietary fiber. However, rice berry flour can be used as a food ingredient in other food recipes for further studies.

Keywords: *riceberry flour, wheat flour, cake*

Computer Science and Information Technology

Monitoring System for Water Level and Soil Moisture for Rice Fields with LoRa Communication on a Wireless Sensor Network

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Abstract

The monitoring system for water level and soil moisture of wetland rice is an important issue for farmers to pay attention to if more than one field is being monitored. The problem is that farmers are still monitoring manually and without proper tools. These problems underlie this research to implement a monitoring system with the application of the concept of wireless sensor networks with LoRa communication. The implementation of LoRa communication because it has low power consumption so it is suitable for applications in open spaces and long communication ranges. The application of LoRa communication at sensor nodes and gateway nodes so that it can send sensing data. The data will be forwarded to the data center and can be monitored via a web application. Because several fields are being monitored, this study uses the concept of a wireless sensor network so that it reaches far away distances of monitored rice fields. The results of the first system evaluation are that the system can measure the water level and soil moisture well. Second, it can send sensor data from the sensor node to the client. Finally, the communication performance of LoRa is the successful rate found in packet delivery, which is a total average of 92.72% or in a good category. Packet loss with an average total of 7.28% or in a good category. RSSI signal (Received Signal Strength Indicator) with a total average of -95.95 dBm. The system has good packet delivery success, small delivery failures, and good delivery signal strength.

Keywords: LoRa, research, systems, monitoring, thesis, wireless sensor networks, rice fields

Model of Frog Farming System on IoT Technology

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Abstract

The objective of this research was 1) to study the composition of the circulated water by IoT system to increase the oxygen in the water. 2) develop an IoT system for frog feeding determine by color. 3) transfer the model of the IoT system to the community or farmer. The research instruments were 1) the evaluation form of component of the suitable environment to transfer water 2) an evaluation form of efficient for frog feeding by IoT system and 3) satisfaction survey form from a user in frog feeding by IoT system. Statistics used for analyzing data were average and standard deviation. The research finding was summarized as follows 1) the composition of circulated water by IoT system was high score 2) IoT System could control every system by efficient, condition and situation 3) farmer's satisfaction toward the process of IoT system to the highest level.

Keywords: IoT, frog farming, feeding machine

Cleaner Production Options for Making Green Manufacturing Model in the Natural Dyes Batik Industry: a Case Study of Mbah Guru, Indonesia

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Abstract

Sustainable production policy has encouraged the batik industry to switch synthetic dyes to natural dyes. However, the production process still brings negative effects on humans and the environment. In order to solve this problem, the batik industry needs to develop a green manufacturing model using cleaner production options. The purpose of this research is to design a green manufacturing model for greening the natural dyes batik industry. The research is conducted in the natural dyes batik industry "Mbah Guru". Mbah Guru batik industry is located in Lamongan, East Java. The research uses Bayes Method to assess and determine cleaner production options based on technical, economical, and environmental aspects. The last decision making of cleaner production options is used a feasibility study by using Pay Back Period (PBP), Net Present Value (NPV), Internal Rate of Return (IRR), and Net Benefit Cost (NBC) Ratio. The result shows that the batik industry will be more profitable if it is able to properly implement the recommended process improvements so that negative effects, both on humans and on the environment, can be minimized.

Keywords: green manufacturing model, cleaner production options, natural dyes batik industry, bayes method

Development of Agribusiness E-commerce System for Market Share Expansion of Banana Fruit

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Abstract

In recent years, the banana fruit business has grown along with the development of information technology which is also growing rapidly. So that, the concept of selling or marketing bananas is increasingly interesting and creative. E-commerce is a marketing or sales concept that uses information technology. E-commerce is made in order to increase market share in the banana business as well as to meet expanding market demand and increase the selling value of bananas. E-commerce has a broad target market without geographical or time limitations because it can be accessed by anyone and anywhere. However, these factors will not become a reality if it is not accompanied by a suitable and creative development strategy so that the target market expansion can be achieved. It is necessary to use the internet (based on digital network technology) with e-commerce applications to develop an e-commerce based system that focuses on personal-based business transactions, and transactions can be completed more quickly and intensively. The banana fruit sales system business based on e-commerce aims to increase sales efficiency. This article uses factor analysis research methods and development strategies, as well as a literature review. The results conclude that banana e-commerce is a business that has many factors of expanding market share, but these factors will be useless if not accompanied by an appropriate development strategy.

Keywords: *agribusiness, e-commerce, banana fruit*

Development of the Krathong Sai Lai Prathip Phan Duang Application with Augmented Reality Technology

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Abstract

The Krathong Sai Lai Prathip Phan Duang was the Loy Krathong festival of Tak province. A cup of coconut shell was decorated beautifully. It has a core to lit before floating them away in a line along the Ping River. This research purposed to develop an application program to display the Loy Krathong with augmented reality technology. A 3D model of a cup of coconut shell was created with Blender application. A model was shown on an application that was developed with Flutter and Unity application. An application also presented the information related to the Loy Krathong festival. For example, the history of the Loy Krathong festival and a method to make a cup of coconut shell. This application not only reduces the amount of waste caused by the Loy Krathong. It was also used to promote the Loy Krathong festival of Tak province.

Keywords: Krathong Sai Lai Prathip Phan Duang , festival , augmented reality

Development Smart Sensor System Prototype for Smart Agricultural Farms

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Abstract

The purpose of this research was to develop a smart sensor system for smart agricultural farms. The internet of things technology was applied to create a prototype for smart sensor systems. An electronic device that connected sensors was obtained electric energy from sunlight through solar panels. The device received information from the sensor. Then, the device sends information to display on an application over a wireless network. The information consisted of temperature, air humidity, soil humidity, light intensity and wind strength.

Keywords: internet of things, smart sensor system, smart agricultural farms

5 Maharaj Tak: Tourism Recommendation Web Application

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Abstract

This research aimed to develop a web application that suggests tourist routes, 5 Maharaj Tak. A web application was used to promote Tak tourism. The infographic was used to show the tourism route. Each route consists of landmarks, restaurants, and souvenir shops. There are five routes. All route starts from the City Pillar Shrine of the Four Great. The first route, the route of King Ramkhamhaeng the Great, finishes at Yuthhatthi Pagoda that locates in the Ban Tak district. The destination of the second route, the route of King Naresuan the Great, was the shrine of King Naresuan the Great that locates in Mae Sot district. The third route, the route of King Narai the Great, goes to the King Narai Temple. The target of the fourth route, the route of King Taksin The Great, was the Doi Khoi Khao Kaen Temple. The destination of the fifth route, the route of King Bhumibol Adulyadej the Great, was the Bhumibol Dam. A new landmark could be suggested by members of the web application.

Keywords: tourism route, infographic, web application