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Serang City - Banten, Indonesia November 16th, 2020

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Deadline for Abstract & Full Paper:

Abstract submission : September 11th 2020

Full Paper submission : October 30th 2020

Deadline for Registration and Payment:

Early bird : September 11th 2020

Regular : October 30th 2020

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Quality of Red Tuna (*Yellowfin Tuna*) Fishball, White Oyster Mushroom (*Pleurotus Ostreatus*) on Different Types of Packaging and Storage Time

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Abstract. This study aims to determine the effect of packaging type and storage time on the quality of red tuna (*Yellowfin tuna*) white oyster mushroom (*Pleurotus ostreatus*) meatball. This research was conducted at the Laboratory of Agricultural Product Technology, Ekasakti University, Padang, Laboratory of Instrumentation and Laboratory of Microbiology, Faculty of Agricultural Technology, Andalas University. The study was conducted for 2 months, from April to May 2019, using a Factorial Completely Randomized Design (CRD) consisting of 2 factors with 3 replications. The first factor is the type of packaging (without packaging, styrofoam packaging, wrap packaging), and the second factor is the storage time (0 hours, 12 hours, 24 hours). Observation data were analyzed using ANOVA with the F test followed by the Duncan Multiple Range Test (DMRT) at the 5% real level. The results showed that the type of packaging with storage time had a very significant effect on moisture content and protein content and had no significant effect on ash content. The type of packaging and storage time for the best white oyster mushroom tuna red tetelan meatball based on water content, ash content, protein content, ALT, Salmonella sp and Organoleptic bacterial contamination is the best use of Wrap packaging with a storage time of 12 hours.
Key words: packaging, storage, oyster mushrooms, meatballs.

Dikirim,10 September 2020

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Unique ID : ICARD0042
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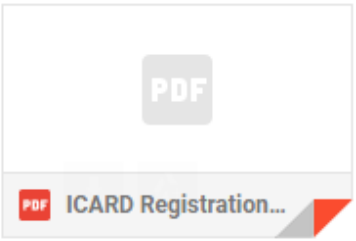
Affiliation : Universitas Ekasakti at Padang City
Scope : Food Sciences and Agricultural Product Technology
Timestamp : 9/10/2020

Warm regards,

Conference committee



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Key words: packaging, storage, oyster mushrooms, meatballs.

Introduction

Seafood, especially fish, is a very potential food source as a source of protein, fat and several vitamins. Fish is a perishable food commodity. Decay is caused by enzymes, either from the fish itself or from microbes. The proportion of collagen protein in fish ranges from 3-5% of the total fish protein. The high water content can cause microorganisms to easily grow and reproduce (Astawan, 2004).

Fish fat contains a lot of unsaturated fatty acids which are very easily oxidized which can cause a rancid odor (Nurjanah et al. 2014), so it is necessary to handle, process, and preserve fishery products which aim in addition to preventing damage to fish so that it can extend the shelf life as well as to diversify processed fishery products (Adawyah, 2011). Processing can be done by processing whole fish without changing its shape, such as smoked fish, pindang fish, and salted fish. In addition, it can also be processed by changing shapes such as fish meal, fish chips, surimi, fish balls, crackers, shredded and sausage (Manurung, 2008).

Fish meatballs are processed fishery products with raw materials for whole fish or fish meat (minced) or surimi, added with starchy fillers or tapioca flour and spices, which are formed in round shapes and boiled in hot water. Good quality fish balls are pure white in color, compact and chewy texture, not brittle or mushy (Veranita, 2011).

One of the substitute ingredients for fish balls is white oyster mushroom (Pleurotus ostratus) with the aim of increasing the nutritional value. Oyster mushroom is a type of mushroom that contains high fiber, namely 11.5%. Oyster mushrooms contain 39.8% lignocellulose fiber, which is insoluble fiber which is very good for digestion, the rest is soluble fiber which is good for cholesterol. In addition, mushrooms

also contain betaglukan which can boost the immune system. Regular consumption of 6-7 grams of mushrooms per day can increase endurance (Parjimo and Andoko, 2007).

The addition of oyster mushrooms to fish balls is an effort to diversify food, increase the nutritional value, especially fiber and vegetable protein and to get a chewy texture. Based on research by Hermalena (2017), the use of oyster mushrooms and tuna red tetelan in the manufacture of fish balls resulted in a protein content of 5.40% and 18.69% carbohydrates in the ratio of red tuna to oyster mushroom (90:10). Meanwhile, the organoleptic value (color, aroma, taste, and texture) can be accepted by consumers in the ratio of red tuna and oyster mushrooms (70:30) with the level of preference, namely; color 5.30%, aroma 4.65%, taste 5.5%, and texture 5.14%

Many studies with the aim of extending the shelf life of meatballs have been carried out. The results of Savitri's (2009) study to extend the shelf life of beef meatballs with preservation methods using the antimicrobial substrate Lactobacillus plantarum 1A5 at room temperature, showed that the activity of the antimicrobial substrate was able to inhibit E.coli and S.aureus during storage for 9 hours at room temperature. The microbiological quality of beef meatballs with the addition of antimicrobial substrates is better than those without antimicrobial substrates stored for 9 hours at room temperature.

According to Hidayati et al. (2013), the deterioration of the quality of meatballs is the appearance of mucus, a distorted aroma and the emergence of gas. During storage, the meatball will experience syneresis, namely the release of water from the gel, changes in flavor, taste and decreased nutrients due to fat oxidation. Damage during storage can occur due to the presence of microbes, enzymatic reactions and the influence of temperature. Marketing of meatballs in the community generally takes place with less sanitary storage conditions at room temperature.

One method of preserving meatballs that can be done is preserving meatballs by packaging. Packaging conditions can affect the shelf life of a product during storage. At present there are many packaging materials used for foodstuffs, including paper and cardboard packaging, glass, cans or metal, plastic and composite packaging. Of the several packages commonly used for storage of meatballs are packaging made of plastic materials such as LDPE (Low Density Poly Ethylene), PP (Polypropylene) plastic, HDPE (High Density Polyethylene) and PS (Polystyrene).

Based on the type of plastic, it is possible to use Styrofoam and plastic wrap. Styrofoam is polystyrene, a type of plastic that is very light, stiff, translucent and cheap but brittle quickly. The advantages of Styrofoam packaging are practical and durable. Plastic Wrap or Wrapping is a type of thin plastic film, with a thickness of 0.010 to 0.020 microns. Its characteristics are transparent (translucent), not easily torn even though it is made of limp material, so it is easy to shape, resistant to acids to avoid dirt or bacteria, impermeable to water, steam or hot enough oil. The objectives of this study were: 1. To determine the effect of the type of packaging on the quality of white oyster mushroom tuna. 2. To determine the effect of storage time on the quality of white oyster mushroom tuna red tetelan meatballs.

MATERIALS AND METHODS

1 Place and Time

The research has been conducted at the Agricultural Product Technology Laboratory of Ekasakti University, Padang, the Instrumentation Laboratory and the Microbiology Laboratory of the Faculty of Agricultural Technology, Andalas University. The research was conducted for 2 months, namely April to May 2019.

2 Materials and Tools

2.1 Material

The main raw material used is yellow fin tuna red tetelan obtained from the by-product of making tuna fish fillets at PT. Dempo Andalas Samudera, Bungus Teluk Kabung Subdistrict, Padang City. Other raw materials used in this study were white oyster mushrooms obtained from the Kongsi soil market in Padang, chicken eggs, Pak Tani Gunung brand tapioca flour, garlic spices, shallots, Dolpin brand salt, ice cubes, and water.

The materials used in chemical analysis are 1) Protein content: selenium 0.4 grams, concentrated H2SO4 (PT Smart Lab Indonesia) 10 ml, 10 ml distilled water, 10 ml 40% NaOH, 50 ml H3BO3 (Merck), 2 drops indicator , HCl 0.1N. 2) Total Plate Figures (ALT): 70% Alcohol, Nutrient Agar (NA), 0.9% NaCl. 3) Identification of Salmonella sp: Mac Conkey Agar (MCA) and Salmonella Shigella Agar (SSA) media, sterile distilled water, 70% alcohol, label paper, aluminum foil, cotton, and plastic bags.

2.2 Tools

The tools used for making meatballs include; sliced knife-Slicing knife, basin, bowl, scissors, portable gas stove with one furnace, Rinnai RI-511C brand, cauldron, steamer pan, bucket, blender, spoon and scale. Chemical analysis tools are: 1) Moisture content: digital scale, oven with Memmert UN 55 53L, vacuum desiccator, dryer jar, clamp, scissors, and aluminum cup. 2) Ash content: Carbolite Hight Temperature Box Furnace type furnaces, analytical scales, desiccators, tongs, porcelain dishes, Maspion S300 electric stove stoves. 3) Protein content: 500 ml kjedahl flask, distillation device, 50 ml burette, 5 ml measuring pipette, 50 ml Erlenmeyer, dropper pipette, 250 ml beaker, and fume hood.

The total plate count (ALT) testing tools are autoclave, erlemeyer, petridish, 10 ml measuring pipette, test tube, test tube rack, water bath, incubator cabinet, colony counter, vortex, tissue , bunsen, and petri dishes. While the tools used to identify Salmonella sp. are ice flasks, knives, scissors, test tubes and racks, petri dishes, erlenmeyers, analytical scales, bunsen heaters, incubators, autoclaves, bent glass rods and magnetic stirrers.

3. Experimental Design

The research design used was factorial completely randomized design with 2 factors, namely the type of packaging used consisting of 3 levels and storage time consisting of 3 levels. Each treatment was repeated 3 times. The treatment factors can be seen as follows: 1. Factor A: The type of packaging used consists of 3 levels. A1 = without packaging; A2 = packing with Styrofoam; A3 = packaging with plastic Wrap. 2. Factor B: Duration of storage at room temperature with 3 levels. B1 = 0 hours, B2 = 12 hours, B3 = 24 hours. The combinations of treatments are presented in Table 1.

Table 1. Combinations of research treatments

Packaging Type	Storage Time (hours)		
	B_1	B_2	B_3
A_1	A_1B_1	A_1B_2	A_1B_3
A_2	A_2B_1	A_2B_2	A_2B_3
A_3	A_3B_1	A_3B_2	A_3B_3

4.Supply of Raw Materials

The raw materials in this study were fresh yellow fin tuna fillets taken directly from PT. Dempo Andalas Samudera in Bungus Teluk Kabung District, Padang City. The red tuna droplets used have been cleaned first. The binder used is tapioca flour and the cooking spices used in the manufacture of tuna meatballs are fried shallots, garlic, pepper, salt.

4.1. Procedure for making meatballs (Hermalena, 2017 modified)

700 grams of yellowfin tuna and 300 grams of white oyster mushrooms are washed, added with ice cubes, then finely ground, added with spices, binder, and emulsifier. Then mix well until the dough becomes homogeneous for about 5 minutes and is printed as desired (in this study 20 grams / seed were made). Furthermore, the dough that has been processed is boiled in boiling water for 45 minutes until the meatballs float, cooled at room temperature for 30 minutes.

4.2. Meatball Packaging Process

Freshly cooked meatballs are cooled to room temperature ± 370C then put into packages according to the treatment (A1 = without packaging, A2 = Styrofoam packaging, and A3 = Plastic Wrap packaging, all treatments are stored at room temperature.

4.3. Observations

Observations were made on meatballs including moisture content, ash content, protein content, determination of Total Plate Number (ALT), Shalmonella sp test and organoleptic test, with a storage time span, namely the initial storage (0 hours) as a control, 12 hours and 24 hours.

5 Analysis and Testing

5.1 Water content (Andarwulan et al. 2014)

Determination of water content is a way to measure the amount of water contained in a food ingredient. The drying method with the oven method is based on measuring the weight loss due to evaporation of water from the dried material at a temperature of about 100 ○ C-105 ○ C. This method is used for all foodstuffs, unless the product contains volatile components or if the product will decompose on heating at 100 ○ C - 105 ○ C.

5.2 Ash content (Andarwulan et al. 2014)

Ash is an inorganic residue obtained by ashing or heating at high temperatures> 450 ○ C and / or digesting organic components with strong acids. This inorganic residue consists of various minerals whose composition and amount depend on the type of foodstuff and the analytical method used. Ash in foodstuffs is determined by weighing the remaining minerals as a result of combustion of organic matter at a temperature of about 550 ○ C.

5.3 Protein Content (Andarwulan et al. 2014)

Determination of protein content to determine the protein content in food. Measurements based on the total nitrogen content present in the sample, protein can be calculated by assuming a certain ratio of protein to nitrogen for the sample being analyzed. The determination of protein is based on the oxidation of carbonaceous materials and the conversion of nitrogen to ammonia. Then ammonia reacts with excess acid to form ammonium sulfate. The solution is made alkaline, and ammonia is evaporated and then absorbed, the amount is determined by titration using 0.02 N HCl.

5.4 Testing of Total Plate Numbers (SNI.2332-3-2015)

This method of determining the total plate number is used to determine the total number of aerobic and anaerobic microorganisms in meatball products. Before the incubation process, which is carried out the first time is homogenization of the material, homogenization is a way of preparing samples to obtain the

best possible distribution of bacteria in the specified sample. The next process after homogenization is sample dilution.

5.5 Identification of Salmonella sp. (SNI.2897: 2008)
Salmonella growth on selective media with pre-enrichment, and enrichment followed by biochemical tests and serological tests. Bacteria were isolated by wiping the entire surface of the meatball using a sterile cotton swab then put into a test tube containing Selenite Cystein Broth (SCB) and incubated at 37oC for 24 hours. Then the bacterial culture was cultured on Salmonella Shigela Agar (SSA) selective media. Next, Gram stain was carried out on separate colonies that grew on SSA media. Salmonella sp bacteria identification was carried out by inoculating the bacteria on IMViC (Indol, Methyl Red Voges-Proskauer (MR-VP), Simmons Citrate Agar, Sulfite Indol Motility (SIM), Triple Sugar Iron Agar (TSIA) media.

5.6 Organoleptic test (SNI.7266: 2014)
Orgonoleptic testing is carried out on the resulting product. Samples are presented in a uniform form. This test includes tests based on parameters on appearance, smell (aroma) and texture carried out by 15 panelists. This test is carried out to determine the value of product specifications starting from the highest to the lowest product specifications. The panelist test results are then tabulated by entering the panelist assessment numbers into the table. The numbers in the table are the values selected by the panelists against the parameters that have been tested. The parameters to be tested are appearance, smell and texture values.

RESULTS AND DISCUSSION

1 Moisture Content

The results of the analysis of diversity showed that variations in the type of packaging, storage time, and interactions had very significant effects on the moisture content of the meatballs produced. The average moisture content of the meatball results of the study is presented in Table 2.

Table 2. Average moisture content (%) of research meatballs

Factor A (Packing Type)	Factor B (Storage Time)		
	B_1 (0 hour)	B_2 (12 hour)	B_3 (24 hour)
A_1 (Non Package)	71,99 a A	54,93 a B	43,50 a C
A_2 (*Styrofoam*)	72,03 b A	63,10 b B	57,38 b C
A_3 (*Wrap*)	73,45 c A	69,99 c B	66,61 c C
KK		0,10	

The numbers followed by the same letter have an insignificantly different effect at the 5% level according to the DMRT follow-up test. Where uppercase is read horizontally and lowercase is read vertically.

Based on Table 2 above, it can be seen that the treatment without packaging with a storage time of 0 hours is very significantly different at 12 hours and 24 hours of storage. The use of Styrofoam packaging was very significantly different for each storage duration of 0 hours, 12 hours and 24 hours. The use of wrap packaging was also significantly different at the storage time of 0 hours, 12 hours and 24 hours. The highest water content was found in the treatment of type of wrap packaging and storage time of 0 hours (A3B1), namely 73.45%. Plastic wrap has mechanical properties that are transparent, strong, flexible, has good resistance to chemical solvents, and low water vapor permeability, thus providing microclimate conditions for the materials it is packed with. The low permeability of wrap packaging can control the hydration process, namely the entry and exit of water and water vapor. While the lowest water content

was found in the treatment without packaging and storage time of 24 hours (A1B3), namely 43.50%. The low water content is related to the influence of environmental factors that are directly contaminated with the material, the volatile nature of water results in a decrease in water content. When the temperature of the water increases, the average number of water molecules decreases and hydrogen bonds break and form again rapidly (Winarno, 2004).

Storage time has an effect on the water content of white oyster mushroom tuna red tetelan meatballs, the longer the storage of each type of packaging used, the lower the water content. This decrease in water content is due to dehydration, namely the transfer of product moisture to the storage room. The use of plastic wrap with low permeability in meatball packaging can prevent moisture absorption because the pores in the packaging are very small, causing the ability to pass gas particles and water vapor as well. This is in line with the opinion of Gunardi (1996) which states that changes in water content during storage can be influenced by the permeability of the packaging used, water absorption properties, and environmental humidity.

The use of styrofoam packaging with a higher moisture permeability than wrap packaging resulted in a decrease in moisture content higher than that of wrap packaging. Styrofoam or polystyrene (PS) is a monomer that is clear rigid but high water vapor and gas permeability with a density level (0.915 - 0.939 g / cm3), while "Wrapping plastic" has a density level (<0.915 g / cm3) is one type of plastic LDPE (Low Density Polyethylene) with water vapor and low water permeability (Sucipta, 2017).

The decrease in water content in the packaged material is related to the hydration characteristics. The hydration factor can be expressed by water activity (aw), water content (KA), and relative humidity (RH). This water vapor transfer takes place from a product that has a higher water vapor pressure to a product with a lower pressure. According to Syarief and Halid (1993), if the humidity in the room is smaller than the food ingredients, some of the water will evaporate. In drying food, there are 2 levels of water removal rate (dehydration). At the beginning of drying, the rate of water loss per unit time is fixed, then a decrease in water removal rate per unit time will occur. This relates to the type of water bound in the material (Winarno, 2004).

In food packaging, hydration characteristics are very important, especially with regard to water vapor. Product packaging affects the rate of water evaporation that takes place during storage depending on the type and nature of the packaging itself in controlling the hydration process. When food products are stored at relative humidity below the monolayer area, there will be less water available to form hydration from trace metals so that the catalytic reaction is active (Syarief, 2007).

The use of wrap packaging in food packaging is better at preventing the absorption of steam by packaged products and the release of moisture from excessively packed products during storage. Changes in water content at 12 and 24 hours storage are not a measure of the quality of meatballs. The water content of a good meatball is determined by the composition of the ingredients and the processing process, while the amount of water content that is affected by storage is indicated by external factors. The main function of packaging is to control the interaction between food products and the external environment (Indraswati, 2017).

2.Ash content

The results of the diversity analysis showed that the type of packaging treatment and storage time had no significant effect (Appendix 12) on the ash content of the resulting meatball. The average ash content of the meatball research results is presented in Table 3.

Table 3. Average ash content (%) of the research results of meatballs

Factor A (Type package)	Factor B (Storage time)		
	B_1 (0 jam)	B_2 (12 jam)	B_3 (24 jam)
A1 (Non package)	1,56	1,54	1,48
A2 (*Styrofoam*)	1,56	1,55	1,51
A3 (*Wrap*)	1,57	1,56	1,54
KK		0,16	

Table 3 shows that the type of packaging treatment, storage time and interaction of the two have no significant effect on the ash content of red oyster mushroom tuna. From these data, there is actually a decrease in ash content with insignificant values. In Table 3 shows that the ash content of the red tetelan of tuna, white oyster mushroom, decreased in each treatment. The use of the type of packaging and storage time does not significantly affect the increase or decrease of mineral substances in the materials they are packed with. It is assumed that the physical and chemical qualities of food are able to maintain the contents in it, including ash. That is, the different treatment factors for the type of packaging and storage time did not affect the ash content of red oyster mushroom tuna.

Research by Hutapea (2010) on the storage of red tilapia fish balls with plastic packaging at room temperature showed no significant changes in ash content. This research is confirmed by Hamdani et al. (2017), regarding the packaging of banana heart and catfish meatballs in vacuum and non-vacuum methods at cold temperatures, there was no significant change in ash content.

Ash content is a mixture of inorganic or mineral components found in non-volatile foodstuffs, which remains in the combustion and annealing of organic compounds (Soebito, 1988). In general, ash consists of sodium (Na), calcium (Ca), potassium (K), and silicate (Si) compounds. Ash content is the residual inorganic substance from combustion. Ash content is related to mineral elements contained in the material (Winarno, 2004).

The ash content of the red oyster mushroom tuna can be based on the flour used in the dough. The mineral content in flour is not large but it is very important. The mineral material will be found in flour residue which has been completely burned to white ash (Winarno, 2002). According to the National Standard Agency (2014) the limit of ash parameters on fish meatballs is a maximum of 2%, so that the red tetelan tuna, white oyster mushroom meatballs on the type of packaging and storage time differ by below 2%, so that it still meets the Indonesian National Standardization.

3.Protein Content

The results of the analysis of diversity showed that variations in the type of packaging, storage time, and their interactions were significantly different (Appendix 13) to the moisture content of the meatballs produced. The average ash content of the research results is presented in Table 4.

Table 4. Average protein content (%) of research results

Factor A (Type Package)	Factor B (Storage time))		
	B_1 (0 hour)	B_2 (12 Hour)	B_3 (24 Hour)
A_1 (Non Package)	3,67 a A	4,28 a A	3,67 a A
A_2 (Styrofoam)	3,88 a A	4,16 a A	5,47 b B
A_3 (Wrap)	4,79 a A	4,45 a A	4,25 a A
KK			

The numbers followed by the same letter have an insignificantly different effect at the 5% level according to the DMRT follow-up test. Where uppercase is read horizontally and lowercase is read vertically.

Table 4 shows that the highest protein content is found in the Styrofoam packaging type with a storage time of 24 hours (A2B3), while the lowest is in the unpackaged treatment with a storage time of 0 hours and 24 hours (A1B1, A1B3). The effect of the type of packaging and storage time had an inconsistent effect on changes in the protein content of the white oyster mushroom tuna. Table 4 shows that the protein content of unpackaged meatballs has increased at 12 hours of storage, while 24 hours of storage have decreased. This condition is related to the growth and development of bacteria which is influenced by high water content and contamination with the environment. A decrease in water content can lead to an increase in protein levels. Furthermore, at 24 hours of storage there was a decrease in protein levels, presumably the effect of the exudation in the form of mucus out of the meatballs due to microbial activity. The discharge of mucus causes several nutrients such as salts, polypeptides, amino acids, lactic acids, purines, etc. which dissolve in water to be carried away with the water that comes out of the meatballs from microbial activity.

During storage, when using Styrofoam packaging, there is an increase in protein content. The type of Styrofoam packaging with a storage time of 24 hours (A2B3) is the highest protein content of all treatments, namely 5.47%. The increase in protein content is influenced by the decreasing water content of the meatballs. This condition cannot be separated from the nature of the Styrofoam packaging material which is able to maintain hot and cold temperatures. The ability of Styrofoam packaging to store heat results in reduced moisture content in the ingredients resulting in drying. According to Adawyah (2007) cit Riansyah, (2013), decreasing water content will result in increased protein content in the material.
In the type of wrap packaging, the protein content decreased during storage but it was not significant because the wrap packaging on the red tuna, white oyster mushroom tuna meatballs was better at preventing protein denaturation by bacteria. The decrease in protein content in the wrap packaging is due to the effect of reactive group bonds on the polypeptide chain of the material itself. If the bonds between the reactive groups hold the entire liquid, a gel will form, whereas if the liquid is separated from the coagulated protein, the protein will precipitate (Winarno, 2004).

Wrap packaging during storage can reduce contamination by environmental factors so that protein denaturation caused by bacteria can be minimized. This is because the packaging used has low water vapor permeability and moderate gas permeability so that bacterial growth can be inhibited (Syarief. 2007). According to Winarno (1997) protein content is closely related to water content and total microbes in food. The activity of microorganisms and enzymatic activity can affect protein levels in meatballs. Bacterial growth will accelerate protein denaturation so that protein levels will decrease. Microorganisms that grow generally will damage proteins turning them into peptides and amino acids (Cahya, 2009).

Protein is a great source of amino acids which contain large organic compounds. Based on the atomic arrangement, proteins contain 50-55% carbon atoms (C), 20-23% oxygen atoms (O), 12-19% nitrogen atoms (N), 6-7% hydrogen atoms (H), and 0.2 -0.3% sulfur atom (S) (Estiasih, 2016). Protein is an important substance for the body, because in addition to functioning as fuel in the body, it also functions as a building and regulatory substance (Winarno, 2002).

Bacteria can break down complex molecules and organic substances such as polysaccharides, fats and proteins into simpler units. This initial breakdown can occur due to the excretion of extracellular enzymes, which are closely related to the process of food spoilage (Buckle et al. 1987).

4 Total Plate Figures (ALT)
In this study, an examination of the Total Plate Number was carried out, namely calculating the number of colonies that grew on the media from sample dilution. Dilution aims to reduce the number of

microorganism populations. The calculation of the total plate count of microorganisms is selected from petri dishes with a colony of 30-300. This is because the media so that the number of colonies is high (> 300 colonies) is not validly counted so it is likely that the calculation error is very large while the number for small colonies (<30 colonies) is not statistically valid.
The results of the observation / calculation of the Total Plate Number (ALT) using the Plate Count Agar (PCA) method in the calculation results are presented in Table 5.

Table 5. Calculation results of meatball ALT

Factor A (Type Package)	Faktor B (Storage time)		
	B_1 (0 Hour)	B_2 (12 Hour)	B_3 (24 Hour)
A_1 (Non package)	$9{,}2 \times 10^3$ cfu/g	$8{,}6 \times 10^4$ cfu/g	$3{,}0 \times 10^5$ cfu/g
A_2 (Styrofoam)	$1{,}0 \times 10^3$ cfu/g	$2{,}1 \times 10^4$ cfu/g	$2{,}8 \times 10^5$ cfu/g
A_3 (Wrap)	$4{,}3 \times 10^2$ cfu/g	$1{,}2 \times 10^4$ cfu/g	$1{,}2 \times 10^4$ cfu/g

Table 5 shows the lowest total number of microbes found in wrap packaging and 0 hour storage time (A3B1), while the highest was found in unpackaged meatballs and 24 hours storage time (A1B3). The total number of meatball microorganisms that did not meet the SNI requirements for fish balls was found in the A1B3 and A2B3 treatments. According to SNI 7266: 2014 fish meatballs have a maximum limit of Total Plate Count (TPC) or a total plate number of 1.0x105 colonies / gram (5 log CFU / gram). The higher number of microbes was caused by the type of packaging that was unable to control the conditions of moisture, temperature and air during storage. According to Atma (2016), the number of microorganisms in processed food is influenced by water content, water activity, pH, temperature, and length of time. High microbial growth is due to the availability of oxygen, free water and sufficient air to support optimal microbial growth (Tshikantwa et al. 2018).

Meatball as a processed meat product is an ideal culture growth medium for microorganisms because of its high water content, pH that is close to neutral and rich in nutrients. The cause of microbial contamination in foodstuffs can be due to the initial number of microbes in fish affecting the number of microbes in the future so that it will increase the number of microbial contamination in fishery products (Sukmawati, 2018)

Contamination from spoilage organisms is difficult to avoid. The total number of microbes in food products is an indicator of food safety (Martoyo et al. 2014). Microbiological analysis needs to be done as an evaluation of the number of microbes in a food ingredient. The raw materials used contain high nutrients, high moisture content, and packaging characteristics and properties. In accordance with the quality requirements of fish balls, this type of wrap packaging still meets the food safety threshold because it can slow down the growth rate of microorganisms and the enzymatic changes that occur after processing and during 24 hours of storage.

6.Identification of Salmonella sp.
Salmonella sp. is a type of rod-shaped bacteria with a size of 1-3.5 µm x 0.5-0.8 µm. Salmonella sp. is a pathogenic bacteria that can cause food poisoning. This identification is done to determine the presence or absence of Salmonella sp. on the red oyster mushroom tuna red meatball after different packaging and storage. SNI 7266: 2014 stipulates that fish meatballs should not contain Salmonella (negative Salmonella).
From the results of identification that was carried out starting from the pre-enrichment stage, enrichment, selective media to biochemical testing of the red oyster mushroom tuna red meatball samples, the identification results of Salmonella sp. Bacteria were obtained. presented in Table 6.

Table 6. Identification results of salmonella sp. on the meatball

Treatment	10^1	10^2	SNI	Information
A_1B_1	Negatif	Negatif	Negatif Per 25 g	just right sni
A_2B_1	Negatif	Negatif		just right sni
A_3B_1	Negatif	Negatif		just right sni
A_1B_2	Positif	Positif		Not just right sni
A_2B_2	Positif	Positif		Not just right sni
A_3B_2	Negatif	Negatif		just right sni
A_1B_3	Positif	Positif		Not just right sni
A_2B_3	Positif	Positif		Not just right sni
A_3B_3	Negatif	Negatif		Just right sni

Amount sample : 9
Amount positif (+)% : 44,44%
Amount negatif (-)% :55,56%
Total :100%

Based on Table 11, the isolation results on SSA media that were positive for Salmonella sp were shown by the formation of clear colonies with black in the middle. The formation of a colorless colony with a black center because Salmonella sp. can produce Hydrogen Sulfide (H2S) which is characterized by the formation of black deposits on the AAS media. In the identification of Salmonella sp. In 9 samples of white oyster mushroom tuna red meatballs, 4 samples were positive for salmonella sp, namely samples A1B2 (without packaging with 12 hours storage time), A2B2 (styrofoam packaging with 12 hours storage time), A1B3 (without packaging) with a shelf life of 24 hours), A2B3 (styrofoam packaging with a shelf life of 24 hours). After the percentage, the results (44.44%) were obtained from the total of all samples. However, meatball with wrap packaging and storage time of 24 hours (A3B3) was not indicated that Salmonella sp was present, meaning that the use of wrap packaging with a storage time of up to 24 hours was still able to protect the meatball products from Salmonella sp bacteria.

Based on research by Susanti et al. (2016) the occurrence of bacterial contamination with Salmonella sp. in smoked fish is influenced by the hygiene practices of producers and sellers. Poor hygiene practices, for example unwashed hands, using dirty utensils, uncut nails and leaving food open are a means of spreading bacteria. In addition, dirty environmental conditions allow the spread of microbes and germ particles to be carried into smoked fish.

According to the theory of Arlita et al. (2015), which causes the sample to be contaminated by bacteria is caused by a knife used to cut raw materials such as raw meat that is contaminated by pathogenic bacteria if the equipment is used again without washing it first to cut cooked food that will be contaminated by the tool, by means of displacement of pathogens that can pose a risk to those who consume these foods. Salmonella sp in food in large enough quantities will not cause a change in appearance, smell or taste (Frazier and Westhoff, 1978). Salmonella sp can grow in a temperature range of 5−47 ° C with the optimum growth temperature is 37 ° C and the maximum temperature is 45.6 ° C (Frazier and Westhoff, 1988).

Food containing Salmonella sp in small amounts will not change the shape, taste and smell of the meal. However, if the food contains large amounts of bacteria, it will change the shape, taste, and distinctive smell of bacteria. The presence of Salmonella sp. According to SNI 7266: 2014 concerning fish meatballs, it must be negative for Salmonella sp microbes per 25 grams. In the research, tuna red tetelan meatball with wrapper was still protected from the growth of Salmonella sp bacteria for 24 hours.

7. Organoleptic Test

Organoleptic tests are carried out through sensory assessments, namely by observing appearance, observing odors, and observing texture. This test is carried out by means of the sample made in accordance with the treatment formulation. Furthermore, the test was carried out on 15 panelists. Panelists will provide a value based on the meatball specifications provided.

1. Appearance

Appearance is the first characteristic that consumers can judge for the first time. This appearance assessment aims to determine the panelists' acceptance which is assessed from the surface appearance of the meatball. The average results of the assessment of the appearance of the meatballs are presented in Table 7.

Table 7. Average parameter values for the appearance of meatballs

Treatment	average
A_1B_1 (Without packaging with a long shelf of 0 hours)	8,60
A_2B_1 (Packaging *Styrofoam* a long shelf of 0 hours)	8,60
A_3B_1 (Packaging *wrap* a long self 0 hours)	8,60
A_1B_2 (Non packaging a long self 12 hours)	6,33
A_2B_2 (Packaging *Styrofoam* a long self 12 hour)	7,00
A_3B_2 (Packaging *wrap* a long self 12 hour)	7,53
A_1B_3 (Non Packaging a long self 24 hour)	4,47
A_2B_3 (Packaging *Styrofoam* a long self 24 hour)	5,53
A_3B_3 (Packaging *wrap* a long self 24 hour)	6,87

Test parameter description:
9: smooth surface, not hollow, bright., 7: surface less smooth, slightly hollow, less bright., 5: surface rough, hollow, dull., 3: surface slightly cracked, hollow a lot, dull, 1: surface lots of cracks, lots of cavities, very dull

Table 7 shows the average value of panelists' acceptance of the appearance of meatballs in different treatments which tends to decrease. The appearance of the red oyster mushroom tuna red meatballs has an average value ranging from 4.47 to 8.60. The treatments for meatballs without 0 hour storage packaging (A1B1), Styrofoam packaging for 0 hours storage (A2B1), and 0 hours storage wrap packaging (A2B1) both had the highest value reaching 8.60. Based on the panelists' values 7-9, the three treatments have specifications of smooth, non-hollow, bright surface. The high value of the appearance test is due to the test carried out before the product experiences storage and the type of packaging used.

While the lowest appearance value was found in the A1B3 treatment (without packaging for 24 hours storage time) with a value of 4.47 with a slightly cracked surface specification, a lot of hollow, dullness. In accordance with SNI 7266: 2014 concerning fish meatballs, the minimum sensory value of 7 (score 1-9) with the surface specifications is less smooth, slightly hollow, less bright. From this research, those that do not meet the requirements according to SNI for the appearance value are without 12-hour storage packaging (A1B2), without 24-hour storage packaging (A1B3) and 24-hour storage packaged Styrofoam meatballs (A2B3).

Table 7 shows the longer the retention of the panelists' acceptance of the appearance of the meatballs, the decreasing. The use of styrofoam packaging and wrap for 12 hours of storage still meets the minimum threshold for the appearance value of meatballs based on SNI 7266: 2014, which is a minimum of 7, meaning that it still has a surface specification that is less smooth, slightly hollow, less bright. Meanwhile, the 24-hour storage without Styrofoam packaging and packaging no longer meets the sensory quality requirements of meatballs.

Products or foodstuffs that experience storage result in quality degradation, both physically and chemically (Ketaren, 1986). Meatballs are known to have decreased water content during storage

resulting in the appearance of dull meatballs. According to Chamidah (2000), explaining that the decrease in appearance value during storage is suspected because the water content of the product during storage has also decreased. In addition, during storage, there will be microorganism activity which results in the appearance of slimy meatballs. This is in accordance with the opinion of Hidayati et al. (2013), said that the meatballs will look soft and slimy due to the activity of microorganisms. It can be seen that the red and white oyster mushroom tuna meatballs during storage for up to 24 hours have deteriorated quality.

2. Odor (aroma)

Aroma is a parameter that affects the quality of a processed product. The smell or smell of food can determine the delicacy of these food ingredients. In general, the smells received by the nose and brain is a combination of four main smells, namely fragrant, sour, rancid, and charred (Winarno, 1997). The average value of the red oyster mushroom tuna red meatball aroma is presented in Table 8.

Table 8. Average value of meatball odor parameters

Treatment	average
A_1B_1 (Without packaging with a long shelf of 0 hours)	8,33
A_2B_1 (Packaging *Styrofoam* a long shelf of 0 hours)	8,60
A_3B_1 (Packaging *wrap* a long self 0 hours)	8,73
A_1B_2 (Non packaging a long self 12 hours)	6,87
A_2B_2 (Packaging *Styrofoam* a long self 12 hour)	6,47
A_3B_2 (Packaging *wrap* a long self 12 hour)	7,93
A_1B_3 (Non Packaging a long self 24 hour)	4,87
A_2B_3 (Packaging *Styrofoam* a long self 24 hour)	4,47
A_3B_3 (Packaging *wrap* a long self 24 hour)	6,07

Test parameter description:
9 = specific product 7 = less specific product 5 = neutral 3 = slightly rotten, rancid 1 = rotten and very rancid

The results of the panelists' average assessment of the aroma parameters of red tetelan tuna, white oyster mushroom tuna on different treatments ranged from 4.47 to 8.33. The highest aroma value of the tested fish balls was achieved by the A3B1 treatment (0 hour storage wrap packaging), namely 8.73. The high value of this aroma is because it has not been influenced by the type of packaging and storage time so that the aroma is still maintained with product specifications. While the lowest value was achieved by the A2B3 treatment (Styrofoam packaging for 24 hours), namely 4.47.

The decrease in the average value of the odor specification for stored meatballs at 0 to 12 hours, the odor sensory value was still acceptable to the panelists, but after the 24th hour the value had been rejected because the aroma had changed. The production of aroma compounds is largely determined by the composition of the bacteria involved in these compounds (Winarno, 1997). Basically, the stored meatball does not experience a change in aroma to become rancid, but rather an increase in the aroma of fish in the meatball. The increase in the fishy aroma of meatballs can occur due to an overhaul of fish protein by enzyme activity and microorganisms. According to Rahmadana (2013), a change in a sharp fishy odor is a sign of protein decomposition in fish.

The decrease in the average value of the odor specification of fish meatballs from the 0th hour to the 12th hour of the odor sensory value of the unpackaged meatballs and wrap packaging was still acceptable to the panelists, but after the 24th hour the value was rejected for fish balls. Where the characteristic appears unpleasant odor close to neutral until a sour smell arises. From the sensory value, it can be seen that the treatment of meatballs without Styrofoam packaging and packaging decreases the specification value faster than the packaging during storage. According to Saleh et al. (1994), during storage, the sensory value of aroma / smell tends to decrease, this is in line with the increase in the value of ammonia,

TVB, TPC, fat oxidation. The increasing number of microorganisms causes the formation of compounds that produce unpleasant odors and tastes.

3.Texture

Texture is one of the factors that determine the acceptance of a product. Texture assessment aims to determine the panelist's acceptance of the level of elasticity or resilience of a product which can be assessed using the sense of touch, namely through touch stimuli. The results of the scoring test regarding the texture of the red and white oyster mushroom tuna meatballs are presented in Table 9.

Table 9. Average value of meatball texture

Treatment	average
A_1B_1 (Without packaging with a long shelf of 0 hours)	8,47
A_2B_1 (Packaging *Styrofoam* a long shelf of 0 hours)	8,60
A_3B_1 (Packaging *wrap* a long self 0 hours)	8,60
A_1B_2 (Non packaging a long self 12 hours)	7,00
A_2B_2 (Packaging *Styrofoam* a long self 12 hour)	7,00
A_3B_2 (Packaging *wrap* a long self 12 hour)	7,13
A_1B_3 (Non Packaging a long self 24 hour)	6,07
A_2B_3 (Packaging *Styrofoam* a long self 24 hour)	6,07
A_3B_3 (Packaging *wrap* a long self 24 hour)	6,60

Description of test parameters: 9 = solid, compact, chewy 7 = compact, rather springy 5 = not solid, not compact, not chewy 3 = easy to break 1 = very easy to break

In Table 9, it can be seen that the average value of the panelists' acceptance rate of the texture of the white oyster mushroom tuna red tetelan meatball ranges from 6.7 to 8.60. The highest average value was found in the A2B1 treatment (Styrofoam packaging for 0 hours storage) and A3B1 (24 hours storage wrap packaging), which had the same value of 8.60 with the specifications of solid, compact, and thick. While the lowest was in the A1B3 treatment (without 24-hour storage packaging) and A2B3 (24-hour storage Styrofoam packaging) which had the same value of 6.07 with the specifications of solid, compact, rather chewy.

Based on the data above, it is known that the meatball product with storage for 12 hours has a value of 7, meaning that it still meets the product specifications for solid, compact, somewhat chewy. In accordance with SNI 7266: 2014 regarding fish meatballs with a minimum sensory value of 7 (score 1-9) with a compact, rather chewy solid specification. Storage at 0 to 24 hours texture parameters in all treatments decreased. However, the texture of the oyster mushroom tuna red tetelan meatball on the A3B3 treatment (24-hour storage wrap packaging) was still acceptable to the panelists with a value of 6.60, meaning that it still met the specifications for solid, compact, somewhat chewy.

One of the parameters that people like about meatballs is their chewy texture. There are several factors that can affect the texture of the meatballs such as the composition of the meatballs, the manufacturing process and heating time (Pramuditya and Yuwono, 2014). During storage, changes in the texture of food can occur due to changes in water content, temperature and microbiological activity which can lead to a decrease in food quality (Purnomo 1995).

Conclusion

Based on research on "The Effect of Packaging Type and Storage Time on Quality of Red Tuna, White Oyster Mushroom Meatballs" can be drawn the following conclusions: 1. Type of red oyster mushroom tuna red meatball packaging based on water content, ash content, protein content, ALT, Salmonella sp and Organoleptic bacterial contamination is the best use of Wrap packaging. 2. The duration of storage of red

oyster mushroom tuna red meatballs based on water content, ash content, protein content, ALT, Salmonella sp and Organoleptic bacterial contamination is the best storage for 12 hours. 3. Combination of treatment on the quality of white oyster mushroom tuna red meatballs is the use of wrap packaging with a storage time of 12 hours.

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Example :

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Layout guide for publication in *IOP Conference Series: Earth and Environmental Sciences* using Microsoft Word

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Abstract. All articles *must* contain an abstract. The abstract text should be formatted using 10 point Times or Times New Roman and indented 25 mm from the left margin. Leave 10 mm space after the abstract before you begin the main text of your article, starting on the same page as the abstract. The abstract should give readers concise information about the content of the article and indicate the main results obtained and conclusions drawn. The abstract is not part of the text and should be complete in itself; no table numbers, figure numbers, references or displayed mathematical expressions should be included. It should be suitable for direct inclusion in abstracting services and should not normally exceed 200 words in a single paragraph. Since contemporary information-retrieval systems rely heavily on the content of titles and abstracts to identify relevant articles in literature searches, great care should be taken in constructing both.

1. Introduction

These guidelines, written in the style of a submission to *IOP Conference Series: Earth and Environmental Sciences*, show the best layout for your paper using Microsoft Word. If you don't wish to use the Word template provided, please use the following page setup measurements.

Margin	**A4 ONLY – DO NOT USE US LETTER**
Top	4.0 cm
Bottom	2.7 cm
Left	2.5 cm
Right	2.5 cm
Gutter	0 cm
Header	0 cm
Footer	0 cm

It is *vital* that you **do not add any headers, footers or page numbers to your paper**; these will be added during the production process at IOP Publishing (this is why the Header and Footer margins are set to 0 cm in table 1).

2. Formatting the title, authors and affiliations

Please follow these instructions as carefully as possible so all articles within a conference have the same style to the title page. This paragraph follows a section title so it should not be indented.

2.1. Formatting the title

The title is set 17 point Times Bold, flush left, unjustified. The first letter of the title should be capitalized with the rest in lower case. It should not be indented. Leave 28 mm of space above the title and 10 mm after the title.

2.2. Formatting author names

The list of authors should be indented 25 mm to match the abstract. The style for the names is initials then surname, with a comma after all but the last two names, which are separated by 'and'. Initials should not have full stops—for example **A J Smith** and *not* **A. J. Smith**. First names in full may be used if desired. If an author has additional information to appear as a footnote, such as a permanent address or to indicate that they are the corresponding author, the footnote should be entered after the surname.

2.3. Formatting author affiliations

Please ensure that affiliations are as full and complete as possible and include the country. The addresses of the authors' affiliations follow the list of authors and should also be indented 25 mm to match the abstract. If the authors are at different addresses, numbered superscripts should be used after each surname to reference an author to his/her address. The numbered superscripts should *not* be inserted using Word's footnote command because this will place the reference in the wrong place—at the bottom of the page (or end of the document) rather than next to the address. Ensure that any numbered superscripts used to link author names and addresses start at 1 and continue on to the number of affiliations. Do not add any footnotes until all the author names are linked to the addresses. For example, to format

J Mucklow[1,3], J E Thomas[1,4] and A J Cox[2,5]

where there are three addresses, you should insert numbered superscripts 1, 2 and 3 to link surnames to addresses and then insert *footnotes* 4 and 5. Note that the first footnote in the main text will now be number 6.

2.3.1. An example. In this example we can see that there are footnotes after each author name and only 5 addresses; the 6th footnote might say, for example, 'Author to whom any correspondence should be addressed.' In addition, acknowledgment of grants or funding, temporary addresses etc might also be indicated by footnotes.

Spin dynamics in geometrically frustrated antiferromagnetic pyrochlores

J S Gardner[1,2,6], G Ehlers[3], S T Bramwell[4] and B D Gaulin[5]

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[3] SNS Project, Oak Ridge National Laboratory, 701 Scarboro Road, Oak Ridge, TN 37830, USA
[4] Department of Chemistry, University College London, 20 Gordon Street, London WC1H 0AJ, UK
[5] Department of Physics and Astronomy, Canadian Institute for Advanced Research, McMaster University, Hamilton, ON, L8S 4M1, Canada

3. Formatting the text

The text of your paper should be formatted as follows:

- 11 point Times or Times New Roman.
- The text should be set to single line spacing.
- Paragraphs should be justified.
- The first paragraph after a section or subsection heading should not be indented; subsequent paragraphs should be indented by 5 mm.

4. Sections, subsections and subsubsections

The use of sections to divide the text of the paper is optional and left as a decision for the author. Where the author wishes to divide the paper into sections the formatting shown in table 2 should be used.

4.1. Style and spacing

Table 2. Formatting sections, subsections and subsubsections.

	Font	Spacing
Section	11 point **Times bold**	1 line space before a section No additional space after a section heading
Subsection	11 point *Times Italic*	1 line space before a subsection No space after a subsubsection heading
Subsubsection	11 point *Times Italic*	Subsubsections should end with a full stop (period) and run into the text of the paragraph

4.2. Numbering

Sections should be numbered with a dot following the number and then separated by a single space:

- sections should be numbered 1, 2, 3, etc
- subsections should be numbered 2.1, 2.2, 2.3, etc
- subsubsections should be numbered 2.3.1, 2.3.2, etc

5. Footnotes

Footnotes should be avoided whenever possible. If required they should be used only for brief notes that do not fit conveniently into the text.

6. Figures

Each figure should have a brief caption describing it and, if necessary, a key to interpret the various lines and symbols on the figure.

6.1. Space considerations

Authors should try to make economical use of the space on the page; for example:

- avoid excessively large white space borders *around* your graphics;
- try to design illustrations that make good use of the available space—avoid unnecessarily large amounts of white space *within* the graphic;

6.2. Text in figures

Wherever possible try to ensure that the size of the text in your figures (apart from superscripts/subscripts) is approximately the same size as the main text (11 points).

6.3. Line thickness

In general, try to avoid extremely fine lines (often called 'hairline' thickness) because such lines often do not reproduce well when printed out—your diagrams may lose vital information when downloaded and printed by other researchers. Try to ensure that lines are no thinner than 0.25 pt. Note that some illustrations may reduce line thickness when the graphic is imported and reduced in size (scaled down) inside Microsoft Word.

6.4. Colour illustrations

You are free to use colour illustrations for the online version of *Journal of Physics: Conference Series* but any print version will only be printed in black and white **unless special arrangements have been made with your conference organizer for colour printing. Please check with the conference organizer whether or not this is the case.** If any print version will be black and white only, you should check your figure captions carefully and remove any reference to colour in the illustration and text. In addition, some colour figures will degrade or suffer loss of information when converted to black and white and this should be taken into account when preparing them.

6.5. Positioning figures

Individual figures should normally be centred but place two figures side-by-side if they will fit comfortably like this as it saves space. Place the figure as close as possible after the point where it is first referenced in the text. If there are a large number of figures it might be necessary to place some before their text citation. Figures should never appear within or after the reference list.

6.6. Figure captions/numbering

Captions should be below the figure and separated from it by a distance of 6 points—although to save space it is acceptable to put the caption next to the figure. Figures should be numbered sequentially through the text—'Figure 1', 'Figure 2' and so forth and should be referenced in the text as 'figure 1', 'figure 2',… and not 'fig. 1', 'fig. 2', ….

For captions not placed at the side of the figure, captions should be set to the width of the figure for wider figures, centred across the width of the figure, or, for narrow figures with wide captions, slightly extended beyond the width of the figure. The caption should finish with a full stop (period).

6.6.1. *Examples.* The following examples show how to format a number of different figure/caption combinations. **Note that the table borders are shown as broken lines for guidance only.**

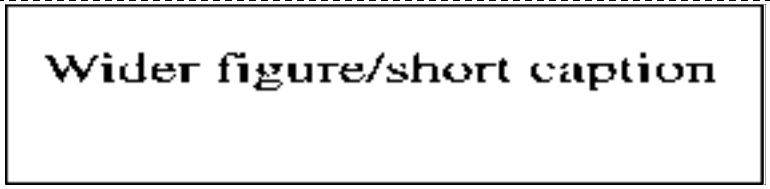

Figure 3. Figure with short caption (caption centred).

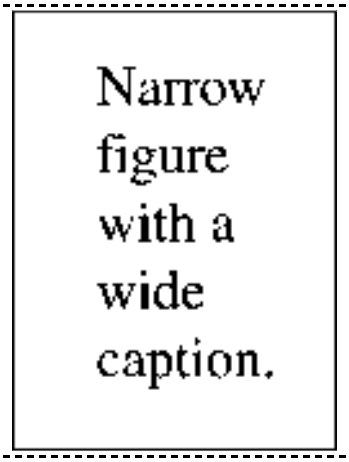

Figure 4. This is a figure with a caption that is wider than the actual graphic. To save space you can put the caption to the right of the figure by placing the graphic and justified caption in a table with one row and two columns.

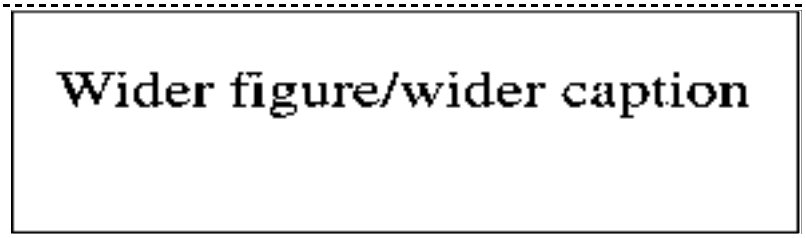

Figure 5. In this case simply justify the caption so that it is as the same width as the graphic.

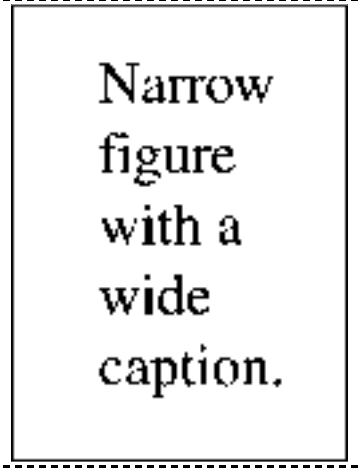

Figure 6. These two figures have been placed side-by-side to save space. Justify the caption.

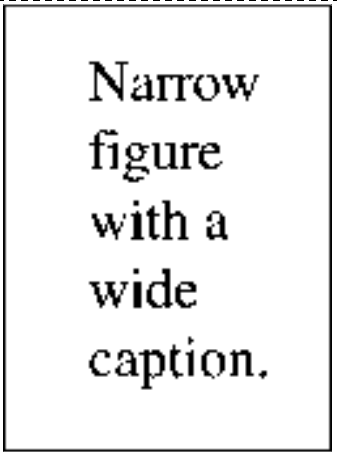

Figure 7. These two figures have been placed side-by-side to save space. Justify the caption.

6.7. Figures in parts

If a figure has parts these should be labelled as (a), (b), (c) etc on the actual figure. Parts should not have separate captions.

7. Tables

Note that as a general principle, for large tables font sizes can be reduced to make the table fit on a page or fit to the width of the text.

7.1. Positioning tables

Tables should be centred unless they occupy the full width of the text.

7.2. Tables in parts

If a table is divided into parts these should be labelled (a), (b), (c) etc but there should only be one caption for the whole table, not separate ones for each part.

7.3. Table captions/numbering

Tables should be numbered sequentially throughout the text and referred to in the text by number (table 1, **not** tab. 1 etc). Captions should be placed at the top of the table and should have a full stop (period) at the end. Except for very narrow tables with a wide caption (see examples below) the caption should be the same width as the table.

7.4. Rules in tables

Tables should have only horizontal rules and no vertical ones. Generally, only three rules should be used: one at the top of the table, one at the bottom, and one to separate the entries from the column headings. Table rules should be 0.5 points wide.

7.5. Examples

Because tables can take many forms, it is difficult to provide detailed guidelines; however, the following examples demonstrate our preferred styles.

Table 3. A simple table. Place the caption above the table. Here the caption is wider than the table so we extend it slightly outside the width of the table. Justify the text. Leave 6 pt of space between the caption and the top of the table.

Distance (m)	Velocity (ms^{-1})
100	23.56
150	34.64
200	23.76
250	27.9

7.5.1. More complex tables. The following is a slightly more complex table with a caption that is narrower than the table. Centre the caption across the width of the table. If it is difficult to make a table fit the page, use a smaller font. Headings should normally be in Roman (i.e., not bold or italic) type, have an initial capital and normally align left (but centred sometimes looks better); it is up to the author to choose a layout that is most useful to the reader. Columns of numbers normally align on the decimal point.

Table 4. A slightly more complex table with a narrow caption.

	Wake Chi Sqr. (*N*=15, *df*=1)	*p*	Stage 1 Chi Sqr. (*N*=15, *df*=1)	*p*	Stage 2 Chi Sqr. (*N*=15, *df*=1)	*p*
F3	1.143	0.285	0.286	0.593	0.286	0.593
Fz	1.143	0.285	0.067	0.796	0.067	0.796
C4	2.571	0.109	0.600	0.439	1.667	0.197

Table 5. A slightly more complex table with a caption that is the same width as the table. Simply place the caption inside a row at the top of the table and merge

(combine) the cells together so that you have a single table cell the width of the table. Justify the caption.

	Wake Chi Sqr. (*N*=15, *df*=1)	*p*	Stage 1 Chi Sqr. (*N*=15, *df*=1)	p	Stage 2 Chi Sqr. (*N*=15, *df*=1)	*p*
F3	1.143	0.285	0.286	0.593	0.286	0.593
Fz	1.143	0.285	0.067	0.796	0.067	0.796
Cz	1.143	0.285	0.077	0.782	0.286	0.593

7.6. Notes to tables

If you wish to format a table so that it contains notes (table footnotes) to the entries within the body of the table and/or within the table caption, these notes should be formatted using alphabetic superscripts such as [a], [b], [c] and so forth. Notes within the table caption should be listed first. Notes should be placed at the bottom of the table; one convenient method is to create an empty row at the bottom of the table to contain them. Again, merge the cells to give you a single cell the width of the table. Table notes should be 10 point Times Roman. Each note should be on a separate line.

Table 6. A table with headings spanning two columns and containing notes[a].

Nucleus	Thickness (mg cm^{-2})	Composition	Separation energies	
			[redacted], n (MeV)	[redacted], 2n (MeV)
^{181}Ta	19.3±0.1[b]	Natural	7.6	14.2
^{208}Pb	3.8±0.8[c]	99% enriched	7.4	14.1
^{209}Bi	2.6±0.01[c]	Natural	7.5	14.4

[a] Notes are referenced using alpha superscripts.
[b] Self-supporting.
[c] Deposited over Al backing.

8. Equations and mathematics

8.1. Fonts in Equation Editor (or MathType)

Make sure that your Equation Editor or MathType fonts, including sizes, are set up to match the text of your document.

8.2. Points of style

8.2.1. Vectors. Bold italic characters is our preferred style but the author may use any standard notation; for example, any of these styles for vectors is acceptable:

'the vector cross product of $\boldsymbol{a}$ and $\boldsymbol{b}$ is given by $\boldsymbol{a} \times \boldsymbol{b}$ …', or

'the vector cross product of $\mathbf{a}$ and $\mathbf{b}$ is given by $\mathbf{a} \times \mathbf{b}$ …', or

'the vector cross product of $\vec{a}$ and $\vec{b}$ is given by $\vec{a} \times \vec{b}$ …'.

8.2.2. *The solidus (/).* A two-line solidus should be avoided where possible; for example, use

- $\frac{1}{M_a}\left(\int_0^\infty d\omega \frac{|S_0|^2}{N}\right)^{-1}$ instead of $\frac{1}{M_a} \Big/ \int_0^\infty d\omega \frac{|S_0|^2}{N}$

- $\left(\frac{x^2+y^2}{x+y}\right)^{1/2}$ instead of $\sqrt{\left(\frac{x^2+y^2}{x+y}\right)}$.

8.2.3. *Roman and italic in mathematics.* Variables should be in italic; however there are some cases where it is better to use a Roman font:

- Use a Roman d for a differential d, for example, $\tan\theta = \mathrm{d}y/\mathrm{d}x$.
- Use a Roman e for an exponential e; for example, $y = \mathrm{e}^x$.
- Use a Roman i for the square root of –1; e.g., $\mathrm{i} = \sqrt{-1}$.
- Certain other common mathematical functions, such as cos, sin, det and ker, should appear in Roman type.
- Subscripts and superscripts should be in Roman type if they are labels rather than variables or characters that take values. For example in the equation

$$\varepsilon_m = -g\mu_{\mathrm{n}}Bm$$

m, the *z* component of the nuclear spin, is italic because it can have different values whereas n is Roman because it is a label meaning nuclear.

8.3. Alignment of mathematics

The preferred style for displayed mathematics in *Journal of Physics: Conference Series* is to centre equations; however, long equations that will not fit on one line, or need to be continued on subsequent lines, should start flush left. Any continuation lines in such equations should be indented by 25 mm.

Equations should be split at mathematically sound points, often immediately before =, + or – signs or between terms multiplied together. The connecting signs are not repeated and appear only at the beginning of the turned-over line. A multiplication sign should be added to the start of turned-over lines where the break is between two multiplied terms.

8.3.1. Small displayed equations: Some examples:

$$\phi_k(\mathbf{r}) = (2\pi)^{2/3}\exp\left(\mathrm{i}\mathbf{k}\cdot\mathbf{r}\right) \tag{1}$$

$$A^{(3/2)} = A^{(+)} - A^{(-)} \qquad (I = \tfrac{3}{2}) \tag{2}$$

However, if equations will fit on one line, do so; for example, (5) may also be formatted as:

$$C(12) = \left[\pi(x)\cdot\phi(x+r)\right] \approx 1 - \mathrm{const}\frac{r^2}{L^2}\int_r^L \frac{x\mathrm{d}x}{x^2} + \cdots \approx 1 - \mathrm{const}\frac{r^2}{L^2}\ln\left(\frac{L}{r}\right) + \cdots \tag{6}$$

8.3.2. *Large display equations: examples.* If an equation is almost the width of a line, place it flush left against the margin to allow room for the equation number.

$$Y(h\nu) = \frac{1}{q}\frac{(h\nu)^2}{[(h\nu_r)^2 - (h\nu)^2]^2 + (\Delta\omega_{1/2})^2(h\nu)^2}\int_{E_T - E_v - \Delta_g}^{\infty}\frac{[E + (E_r - h\nu)]^{1/2}}{[E + (E_v - E_-)]^{1/2}}\frac{E}{\exp[(E - E_m)/kT] + 1}\mathrm{d}E \tag{7}$$

8.4. Miscellaneous points

- Exponential expressions, especially those containing subscripts or superscripts, are clearer if the notation $\exp(\ldots)$ is used, except for simple examples. For instance, $\exp\left[\mathrm{i}\left(kx-\omega t\right)\right]$ and $\exp\left(z^2\right)$ are preferred to $\mathrm{e}^{\mathrm{i}(kx-\omega t)}$ and e^{z^2}, but e^2 is acceptable. Similarly the square root sign $\sqrt{\ }$ should only be used with relatively simple expressions, e.g. $\sqrt{2}$ and $\sqrt{a^2+b^2}$, but in other cases the power $1/2$ should be used.
- It is important to distinguish between $\ln = \log_{\mathrm{e}}$ and $\lg = \log_{10}$.
- Braces, brackets and parentheses should be used in the following order: {[()]}. The same ordering of brackets should be used within each size. However, this ordering can be ignored if the brackets have a special meaning (e.g. if they denote an average or a function).
- Decimal fractions should always be preceded by a zero: for example 0.123 *not* .123 (note, do not use commas, use the decimal point).
- Equations that are referred to in the text should be numbered with the number on the right-hand side.

8.5. Equation numbering

Equations may be numbered sequentially throughout the text (i.e., (1), (2), (3),…) or numbered by section (i.e., (1.1), (1.2), (2.1) ,…) depending on the author's personal preference. In articles with several appendices equation numbering by section is useful in the appendices even when sequential numbering has been used throughout the main body of the text: for example, A.1, A.2 and so forth. When referring to an equation in the text, always put the equation number in brackets—e.g. 'as in equation (2)' or 'as in equation (2.1)'—and always spell out the word 'equation' in full, e.g. 'if equation (5) is factorized'; do not use abbreviations such as 'eqn.' or 'eq.'.

9. Appendices

Technical detail that it is necessary to include, but that interrupts the flow of the article, may be consigned to an appendix. Any appendices should be included at the end of the main text of the paper, after the acknowledgments section (if any) but before the reference list. If there are two or more appendices they should be called appendix A, appendix B, etc. Numbered equations should be in the form (A.1), (A.2), etc, figures should appear as figure A1, figure B1, etc and tables as table A1, table B1, etc.

10. References

As part of the production system for *Journal of Physics: Conference Series*, online versions of all reference lists will, wherever possible, be linked electronically using CrossRef. **It is *vitally* important for all the references to be accurate and to be carefully formatted using the guidelines below, otherwise delays may be incurred and the references may not link through CrossRef**.

A complete reference should provide the reader with enough information to locate the article concerned, whether published in print or electronic form, and should, depending on the type of reference, consist of:

- name(s) and initials;
- date published;
- title of journal, book or other publication;
- titles of journal articles may also be included (optional);
- volume number;
- editors, if any;
- town of publication and publisher in parentheses for *books*;
- the page numbers.

For *Journal of Physics: Conference Series*, please use the Vancouver numerical system where references are numbered sequentially throughout the text. The numbers occur within square brackets, like this [2], and one number can be used to designate several references. The reference list gives the references in numerical, not alphabetical, order.

Points to note

- There should be a 5 mm gap between the reference number (e.g., '[8]') and the start of the reference text. Second and subsequent lines of individual references should be indented by 5 mm. For example:

[1] Aderhold J, Davydov V Yu, Fedler F, Klausing H, Mistele D, Rotter T, Semchinova O, Stemmer J and Graul J 2001 *J. Cryst. Growth* **222** 701

- the authors should be in the form surname (with only the first letter capitalized) followed by the initials with no periods after the initials. Authors should be separated by a comma except for the last two which should be separated by 'and' with no comma preceding it.
- The article title (if given) should be in lower case letters, except for an initial capital, and should follow the date.
- The journal title is in italic and is abbreviated. If a journal has several parts denoted by different letters the part letter should be inserted after the journal in Roman type, e.g. *Phys. Rev.* A. **Please do not join the part letter to the volume number in bold type.**
- Both the initial and final page numbers should be given where possible. The final page number should be in the shortest possible form and separated from the initial page number by an en rule '– ', e.g. 1203–14, i.e. the numbers '12' are not repeated.
- References to printed journal articles. A normal reference to a journal article contains three changes of font (see table 6).

Table 6. Font styles for a reference to a journal article.

Element	Style
Authors, date	Roman type
Article title (optional)	Roman type
Journal title	Italic type
Volume number	Bold type
Page numbers	Roman type

Here are some examples taken from published papers:

[1] Strite S and Morkoc H 1992 *J. Vac. Sci. Technol.* B **10** 1237
[2] Nakamura S, Senoh M, Nagahama S, Iwase N, Yamada T, Matsushita T, Kiyoku H and Sugimoto Y 1996 *Japan. J. Appl. Phys.* **35** L74

10.1.1. References to preprints. For preprints there are two distinct cases:

1. Where the article has been published in a journal and the preprint is supplementary reference information. In this case it should be presented as:

[1] Kunze K 2003 T-duality and Penrose limits of spatially homogeneous and inhomogeneous cosmologies *Phys. Rev.* D **68** 063517 (*Preprint* gr-qc/0303038)

2. Where the only reference available is the preprint. In this case it should be presented as

[1] Milson R, Coley A, Pravda V and Pravdova A 2004 Alignment and algebraically special tensors *Preprint* gr-qc/0401010

10.1.2. References to electronic-only journals. In general article numbers are given, and no page ranges, as most electronic-only journals start each article on page 1.

- For SISSA journals the volume is divided into monthly issues and these form part of the article number

[1] Horowitz G T and Maldacena J 2004 The black hole final state *J. High Energy Phys.* JHEP02(2004)008

10.1.3. *References to books, conference proceedings and reports.* References to books, proceedings and reports are similar to journal references, but have only two changes of font (see table 7).

Table 7. Font styles for references to books, conference proceedings and reports.

Element	**Style**
Authors, Date	Roman type
Book title	Italic type
Editors	Roman type
Place (city, town etc) of publication, publisher	Roman type
Volume, page number	Roman type

Points to note

- Book titles are in italic and should be spelt out in full with initial capital letters for all except minor words. Words such as Proceedings, Symposium, International, Conference, Second, etc should be abbreviated to *Proc*., *Symp*., *Int*., *Conf*., *2nd*, respectively, but the rest of the title should be given in full, followed by the date of the conference and the town or city where the conference was held. For Laboratory Reports the Laboratory should be spelt out wherever possible, e.g. *Argonne National Laboratory Report*.
- The volume number, for example vol 2, should be followed by the editors, in a form such as 'ed A J Smith and P R Jones'. Use *et al* if there are more than two editors. Next comes the town of publication and publisher, within brackets and separated by a colon, and finally the page numbers preceded by p if only one number is given or pp if both the initial and final numbers are given.

Examples taken from published papers:

[1] Sze S M 1969 *Physics of Semiconductor Devices* (New York: Wiley–Interscience)
[2] Dorman L I 1975 *Variations of Galactic Cosmic Rays* (Moscow: Moscow State University Press) p 103
[3] Caplar R and Kulisic P 1973 *Proc. Int. Conf. on Nuclear Physics (Munich)* vol 1 (Amsterdam: North-Holland/American Elsevier) p 517
[4] Szytula A and Leciejewicz J 1989 *Handbook on the Physics and Chemistry of Rare Earths* vol 12, ed K A Gschneidner Jr and L Erwin (Amsterdam: Elsevier) p 133

[5] Kuhn T 1998 Density matrix theory of coherent ultrafast dynamics *Theory of Transport Properties of Semiconductor Nanostructures (Electronic Materials* vol 4*)* ed E Schöll (London: Chapman and Hall) chapter 6 pp 173–214

10.2. Reference lists

Up to ten authors may be given in a particular reference; where there are more than ten only the first should be given followed by *et al*. Abbreviations of the names of periodicals used by IOP Publishing are usually the same as those given in British Standard BS 4148: 1985. If an author is unsure of an abbreviation it is best to leave the title in full. The terms *loc. cit.* and *ibid* should not be used.

Unpublished conferences and reports should generally not be included in the reference list and articles in the course of publication should be entered only if the journal of publication is known. A thesis submitted for a higher degree may be included in the reference list if it has not been superseded by a published paper and is available through a library; sufficient information should be given for it to be traced readily.

Acknowledgments

Authors wishing to acknowledge assistance or encouragement from colleagues, special work by technical staff or financial support from organizations should do so in an unnumbered Acknowledgments section immediately following the last numbered section of the paper.

Note : maximum allowed pages in ICARD are twelve (12) including tables, figures, and references.

THE 2nd INTERNATIONAL CONFERENCE ON AGRICULTURE AND RURAL DEVELOPMENT (ICARD)
Administrative office: Jl. Raya Jakarta km.04, Serang City, Banten Province-Indonesia
Faculty of Agriculture, University of Sultan Ageng Tirtayasa
Website: https://icard.untirta.ac.id/ E-mail : icard@untirta.ac.id

Serang, November 9, 2020

Number : 25/ INV/ ICARD/ 2020
Subject : Invitation Letter

Dear I Ketut Budaraga,

We are very grateful to invite you as **oral presenter** with following paper details:

Title : Quality of Red Tuna (Yellowfin Tuna) Fishball, White Oyster Mushroom (Pleurotus Ostreatus) on Different Types of Packaging and Storage Time

Contributor(s) : I Ketut Budaraga, Vincensius Saibuma, Leffy Hermalena

Turnitin check : 11 %

in the 2nd International Conference on Agriculture and Rural Development (the 2nd ICARD), organized by Faculty of Agriculture, University of Sultan Ageng Tirtayasa, Indonesia. The theme for this conference is "The Challenge of Sustainable Agriculture in the New Normal Era", and this event will be held virtually at Zoom Meetings on **November 16, 2020**.

We also inform you to fill the attendance form at http://bit.ly/ICARDpresentation. Please fill your name correctly because it will be filled in the certificate. Suppose the presenter isn't the first author and needs a new invitation letter, please ask us.

Please notice the additional notifications on the next page. We will send the Zoom room, conference program, oral presentation schedule, and Zoom virtual background later.

Please do not hesitate to contact us if you need further assistance. Looking forward to seeing you soon at the 2nd ICARD.

Yours Sincerely,

Dr. nat.techn. Weksi Budiaji, S.Si, M.Sc
Chairman of the 2nd ICARD

Additional Information

1. The 2nd ICARD will be held on November 16, 2020 as Virtual Conference.
2. All Authors of accepted and registered presentations for the 2nd ICARD are strongly advised to upload a **pre-recorded video** for their oral paper presentation. The presentation can be recorded by either the author or any of the co-authors. The presentation video will be available during the presentation date of the conference and on-demand after the conference concludes.The file of the video must be in an MP4 format with **30 MB** maximum size. During the presentation on November 16, 2020, either the author or any of the co-authors will need to be available online after their videos are played to answer the other conference participants in the discussion session.
3. The presentations are in English and each presenter is given 10 minutes (Pre-recorded video or live). The remaining 5 minutes is a discussion session (**LIVE** only).
4. The presenters are required to submit a presentation slide (pdf/ ppt) and presentation video (optional) no later than Friday, November 13th, 23:59:59 Western Indonesia Time (WIB : GMT+7) through this link http://bit.ly/ICARDpresentation. The style and format of the slide are not restricted.
5. If a presenter prefers to perform a live presentation than present a recorded video, the presenter gets an allocated time as stated in the schedule.
6. As of Friday, November 13th, 23:59:59 Western Indonesia Time (WIB : GMT+7) at the latest, you are required to upload an **agreement letter** as in the following page.

Agreement Letter

This letter confirms that ***I Ketut Budaraga*** is going to present orally an article entitled ***Quality of Red Tuna (Yellowfin Tuna) Fishball, White Oyster Mushroom (Pleurotus Ostreatus) on Different Types of Packaging and Storage Time*** at the 2nd ICARD virtually.

(Tick one only)

☐ I agree that after my presentation, I am going to revise my article as suggested by the reviewers (if any) at a predetermined time. If I cannot complete the revised article as a concluded time, the editor can cancel my article publication in the IOP Proceeding and I get my registration fee back. For an equitable contribution, the conference organizer can deduct my registration fee for the seminar fee as much as Rp 500.000, - (35 USD).

☐ I decline to orally present my article and I get my registration fee back.

Signature,

I Ketut Budaraga

please upload this letter at http://bit.ly/ICARDpresentation as of Friday, November 13th, 23:59:59 Western Indonesia Time (WIB : GMT+7) at the latest.


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Contact : Phone/WA : +62 857-9202-400 Email : icard@untirta.ac.id
The 2nd International Conference
on Agriculture and Rural Development (ICARD)
"The Challenge of Sustainable Agriculture in New Normal Era"
ICARD FAPERTA
The 2nd ICARD
Organized by:
Faculty of Agriculture
University of Sultan Ageng Tirtayasa
SCOPE
This international conference will discuss various scopes as follow:
– Agricultural and Environmental Sciences
– Agribusiness and Agricultural Resource Economics
– Fishery and Marine Sciences
– Forestry / Silviculture
– Food Sciences and Agricultural Product Technology

KEYNOTE SPEAKERS

Elena V. Nikitina, Ph.D.
Faculty of Food Technology,
Kazan National Research Technological University, Russian Federation

Dr. Asmah Awal
Faculty of Plantation and Agrotechnology,
Universiti Teknologi MARA, Malaysia

Dr. Saeid Gorgin
Faculty of Fisheries and Environmental Sciences,
Gorgan University of Agricultural Sciences and Natural Resources, IRAN

COMMITTEES

Scientific Committees

- Elena Nikitina, Ph.D; Kazan Federal University, Rusia
- Dr. Willy Bayu ardi Suwarno, IPB University, Indonesia
- Dr. SaedGorgin, Iran, Gorgan University of Agricultural Sciences and Natural Resources, IRAN)
- Dr. Asmah Awal, Universiti Teknologi MARA, Malaysia)
- Dr. Fitria Riany Eris, S.P., M.Si., Faculty of Agriculture, University of Sultan Ageng Tirtayasa, Indonesia)

Organizing Committee:

Chairperson	: Dr. nat. techn. Weksi Budiaji, S.Si., M.Sc.
Secretary	: Nur Iman Muztahidin, S.P., M.Sc
Abstract, Paper Selections	: Rifqi Ahmad Riyanto, S.Si.,M.Sc
Live event	: Tatang Sutisna, S.P.,M.Sc.

DATE OF EVENT

The conference will be held on November 16th, 2020 by Virtual meeting via Zoom Application.

DATE OF EVENT

The conference will be held on November 16th, 2020 by Virtual meeting via Zoom Application.

IMPORTANT DATES (CALL FOR PAPER)

CALL FOR PAPERS

In order to face "**The Challenges of Sustainable Agriculture in the New Normal Era**" after the Pandemic of Covid-19, we are pleased to invite the colleagues to share the work on the **virtual presentation** in The 2nd International Conference on Agriculture and Rural Development (ICARD).

We also invite the authors to submit the manuscript on the proceeding of The 2nd ICARD.

Selected manuscripts from presented oral presentations will be published in IOP Publishing as IOP Conference Series: Earth and Environmental Science (**Scopus-indexed**).

Important Dates

Deadline for Abstract Full Paper :

Abstract submission	: September 11th 2020
Full Paper submission	: October 30th 2020

Deadline for Registration and Payment :

Early bird	: September 11th 2020
Regular	: October 30th 2020

REGISTRATION FEE

1. Early Bird

Presenter	: IDR 2,000,000/USD 140
Student Presenter	: IDR 1,500,000/USD 100
Non-Presenter	: IDR 150,000/ USD 10
Student Non-Presenter	: IDR 50,000/USD 3

2. Regular

Presenter	: IDR 2,500,000/ USD 170
Student Presenter	: IDR 2,000,000/ USD 140
Non-Presenter	: IDR 200,000/ USD 15
Student Non-Presenter	: IDR 75,000/USD 5

REGISTRATION FORM

PAYMENT

Bank BNI

Swift Code	: BNINIDJA
Account Nomor	: 0804356840
Account Name	: Nur Iman Muztahidin

PUBLICATION

Selected manuscripts will be published in IOP Publishing (Scopus-Indexed)

About University of Sultan Ageng Tirtayasa

Contact Person

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BOOK OF ABSTRACT

Supported by:

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KOMDA Banten

ICARD

INTERNATIONAL CONFERENCE ON AGRICULTURE & RURAL DEVELOPMENT

The 2nd International Conference on Agriculture & Rural Development

16 November 2020

Faculty of Agriculture
University of Sultan Ageng Tirtayasa
Serang, Indonesia

Dean's Address

All praise is due to Allah, who has bestowed His blessings and allows us for hosting and joining the Second International Conference on Agriculture & Rural Development (the Second ICARD).

On behalf of the organizer, it is a great pleasure and privilege for us to extend my sincerest and warmest welcome to all distinguished participants who joined this conference. The main objective of this event is to appreciate and share the experience and results of research in agriculture. Besides, to improve our understanding and action to deal with the challenges of sustainable agriculture in the new normal era amid the covid 19 pandemic.

Currently, the focus of the agricultural development in Indonesia is to build up a system of food security based on production capability, diversity of food resources, diversity of local institutions by improving competitive advantages of local products based on competition and comparative advantage of nature and human resources.

Unfortunatelly, the Coronavirus (COVID-19) pandemic and its associated economic impacts have implications for agriculture, food, and rural livelyhood. The effects of COVID-19 on the agriculture industry span across the value chain, from smallholder farmers to the agriculture processing industry and trade of agriculture and food products. COVID-19 has brought major socioeconomic disruptions in communities. The effects of measures taken to overcome the pandemic along with fall in consumer purchasing power are impacting economic development and social life in the country. Prompt responses are required to minimize deterioration and to support recovery efforts.

To sustain the availability of food for all in the new normal era, Indonesia government have developed four ways of action. The four priorities are including increasing production capacity, local food diversification, strengthening the food reserves and logistics system, and development of modern agriculture.

University of Sultan Ageng Tirtayasa, through the faculty of agriculture, has great enthusiasm and attention to strengthen scientific studies, publication and collaboration among research and academic insitutions. The event we are joining in today, International Conference on Agriculture and Rural Development (ICARD), is a collaboration between the Faculty of Agriculture Untirta and Perhimpunan Agronomi Indonesia (Indonesia agronomist association-PERAGI). The outputs this event is scientific publications in Scopus indexed international proceeding. In this respect, we hope this international conference can contribute to the development of the agricultural sector, to support food sovereignty on the people in Indonesia and around the world in new norma era. Also, it serves as an excellent opportunity to bring together scientists, researchers, and students who are expected to be future researchers.

This event is attended by presenters from four countries, Indonesia, Malaysia, Russia, and Iran. Four invited speakers and 76 oral presenter attand this conference. We are glad of having you all here.

Finally, welcome to this Second International Conference on Agriculture and Rural Development. Hopefully, everything we have conducted, particularly on the research and education will benefit all of our people in the "new normal" situation, and help the country to strengthen food security amid the pandemic.

Thank you very much.

Serang, 16 November 2020

Prof. Dr. Ir. Nurmayulis, MP

Dean
Faculty of Agriculture
University of Sultan Ageng Tirtayasa

RUNDOWN OF THE 2nd ICARD

Monday, November 16th, 2020

Time (GMT +7)	Agenda
07.30 – 08.15	**Registration** **(**Plus showing video profil Untirta and The 2nd ICARD**)**
08.15 – 08.25	**Opening Ceremony,** **MC (**Ratna Megasari, S.P., M.Si.**)**
08.25 – 08.35	**Speech from Chairman The 2nd ICARD** (Dr. nat. techn. Weksi Budiaji, S.Si., M.Sc)
08.35 – 08.45	**Welcoming Speech** Prof. Dr. Nurmayulis, Ir., MP *Dean, Faculty of Agriculture, University of Sultan Ageng Tirtayasa*
08.45 – 09.00	**Opening Speech** Prof. Dr. H. Fatah Sulaiman, ST., MT *Rector, University of Sultan Ageng Tirtayasa, Indonesia*
09.00 – 09.10	**Praying: (**Rifqi Ahmad Riyanto, S.Si., M.Sc.) **Photo Session & Break**
09.10 – 09.50	**Sesion 1:** **Invited Speakers** (30 mins presentation, 10 mins Q&A) Dr. Yudi L.A. Salampessy University of Sultan Ageng Tirtayasa *Mining and Biodiversity Comics Publishing to the Elementary School Students around Mine Areas.* **Moderator:** Dr. Adi Susanto, S.Pi., M.Si
09.50 – 10.30	**Sesion 1:** **Invited Speakers** (30 mins presentation, 10 mins Q&A) Dr. Saed Gorgin Gorgan University of Agricultural Sciences and Natural Resources, Iran *Strategy of Shelf-Life Extension to Keep the Quality of Conical Lift net Catch for Sustainability in New Normal Era*. **Moderator:** Dr. Adi Susanto, S.Pi., M.Si MC: Conferment of Certificate of Appreciation

Time (GMT +7)	Agenda
10.30 – 11.10	**Sesion 2:** **Invited Speakers** (30 mins presentation, 10 mins Q&A) Assoc. Prof. Dr. Asmah Awal Universiti Teknologi MARA, Malaysia *Sugar Palm (Arenga pinnata* Wurmb Merr.*): A Review on Plant Tissue Culture Techniques for Effective Breeding*. **Moderator:** Nur Iman Muztahidin, S.P., M.Sc
11.10 – 11.50	**Sesion 2:** **Invited Speakers** (30 mins presentation, 10 mins Q&A) Elena Nikitina, Ph.D Kazan National Research Technological University, Rusia *Potato Starch as a Component Increasing the Antioxidant Potential of Yogurt*. **Moderator:** Nur Iman Muztahidin, S.P., M.Sc MC: Conferment of Certificate of Appreciation
11.50 – 13.00	**Break**
13.00 – 17.00	**Parallel Session**
17.00 – 17.15	**Break**
17.15 – 17.45	**Closing** Awarding ceremony

PARALLEL SESSION

The virtual conference will be held separately for all session with 5 parallel sessions which the following schedule for each parallel sessions are explained below.

PARALLEL A : Tatang Sutisna, SP., M.Sc.

No	Time (GMT +7)	Title	Author(s)
1	13.00-13.15	Analysis of the Role of Livestock Sub-Sector in Economic Growth in West Sumatra	Amna Suresti, Firwan Tan, and Adrimas
2	13.15-13.30	Demand for Agricultural Product and Sustainable Development Issues: Empirical Studies from Household Survey	Mohtar Rasyid
3	13.30-13.45	The role of the Sawangan Organic Rice Farmers Association in increasing the economic value of organic rice: case study in Sawangan, Magelang	Atik Setiawati, Mahendra Wijaya, and Retno Setyowati
4	13.45-14.00	Risk Analysis of Rice Farming in Alue Merbau Village, East Langsa Sub-District, Langsa District	Faoeza Hafiz Saragih, Hanisah, Fiddini Alham
5	14.00-14.15	The Analysis on Factors Affecting the Risk of Rice Farming Production in West Tanjung Jabung Regency	Yardha, Erwan Wahyudi and Alfadholy Wafi
6	14.15-14.30	Possible Use of Food Security and Vulnerability Atlas (Fsva) to Detect Problem on Poverty and Stunting (the Case of Banten Province)	Yeni Budiawati and Ronnie S. Natawidjaja
7	14.30-14.45	Environmental Carrying Capacity for Food Availability in Pandeglang Regency, Banten Province	Mirajiani
8	14.45-15.00	Revenue and Feasibility Analysis of Celery (*Apium graveolens* l.) in Kelurahan Lingkar Selatan Kecamatan Paal Merah Kota Jambi	Suharyon and Syafri Edi
9	15.00-15.15	Communication Networks of on-Farm Rubber in Riau Province, Indonesia	R. Yulida, Rosnita Rosnita, Y. Andriani, and M. Ikhwan
	15.15-15.30	**Break**	

10	15.30-15.45	Farm Business Analysis of Crops in Tidal Land (Case Study in Rantau Makmur Village, Rantau Rasau District)	Adri and Yardha
11	15.45-16.00	The Effect of Personal and Situational Factors on The Performance of Agriculture Extention Worker on the Behavior of Seeking Information as an Intervening Variabel (Study Case in Lebak Regency Banten Province)	Linda Nurhayati, Nurmayulis, Yudi L.A Salampessy
12	16.00-16.15	Mitigation of Human-Orangutan Conflict in Orangutan Reintroduction Area at Suo-suo Village, Buffer Zone of Bukit Tigapuluh National Park	Maskulino, Alfonsus H. Harianja, Wanda Kuswanda
13	16.15-16.30	Visitor's Perception of Cultural Technology Innovation in Taman Agro Inovasi, BPTP Jambi	Syafri Edi, Rustam
14	16.30-16.45	Gender Adaptation Strategy To The Impact Of Forest And Land Fire In Kelampangan Village Peatland, Sebangau, Central Kalimantan	Sari Marlina; Bambang Supriyono Lautt; Aswin Usup; and Revi Sunaryati
15	16.45-17.00	Distribution Mapping of Rice, Corn, and Soybean Production Based on Geographic Information Systems in Pandeglang Regency	A. T. Sumantri, N. Hermita, R. A. Riyanto, and A Mulyaningsih

PARALLEL B : Abdul Hasyim Sodiq, SP., M.Si.

No	Time (GMT +7)	Title	Author(s)
1	13.00-13.15	Yield Ability and Grain Quality of Upland Rice in Sukabumi and Lampung	Hermanasari R, A P Lestari, Yullianida, A Hairmansis, Santoso, A Nasution
2	13.15-13.30	Quantifying the Reliable Discharges as an Incipient Analysis of Agricultural Planning and Developing in Ciujung Watershed	Ngakan Putu Purnaditya and Siti Asyiah
3	13.30-13.45	Improving Rice Productivity through the Implementation of Jajar Legowo Super (Jarwo Super) Technology in Jambi Province	Julistia Bobihoe, Jumakir and Endrizal
4	13.45-14.00	Screening of Rizoplan Rhizobacterial for Suppression of Bacterial Wild (Ralstonia Solanacearum) and Promoting the Growth on Chili *(Capsicum annum)*	J E R Rumbiak and S Hilal
5	14.00-14.15	Analysis of Spatial Distribution in Various Types of Use Sub-Optimal Dry Land in Aceh Besar District	Umar. H. A, Sufardi, Syafruddin, Teti Arabia and Munar
6	14.15-14.30	Characterization of Performance 12 Superior Lines of Upland Rice Planted in Two Environmental Conditions	Enung Sri Mulyaningsih, Yuliana Galih Dyan Anggraheni, Eko Binnaryo Mei Adi, Nana Burhana, and Likarsilia Santun
7	14.30-14.45	Efficacy of Red Betel Leaf's *(Piper crocatum)* Chloroform Extract as Repellent against Rice Bugs Leptocorisa acuta Thunberg, 1783 (Hemiptera:Alydidae)	F. Saraswati, A. S. Herdiannanta and R. C. H. Soesilohadi
8	14.45-15.00	Tuba Root (*Derris elliptica* Benth) Flour Extract Concentration Assay to Control the Corn Cob Borer (*Helicoverpa armigera* Hubn.)	R Rustam, D Salbiah, R Rismawanto and R Saputra
9	15.00-15.15	Hybridization and in Vitro Seed Germination of a Commercial Hybrid Oncidium Orchid in Indonesia	S Rianawati. Suryanah. Syafni. Musalamah. Dwiatmini. K.. and B Marwoto
	15.15-15.30	**Break**	

10	15.30-15.45	Improvement of Shallots (Allium Ascalonicum) Cultivation on Paddy Fields to Increase Shallots Yields and Farmers Income During The Covid-19 Pandemic	D Haryani, M C Hadiatry, S Yuniarti, and R Purba
11	15.45-16.00	The performance of the Brown Planthopper *(Nilaparvata lugens)* Population and Predators on Endemic Lowland Rice Areas of Banten Province	Pepi Nur Susilawati, Sri Kurniawati, Yati Astuti, Yusuf Sopyan, Iin Setyowati
12	16.00-16.15	Yield of Soybean and Corn Intercropping Farming in Rainfed Lowland in Central Lampung, Lampung Province	Slameto, Meidaliyantisyah, Agung Lasmono, and Wahyu Wibawa
13	16.15-16.30	Yield Performance of Shade Tolerant Soybean Cultivars under Shaded Environment at Various Planting Densities	A Saryoko, Z Yursak, Y Astuti, S Kurniawati, S Kusumawati, and T Mulyaqin
14	16.30-16.45	Potassium Nutrition Supply Affecting Early Growth and Chlorophyll Content of Shallot under Micro Sprinkle Fertigation in Dry Land	Alfu Laila, Nur Iman Muztahidin, Mona Sari, Andi Apriyani Fatmawaty, Nuniek Hermita
15	16.45-17.00	Characterization of Palm Plant Seeds (*Arenga pinnata* merr.) from Several Locations in Banten Province and Their Growth Response to the Provision of Liquid Organic Fertilizers	Kartina AM., Susiyanti and W.A. Rusadi

PARALLEL C : Dr. Fitria Riany Eris, SP.,M.Si

No	Time (GMT +7)	Title	Author(s)
1	13.00-13.15	Increasing Planting Density of Maize Through Double Row Cropping System to Improves Seed Yield	A Saryoko, Y Giamerti, Z Yursak, P N Susilawati, S Kusumawati, Kardiyono and N Winanti
2	13.15-13.30	Effect of Basic Fertilizer Doses on Soybean Grow and Production	Twenty Liana, Dedy Irwandi and Andy Bhermana
3	13.30-13.45	Quality of Growth Media and Yields of *Allium ascolanicum* L. on Ultisol Soil Combined with Rabbit Manure	Ikrarwati, N A Syamsi, Y Sastro, T B Rusbana, NR Sudolar, and Y Romadhonah
4	13.45-14.00	Optimization of Annealing Cycle and Temperature SNAP T12 Primer Distinguishing Markers for Male, Female and Hermaphrodite Plants in Papaya (*Carica papaya* L)	Noflindawati, Aswaldi Anwar, Agus Sutanto dan Yusniwati
5	14.00-14.15	Implementation of Eco-friendly Technologies to Control Bacterial Leaf Blight of Rice Disease (*Xanthomonas oryzae* pv. oryzae)	Sri Kurniawati, Yati Astuti, Yusup Sopian Hidayat, Eka Yuli Susanti, Pepi Nur Susilawati
6	14.15-14.30	Application of New Superior Varieties of Irrigated Land Rice within Integrated Crop Management	Rachmiwati Yusuf, Nana Sutrisna, Achmad Saiful Alim, Ida Nur Istina, Indra Fuadi
7	14.30-14.45	The Success Factor In Developing an Energy Independent Village In Klaten Central Java	Dita Wahyu Ningtyas T, Suwarto and Eny Lestari
8	14.45-15.00	Interaction of Genetic and Zn Fertilizer Application on Rice Yield and Grain Zinc Content	Untung Susanto, Cucu Gunarsih, and Wage R Rohaeni
9	15.00-15.15	Correlation Study of Soil Test on Phosphorus In Ultisol Soil For Shallots (*Allium ascalonicum* L.)	I P Lestari, A D Susila, A Sutandi and D Nursyamsi
	15.15-15.30	**Break**	
10	15.30-15.45	Increasing Shelf Life of Rhizobacteria Formula with Alginat on Encapsulation During Storage	J E R Rumbiak and S Hilal

11	15.45-16.00	Studies on Cultivation of Several Varieties of Onion (*Allium ascalonicum* L.) in Polybag During Rainy Season in Jakarta	E Sugiartini, F R Eris, E Pancaningsih, O Nurviani, and N Herawati
12	16.00-16.15	Heavy Metal Uptake and Transition Across the Links of Soil-Plant-Animal-Food Chain	R Volkov and D Samigullin
13	16.15-16.30	Diversity Assessment of Mango (Mangifera spp) Plant Collection of Cibinong Germplasm Garden Based on Leaves Morphology and RAPD Markers	Y G D Anggraheni, and E S Mulyaningsih
14	16.30-16.45	The Study of Composting System and Its Use in Supporting Vegetable Cultivation in Kepulauan Seribu-Jakarta	Ana Feronika Cindra Irawati, Yudi Sastro, Ikrarwati, and Susi Sutardi
15	16.45-17.00	Genetic Diversity of SOME Indonesian Local Rice Varieties Based on SSR Marker Related to Aromatic Genes	Susiyanti, Nopiasari, I Rohmawati, P Nursusilawati, Sjaifuddin, S Abdullah

PARALLEL D : Muta Ali Khalifa, SIK., M.Si.

No	Time (GMT +7)	Title	Author(s)
1	13.00-13.15	Development of Seed Mass Production of Snakehead (*Channa striata*) in Indonesia	A Saputra, M B Syamsunarno, and M T D Sunarno
2	13.15-13.30	Penetration of Microplastics (Polyethylene) to Several Organs of Nile Tilapia (*Oreochromis niloticus*)	Desy Aryani , Muta Ali Khalifa, Muh. Herjayanto, Edo Ahmad Solahudin, Exel Muhamad Rizki, Wihdatul Halwatiyah, Hanifah Istiqomah, Siti Hamisah Maharani, Haeru Wahyudin, Ginanjar Pratama
3	13.30-13.45	Business Analysis of Soy Sauce from Chicken Feather Fish (*Coilia dussumieri*) in Bagansiapiapi, Rokan Hilir Regency, Riau Province	Kurnia Sada Harahap, Ratu Sari Mardiah, and Suci Asrina Ikhsan
4	13.45-14.00	Measurement of Fish Gelatin Using Rotational Viscometer: An alternative to conventional pipette method	Agusman, Suryanti, Nurhayati, Murdinah, Tuti Wahyuni
5	14.00-14.15	Economic Resilience of Fishermen Community during Covid-19 Pandemi around Karangantu Archipelago Fishing Port	Asep Hamzah, Hery Sutrawan Nurdin
6	14.15-14.30	Combination Effect of Solid Waste of Gracilaria Extraction and Sargassum Powder on Nitrogen Content of Bio Fertilizer	Jamal Basmal, R. Kusumawati, Nur Rahman, and Zazili Hanafia
7	14.30-14.45	Comparison of Gel Preparation Methods on Gel Strength Measurement of Carrageenan	Fateha, N Ulya, Asmanah, and Agusman
8	14.45-15.00	The Development Design of Venturi Type Protein Skimmer for Mariculture Land Base System	Adi Susanto, Muh. Herjayanto, Alimudin, Weksi Budiaji , Eko Priyantono, Nanda Adi Guna
9	15.00-15.15	Effect of Trichoderma Addition on Sargassum Organic Fertilizer	R. Kusumawati, Nurhayati, H.E. Pangestu, and J. Basmal
	15.15-15.30	**Break**	

10	15.30-15.45	Aquaculture in the World and in RUSSIA: State and Prospects	T E Marinchenko
11	15.45-16.00	Characteristic of Lotion M/A type with Kappa/Iota Carrageenan	Dina Fransiska, Muhamad Darmawan, Ellya Sinurat, Bakti Berlyanto Sedayu, Yoga Windhu Wardhana, Yedi Herdiana and Ghaida Putri Setiana
12	16.00-16.15	The Effect of Addition Glycerol Against Nori Characterization from Gracilaria sp and Ulva Seaweeds	E Sinurat, D Fransiska, and Livia
13	16.15-16.30	Combination of Fish Oil with Rubber Seed to the Growth Performance of Catfish (Clarias sp.)	M B Syamsunarno, I D G Tambunan, A Munandar, Mustahal, A N Putra, M Herjayanto
14	16.30-16.45	Effects of Water on Hydrophobization and Mechanical Properties of Thermoplastic Agar	Agusman, D Fransiska, Nurhayati, H E Irianto, P Priambudi, A H D Abdullah, and R C Nissa, B B Sedayu, A R Hakim, P Wullandari and Wahyu
15	16.45-17.00	The Effect of Adding Bacillus NP5 to Feed on Growth, Survival Rate, and Protection Against Aeromonas hydrophila of Catfish (*Clarias sp.)*	Mustahal, Sevia, Muhamad Herjayanto, Mas Bayu Syamsunarno, Achmad Noerkhaerin Putra

PARALLEL E : Septariawulan Kusumasari, STP., M.Si.

No	Time (GMT +7)	Title	Author(s)
1	13.00-13.15	Whole Genome Sequence Data of *Lactobacillus fermentum* AG8, the Producer of Antibacterial Peptides	A Pavlova, G Ozhegov, M Nait Yahia, N Gogoleva, E Shagimardanova, E Nikitina, A Kayumov
2	13.15-13.30	Design Formula and Product Prototype of Beverage Made from Tamarillo (*Solanum betaceum*) Fruit and Sappan Wood (*Caesalpinia sappan*) Using Kano Method	C Angelica, O O Pangestu, J Kurniawan, B Meindrawan, D J C Hutabarat
3	13.30-13.45	Shrimp Paste Crackers as Potential Product Development for Small and Medium Enterprise (SMEs)	Christiana Retnaningsih, Berta Bekti R , Okti Ruenda, and Meiliana
4	13.45-14.00	The use of Plant Proteins in the Technology of Fermented Dairy-Free Products	D Khrundin, V Ponomarev, E Yunusov, G Egkova
5	14.00-14.15	Analysis of Glutamine Synthetase Activity from *Lactobacillus hilgardii* LMG 7934	D Zhuravleva, L Yadykova, Z Iskhakova, A Kayumov
6	14.15-14.30	Quality of Red Tuna (*Yellowfin Tuna*) Fishball, White Oyster Mushroom (*Pleurotus Ostreatus*) on Different Types of Packaging and Storage Time	I Ketut Budaraga, Vincensius Saibuma, Leffy Hermalena
7	14.30-14.45	Effect of the Formulation of Fermented white Corn Flour and Glutinous Rice Flour on the Quality of Instant Cream Soup Powdered	N A Pratiwi, R Rahmawati, R R Maulani, D Hunaefi, D Saputra , Tj Muhandri
8	14.45-15.00	Performance Test and Economic Analyses of Semi Mechanic Corn Sheller	Taufik Hidayat, Yahumri, Miswarti, Heryan Iswadi, Taupik Rahman, and Wilda Mikasari
9	15.00-15.15	Development of Functional Beverages from Herbs: Aspect of Nutrition, Processing and Safety	V Y Pamela, S Kusumasari and B Meindrawan
	15.15-15.30	**Break**	

10	15.30-15.45	Hazard Analysis and Critical Control Point of Milkfish Floss Production as Indigenous Food from Banten Province	W Nurtiana, Z Najah, D Anggraeni, N A Putri
11	15.45-16.00	Ethnopharmalogical Properties of Essential Oils from Natural Forests in Northern Sumatra	A Aswandi and C R Kholibrina
12	16.00-16.15	The Consumer Preferences for New Sumatran Camphor Essential Oil-Based Products Using a Conjoint Analysis Approach	C R Kholibrina and A Aswandi
13	16.15-16.30	Changes and Differences of Biochemical Characteristics and Sensory of Red Robusta Premium Coffee Seeds Based on Varian Technology (Full Wash, Honey and Natural Process) in Bandung Jaya Village, Kepahiang District Bengkulu Province	Sri Wulandari, Makhmudun Ainuri, Anggoro Cahyo Sukartiko
14	16.30-16.45	Morphological Characterization and Development Potential Beneng Variety (*Xanthosoma undipes* K.Koch) Pandeglang-Banten	Z.Yursak, I Hidayah, A Saryoko, S Kurniawati, O Ripasonah and PN Susilawati
15	16.45-17.00	A model for Accelerating Rice Planting in Paddy Fields to Provide Food in Banten Province During the Covid-19	Kardiyono, Tian Mulyaqin, Pepi N, Dewi Haryani, Iin Setyowati and Ismatul H

[Invited Speaker]

Mining and Biodiversity Comics Publishing to the Elementary School Students around Mine Areas

Yudi L.A Salampessy, Novi Endi, Alvigho Chandra, Tatang Sutisna

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Abstract

Incorrect perceptions about mining exploration process of the natural resources can reduce a harmony relationship between factory and communities around quarry. This project purpose was to improve knowledge and shaping positive attitudes and behavior of the community members towards the importance of natural conservation and mining business in an early age. The project was based on a survey method to collect and analyze data and a quasi experimental to evaluate the comic effectiveness to improve the understanding and positive attitudes and behaviors of the students. The comic effectiveness was analyzed using paired t-test. The result indicated that the comic about mining and biodiversity publishing was effective to enhance knowledge and positive attitude of elementary students around quarry towards mining factory and natural preservation.

[Invited Speaker]

Strategy of Shelf-Life Extension to Keep the Quality of Conical Lift net Catch for Sustainability in New Normal Era.

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Abstract

The Caspian Sea, which is known as the largest lake in the world, is located in the northern part of Iran. One of the important fish of this lake is Caspian Sea Sprat (Clupeidae). Clupeidae are pelagic fish and play an important role in food chain. In Iran, clupeid fish are caught by conical lift net with an artificial light and at night. The color of artificial light that used in conical lift net is white or sunny. In a study conducted from May 2018 to January 2019 in the fishing port of Amirabad, the effect of two types of artificial light (blue and red light) was investigated. For this purpose, two lamps with color of blue and red with the same Volt and Ampere of white light were used in the depth of 40 – 50 meters. The results show a significant difference in the average length of sprat fish caught in each of the lights used (P-value <0.05). In blue light, the fish caught had a longer length and a heavier weight, while the fish caught in red light had a shorter length and a lighter weight.

[Invited Speaker]

Sugar Palm (*Arenga pinnata* Wurmb Merr.): A Review on Plant Tissue Culture Techniques for Effective Breeding

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Abstract

This review paper outlines the plant tissue culture works done on sugar palm (*Arenga pinnata* Wurmb Merr.); a tree under the family Arecacea and genus *Arenga* cultivated mainly for its sugary sap, sweetened endosperm and highly valuable industrial black fibers. Plant tissue culture technique is a method of growing plant cells, tissues and organs on an artificial nutrient medium under controlled aseptic conditions. Plant tissue culture is a revolutionary biotechnological tool which facilitate successful breeding programs and research of many incredible plant diversity particularly of species which are facing the risks of extinction, plants of valuable economic importance and plants with morphological and physiological sterility and incompatibility. The taxonomy, botanical description, population distribution, ecology and climate requirement, horticulture practice as well as the economic contributions and challenges of sugar palm was also described.

[Invited Speaker]

Potato Starch as a Component Increasing the Antioxidant Potential of Yogurt

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Abstract

Potato starches treated with Amylosubtilin at a low dose have a higher DPPH-scavenging activity than native starch. The use of such partially hydrolyzed starches in non-fat yogurt production does not degrade the chemical characteristics and promotes the accumulation of exopolysaccharides in food. Yogurt with the addition of AM-starch has higher reduction properties and radical-binding activity even after 28 days of storage. the investigated protective effect increases the attractiveness of such products for people caring for their health.

Farm Business Analysis of Crops in Tidal Land (Case Study in Rantau Makmur Village, Rantau Rasau District)

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Abstract. Tidal land is generally planted with rice once a year, followed by soybean cultivation. The study to determine the feasibility of cultivating food crops on tidal land was carried out in Rantau Makmur Village, Rantau Rasau District, Tanjung Jabung Timur Regency, Jambi Province from June to July 2020. The research method used a survey of 20 farmers who are members of the Bambu Kuning farmer group. The research objective was to analyze rice and soybean farming in tidal fields. The results showed that the respondent farmers were at the productive age, namely 32-61 years. The highest level of education is Elementary School (SD), namely 65%. The average land ownership is 1.3 ha. Rice farming and soybean farming in tidal land are feasible to be cultivated. The total revenue from rice farming is IDR 15,065,000 / ha / planting season (PS) with an income of IDR 8,325,000 / ha / PS. Meanwhile, revenue from soybean farming is Rp. 7,260,000 / ha / PS, with an income of Rp. 1,800,000, - / ha / PS. The ratio of revenue to costs (R / C) of rice farming is 2.2, the breakeven point of production is 1.465.2 kg / ha, the break-even point price is IDR 2,058 / kg. Meanwhile, R / C for soybean farming was 1.3 with a brekeven point of production of 910 kg / ha and a brekeven point of price of IDR 4,512.4 / kg.

Keywords: analysis, farming, rice, soybean, tidal land.

Communication Networks of on-Farm Rubber in Riau Province, Indonesia

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Abstract. The rubber on-farm subsystem is an important part of rubber commodity development. Communication is an important part of the on-farm subsystem carried out by farmers because the communication network formed describes the farmer's communication pattern. The research was conducted in two potential districts for rubber commodities in Riau Province, which are Kuantan Singingi Regency and Kampar Regency. To obtain research data, respondents were determined by purposive and snowble sampling. The number of respondents in this research was 168 rubber farmers. The results of the research describe the on-farm communication network of rubber farmers in Riau Province, in a centralized pattern form (interlocking personal network) in Kampar Regency, which indicates that there are individuals who are dominant in the rubber farmer communication network. Meanwhile, the communication network for rubber farmers in Kuantan Singingi Regency, with a radial personal network, indicates that the farmer information centers have begun to spread to several individuals. It is necessary to introduce institutional and communication technology, so that farmer information centers are not centered on only certain individuals, and farmers have choice of information sources that can increase knowledge and help to solve problems for rubber farmers in Riau Province.

Revenue and Feasibility Analysis of Celery (*Apium graveolens* L.) in Kelurahan Lingkar Selatan Kecamatan Paal Merah Kota Jambi

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Abstract. The research objective was to analyze the income and feasibility of cultivating celery in the production centers. The research was conducted in Lingkar Selatan Village, Paal Merah District, Jambi Province in July 2018. The data collected included primary data in the form of information from farmers as well as secondary data and conditions of the research area, the potential of social and economic. Primary data were collected using survey techniques, interviews with farmers and key information using a questionnaire. The sample was determined randomly from the population of celery farmers at the study site, totaling 25 cooperator farmers. The data analysis technique includes tabulation analysis which is used to understand the farmers' financial farming conditions, and the economic feasibility analysis uses the R / C ratio. The results of research on celery farming showed that this business was profitable with a total profit Rp. 11,121,000,-. BEP calculation, the BEP unit is 558 kg, the rupiah BEP is Rp. 14,721, and the R / C ratio value is 1.17, so it can be concluded that the celery farming in this study is profitable and feasible to continue.
Keywords: Income analysis, Farming, Celery

Assessing the Effect of Input Subsidies Program onProductivity: The evidence of Indonesian Maize Farm Households

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Abstract: Improving the performance of the agricultural sector will be easier to do with government's support or intervention. Agricultural input subsidies are one of the most important policy instruments to increase the capacity of farmers who have limited resources. This study aims to examine the impact of input subsidy policies on agricultural productivity. Using the 2014 Agricultural Census micro-data, 67,100 maize farm households were included in the analysis. In this study, Propensity Score Matching (PSM) was used to test the impact of fertilizer subsidies and seed subsidies on productivity. The analysis showed that the PSM model succeeded in reducing bias and confirmed that input subsidies affected productivity. There is a contrast effect between fertilizer subsidies and seed subsidies, where fertilizer subsidies give a boost to productivity, while, seed subsidies actually play a role in decreasing productivity. Such policy needs to be re-evaluated in addressing the inefficiency of subsidy distribution; thus, more enormous benefits could be generated.

Keywords: input subsidy, maize farm households, productivity, Propensity Score Matching

Environmental Carrying Capacity for Food Availability in Pandeglang Regency, Banten Province

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Abstract. Environmental Carrying Capacity is the ability of the environment to support the life of humans and other living creatures and the balance between the two. Food availability and agricultural land are variables to quantify the carrying capacity of the environment for food security. This study aims to analyze the carrying capacity of the field and agricultural land for sustainable food availability in Pandeglang Regency and to analyze how food availability is in Pandeglang Regency. The study used the quantitative methodology approach with literature. The results of the study show environmental Supporting Capacity in Pandeglang Regency in all sub-districts, the availability of food produced from the area of agricultural land exceeds the need or demand for food. This means that Pandeglang Regency has the potential to achieve food security and food independence.. The carrying capacity of the environment, in this case, the carrying capacity of agricultural land, can be managed properly to meet the food needs of the entire population and can still be developed to obtain a surplus in food production. The achievement of sustainable food security in Pandeglang Regency is determined by environmental management, especially the optimization of food and land carrying capacity in the local area.
Keywords: *Environmental Carrying Capacity, Food Security, Pandeglang Regency*

Possible Use of Food Security and Vulnerability Atlas (Fsva) to Detect Problem on Poverty and Stunting, the Case of Banten Province

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Abstract. The paper examines whether the Food Security and Vulnerability Atlas (FSVA) can be used to indicate the actual insident happen on poverty and children malnutrition in certain areas. It will be usefull for the policy maker to target programs consistent with the National SDG target guided by the FSVA. The quantitative analysis was carried out using correlation analysis between 2 predetermined variables, namely: scores and the rank of food security of cities/regencies in Banten Province against 5 exante variables, namely: food crop production, number/percentage of poor people, the nutritional status of underweight children and stunting. The study has shown that the policy makers can anticipate the possibility poverty pocket, underweight and stunting problems on children under five before it actually occurs using FSVA. The results show that a city/district with highest priority (ranking) on the FSVA are most likely to be the locations with high poverty rate, malnurish and stunting children, and also low ability to produce food. Based on the Banten Province FSVA, the regions that need special attention is Kota Serang (Priority 4), relatively to other cities/districts (Priority 5-6).

The Analysis on Factors Affecting the Risk of Rice Farming Production in West Tanjung Jabung Regency

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Abstract. This study aims to determine factors affecting the risk of paddy rice farming in West Tanjung Jabung regency. Respondents were determined using the simple random sampling method. The number of samples taken was 90 farmers from 250 farmer populations. The measurement of production risk uses the Just and Pope method. The results of the study indicated that those variabels such as seeds, urea fertilizer, Sp36 fertilizer, and insecticides can significantly reduce the risk of lowland rice production, while organic fertilizers do not significantly reduce the risk of lowland rice production. Production factors that significantly affect the risk of rice production are fertilizer (KCl), organic fertilizer and labor.
Keywords: Risk, production, farming, wetland rice.

Risk Analysis of Rice Farming in Alue Merbau Village, East Langsa Sub-District, Langsa District

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Abstract. Rice is the main agricultural commodity in Langsa City which participates in efforts to support government programs, namely special efforts for soybean corn rice. However, a decrease in farm productivity will be a risk in farming.This research was aimed to determine the risk to farmers prices, production and income of rice farming in Alue Merbau village, East Langsa sub-district, Langsa . The research was designed as descriptive and analytical research. The sampling farmers was selected by using simple random sampling and structural review. The method if this research used coefficient variance as analytical tools in this research. The result showed that coefficient of variation of cost risk was low, meanwhile income and production risk were high. It's indicate that the rice farming was unefficient and the farmers never record all the expense.
Keyword: risk, rice, production, income, cost

The role of the Sawangan Organic Rice Farmers Association in increasing the economic value of organic rice: case study in Sawangan, Magelang

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Abstrak. The role of the Sawangan Organic Rice Farmers Association in increasing the economic value of organic rice is an effort to make farmers more empowered. The research method is qualitative with a case study approach. Data collection was done by using observation, in-depth interviews, and documentation. This study aimed to analyze the Sawangan Organic Rice Farmers Association's role in empowering organic rice farmers In the Sawangan sub-district, Magelang District. Informants as data sources were determined by purposive sampling. The results of this study indicate that the Sawangan Organic Rice Farmers Association, as a facilitator, has carried out various essential roles in empowering organic rice farmers. Empowerment is carried out through education by delivering marketing information and technical guidance on post-harvest processing, the role of facilitation in helping provide convenience, the role of advocacy, and the role of monitoring and evaluation. The role played by the Sawangan Organic Rice Farmers Association encourages changes in increasing the economic value of organic rice.
Keywords: role, association, organic rice

Demand for Agricultural Product and Sustainable Development Issues: Empirical Studies from Household Survey

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Abstract. The agricultural sector is an important sector in the national economy because it has a strategic position in the national economic sector. This sector is a support for the sustainability of other economic sectors. In times of economic crisis, the agricultural sector is relatively resilient in facing turmoil. However, the relative role of this sector in domestic products is getting smaller. This occurs because the demand for this sector is relatively stagnant. Based on this, this paper aims to evaluated and estimate the demand for agricultural products in Indonesia using micro household level data. The results showed that the demand for agricultural products was relatively inelastic. The increase in household income has a relatively small effect on the demand for the agricultural sector. Therefore, the development of the agricultural sector is relatively stagnant. In fact, this sector is very important for the economy, so a special strategy is needed to ensure the sustainability of agricultural sector development in the future.

Analysis of the Role of Livestock Sub-Sector in Economic Growth in West Sumatra

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Abstract. This study aimed to analyze the role and growth of the livestock sub-sector on economic development in West Sumatra Province. This study used Analysis of Location Quotient (LQ), Dynamic Location Quotient (DLQ) and Shift Share Analysis. The data used in this study are secondary data from the 2016-2019 period. The research method used is Desk Study (Literature Study). The results showed that the livestock sub-sector is a non-basis sub-sector. he average LQ value of the sub-sector in 2016-2019 is 0.96 and And this sub sectorwill remain a non-base in the future, this shows that the livestock sub-sector has not changed its role in the future as indicated by a DLQ value of 0,63. The determining factor for this change in role is the structure of the economy.
Keywords: Animal Husbandry, LQ, (DLQ), Shift Share, West Sumatra

The Effect of Personal and Situational Factors on The Performance of Agriculture Extention Worker on the Behavior of Seeking Information as an Intervening Variabel (Study Case in Lebak Regency Banten Province)

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Abstract. The successful of agricultural development requires the availability of reliable agriculture extention staff. It was reported in many studies that the performance of agriculture extention staff is influenced by personal factor and the situational factors of the instructors. On the other hand, the development of the information and communication technology (ICT) recently is very helpful in the completion of work in various fields, including in the agricultural sector. The study was conducted to describe the behavior of seeking information as a variable as mediated the influence of personal and situational factors on the performance of agriculture extention staff. The survey was conducted on 41 agriculture extention staffs in Lebak Regency and was investigated using stratified random sampling. For objectivity, the performance of agriculture extention staff is assessed by two of their fostered farmers using simple random sampling. Data were analyzed using the path analysis. The results showed the workload factor directly affected the performance of agriculture extention staff. The length of work, the involvement in training, the ability to use an information tool, and the information literacy as personal factors and working environment conditions as a situational factor of agriculture extention staff indirectly influenced the performance of agriculture extention staff through intervening variables of the behavior of seeking information in agriculture. Meanwhile, the level of utilization of internet-based communication media has approached the level of utilization of interpersonal communication channels that dominated the behavior of seeking information of agriculture extention staff. This condition may emphasize the importance of the availability of ICT facilities and infrastructure to improve the performance of agriculture extention staff.

Keywords: personal factor, situational factor, performance, agriculture extention staff, the behavior of seeking information, ICT.

Yield Ability and Grain Quality of Upland Rice in sukabumi and Lampung

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Abstract. Efforts to increase rice food production in the future are faced with increasing climate uncertainty due to global climate change. One of the impacts is changes in strains or biotypes of pests and diseases, which are increasingly rapid. To minimize the impact of climate change on national rice production. The purpose of this study was to produce upland rice lines that resistant to blast disease and had good rice quality. The research carried at Lampung and Sukabumi of 2018. A total of 17 lines and three comparison varieties tested using a randomized block design with four replications. Observations made on the agronomic character, yield components and quality of rice. The results showed that the average plant height in the two locations ranged from 90 to 136 cm. The number of productive tillers at two locations it's the average of 11 panicles. The mean flowering age did not differ from the harvest age between the lines tested at the two locations. The length of panicle lines tested at two locations averaged 25.5 cm. The average weight of 1000 grains at both locations is 26.1 grams. Grain yield in Lampung averaged 4.7 t ha^{-1}, higher than in Sukabumi 3.6 t ha^{-1}. Five lines had no significant difference with Limboto both at the Lampung location and in Sukabumi. Among all the lines tested, there are three lines with the medium of chalkiness or LMM size. The results of testing in the greenhouse against blast disease obtained one line resistant to three blast races.

Quantifying the Reliable Discharges as an Incipient Analysis of Agricultural Planning and Developing in Ciujung Watershed

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Abstract. Rainfall-run-off modelling applicable to estimate the surface water discharges according to the rainfall data record. The incremental rainfall derives the reliable rainfall in many probabilities, and then it becomes reliable discharges after rainfall-run-off modelling processes. The standard models to derive rainfall to discharges are F.J. Mock and NRECA. Both models use rainfall, meteorology, and climatology data as the primary information. Location of this research is in the Ciujung watershed, Banten province. Rainfall data recording from January 1997 until December 2018 will derive the reliable rainfall of 50%, 70%, 80%, 90% and 99% probability. The meteorology and climatology information are following the days of rainfall, sunshine ratio, wind velocity, air temperature, and relative humidity. The results give information about the potential of reliable discharges in the Ciujung watershed. As the agricultural planning and developing purpose, the 80% reliable discharges Q_{80} becomes the fundamental consideration. It forecasts maximum discharges in a range of 60 m^3/s to 80 m^3/s and the minimum discharges in the range of 0.1 m^3/s to 0.6 m^3/s. These values become the threshold in agricultural planning and development. The advance analysis is quantifying the human needs of water, and the remaining value can be as the potential discharges for agricultural purpose. Further research will accommodate these analyses.

Improving Rice Productivity through the Implementation of Jajar Legowo Super (Jarwo Super) Technology in Jambi Province

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Abstract. Jarwo super rice cultivation is the result of the development of integrated rice cultivation technology from the Agricultural Research and Development Agency (Balitbangtan) based on the legowo row planting method (jarwo). Super jarwo rice cultivation is an improvement of the jarwo rice cultivation technology. Jarwo itself only relies on the spacing of the rice plants, so that all plants become marginal crops. In addition, the application of jarwo increases the plant population. This then has the effect of increasing production by around 30%. The assessment activity was carried out in Rantau Panjang Village, Batang Asai District, Sarolangun Regency, Jambi Province, in the Tanjung Harapan farmer group area of 10 ha involving 21 farmers. The activity was carried out from September to December 2016. The purpose of the study was to determine the growth performance and increase in production of new superior varieties Inpari 30, Inpari 32 and Inpari 33 through the application of super jarwo technology. The components of super jarwo rice cultivation technology include new superior varieties with high yield potential, straw decomposers, biological fertilizers, balanced fertilization based on the Paddy Soil Test Tool, and control of Plant Pest Organisms with vegetable and chemical pesticides based on control thresholds, as well as alsintan (transplanter and combine harvester). The results of the study showed that the innovation of super legowo row (jarwo) cultivation technology with superior varieties Inpari 30, Inpari 32 and Inpari 33 was able to increase yields by an average of 3.41 t/ha (40 - 50%), with the production of each variety. are: Inpari 30 (5.60 - 8.58 t/ha, followed by Inpari 33 varieties (6.50 - 8.20 t/ha) and Inpari 32 (7.25 - 7.30 t/ha) This result is higher than the average yield of the Ciherang comparison variety (4.60 t/ha) (existing/farmer) which is commonly grown in the Rantau Panjang location. Disemination of Jarwo Super technology has been carried out through technology guidance, fields meeting, and leaflets, generally farmers can receive the introduced super jarwo technology.
Keywords: Technology, Jarwo Super, New Superior Varieties, Production, Dissemination

Screening of Rizoplan Rhizobacterial for Suppression of Bacterial Wild (*Ralstonia solanacearum*) and Promoting the Growth on Chili (*Capsicum annum*)

J E R Rumbiak and S Hilal

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Abstract. *Ralstonia solanacearum* (Rs) is a pathogen that causes bacterial wilt on chili. Rs can reportedly infect more than two hundred crops and cause high impact losses. Recommendation in controling of Rs by using synthetic pesticides which are harmful to the environment. Therefore, it is necessary to control bacterial wilt disease effectively and efficiently by utilizing rhizobacteria rizoplane as biological agents. The aims in this study were to obtain rhizobacteria which prevent bacterial wilt disease and stimulate the growth of chili. This experiment consisted of two stages, (i) screening of rhizobacteria isolates and (ii) introduction of selected isolates in suppressing Rs and promoting growth of chili. The research was conducted in randomized block design with 21 treatments with 5 replications for each treatment. Chili seeds were introduced with rhizobacteria isolates before planting. The results showed that there were isolates that were able to increase plant growth, Rp. Han-1.4; Rp. Han-9.2; Rp. Han-6.2; Rp. Han-1.4; 5.2 and Rp. Han-9.1 with effectiveness of 69.20% -75% (plant height) and 57.29-59.22% (number of leaves). The isolates that were able to suppress disease progression were Rp. Han-1.4; Rp. Han-9.2 and Rp. Han-3.2 with an effectiveness of 44.99 - 53.75% (disease incidency) and 32.09- 44.95% (disease intensity).

Distribution Mapping of Rice, Corn, and Soybean Production Based on Geographic Information Systems in Pandeglang Regency

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Abstract. This study aims to present data on the distribution mapping of rice, corn and soybean production based on geographic information systems. The method used in this research was the survey method. The research location was in Pandeglang Regency with the consideration that Pandeglang Regency is one of the areas in Banten Province with variety of potential natural resources, especially the abundant and valuable agricultural crop production.. Data were collected in July 2020-September 2020 and analyzed descriptively. The results showed that the average production was very high for rice (39713.61-62309.88); Corn (240.50-988.47); and soybeans (2524.50-5004.45) while the average production was very low for rice (6967.11-13783.74); Corn (13095.92-32175.48); and Soybean (00.00-166.30) which means that the production yield was very low in several sub-districts in Pandeglang Regency which need attention in this case related to land suitability evaluation.

Analysis of Spatial Distribution in Various Types of Use Sub-optimal Dry Land in Aceh Besar District

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Abstract. Acid dry land is classified as suboptimal dry land with the main barrier of soil acidity, while the main barrier of dry land dry climate is the availability of water. For that it is necessary to map forknow the various types of suboptimal dry land uses and their size in the district Aceh Besar. Administration maps, land use maps, slope maps and soil type maps later it will be overlaid and digitized on the screen in order to obtain the map and the area of research to be carried out. The slope gradient is limited to only 25% due tolook conditions that allow it to be used in the management business agriculture. The forest area was 19,136.65 ha, the dry land agricultural, area was 89,472.15 ha, area open land of 1,070.75 ha and scrub area of 58,840.87 ha. It can be seen that land use in Aceh Besar district is dominated by Dryland farming.

Characterization of Performance 12 Superior Lines of Upland Rice Planted in Two Environmental Conditions

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Abstract. The development of upland rice cultivars that could also adapt to lowland will be needed to anticipate climate change effects. The identification of several characters and their performance needs to be studied. Morpho-agronomic characters are divided into qualitative and quantitative character. The research aimed to identify several qualitative and quantitative characters' changes to obtain adaptive information lines in both environments. The experiment was conducted in a greenhouse from January until June 2020. As many as 12 promising upland rice lines were used as the source of genetic materials. There are two types of growing environment simulated as a treatment: (1) lowland and (2) upland; each treatment line was repeated three times. Data were analyzed using *the PAST 3.25* program. Clustering analysis was performed using the UPGMA algorithm and the euclidean distance, and quantitative data were also analyzed using a comparison of relative values. The results on qualitative characters show the color type does not change even in different environments, but there is a gradient of color sharpness in several characters. Some anthocyanin-related color characters become more concentrated in upland environments than lowland and chlorophyll-related colors are vice versa. Based on the color character, the L8 line is more stable in both environments than the other lines, and the L12 line had the best vigor in both environments. Biplots of eight color characters in lowland and dry conditions indicate that the lines are divided into two groups. The principal analysis (PCA) on lowland and upland of obtained two and three PCs, with eigenvalues > 1, and it is mean explained that the diversity index of examined material was 73.1% and 87%. Most of the lines show that the relative changes in qualitative and quantitative characters in two environments, except the L5 line, are more stable. Biplot-PCA clustering on 11 quantitative characters in a lowland and dry environment formed small clusters with a small number of lines in them. The clustering analysis between qualitative and quantitative characters in 12 upland rice lines did not have the same illustration. This study proves that different levels of water availability will affect several color gradient and several quantitative characters. It seems that although upland rice is grown on dry land, plant growth will be better if planted in lowland environment.

Keywords: lowland, upland, rice, amphibian

Efficacy of Red Betel Leaf's (*Piper crocatum*) Chloroform Extract as Repellent against Rice Bugs *Leptocorisa acuta* Thunberg, 1783 (Hemiptera:Alydidae)

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Abstract. Rice bugs *Leptocorisa acuta* is one of the insects that can damage and reduce the rice production by sucking the sap inside of the rice grains during milky phase. The usage of red betel leaf's (*Piper crocatum*) extract as biorepellent is one of alternatives to reduce rice bug's pest without causing any environmental degradation. This research aims to compare and determine the most effective concentration level of red betel leaf's chloroform extract as a repellent. The red betel leaf's extract tested at concentrations 25%, 37,5%, and 50%. The methods in this research included sampling and acclimatization of rice bugs, and repellency test of rice bugs using various concentrations of the extract. The results of the study were analyzed using Probit Analysis with Lethal Concentration (LC_{50}) according to the number of rice bug's repellency. The results showed that at 59.75% concentration of red betel leaf extract's chloroform was effective to repel 50% of the rice bug's population and effectively reduce the number of rice bug's population below the economic threshold level.

Tuba Root (*Derris elliptica* Benth) Flour Extract Concentration Assay to Control the Corn Cob Borer (*Helicoverpa armigera* Hubn.)

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Abstract. Pests that attack the corn crop are cobs borer (*Helicoverpa armigera* Hubner). The pest control can be done using tubal root botanical insecticide (*Derris elliptica* benth.). This study aims to obtain the best concentration of tuba root powder extract in controlling the corn cob borer pests *H. armigera*. Research has been carried out at the Plant Pest Laboratory of Agriculture Faculty, University of Riau. This study used a completely randomized design (CRD) with 6 treatments and 4 replications. The treatments given were several concentrations of tuba root powder extract, namely 0 $gr.l^{-1}$ of water, 20 $gr.l^{-1}$ of water, 40 $gr.l^{-1}$ of water, 60 $gr.l^{-1}$ of water, 80 $gr.l^{-1}$ of water and 100 $gr.l^{-1}$ of water. The parameters observed were initial death, lethal time 50, lethal concentration 50 and 95, daily mortality and total mortality. Daily mortality data obtained from the results of the study were analyzed descriptively and displayed in graphical form, data lethal concentration ($LC_{50 \text{ and } LC95}$) were probit analyzed using the POLO-PC program, while other data such as initial death, total mortality, lethal time (LT_{50}), statistically analyzed using a variance. Data from analysis of variance will be continued using the smallest significant difference (LSD) test at the 5% level. The application concentration of tuba root extract with 100 $g.l^{-1}$ of water is the best concentration to control larvae of *H. armigera* with an initial time of death 26.50 hours, 67.50 hours of LT_{50}, highest daily mortality on the fourth day by 40% and total larval mortality by 87.5%.
Keyword: Tuba root, Helicoverpa armigera, Vegetable insecticide, Concentration

Hybridization and in vitro seed germination of a commercial hybrid *Oncidium* Orchid in Indonesia

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Abstract. *Oncidium* is the one of orchid family that is not native Indonesia. In the development of *Oncidium* breeding are widely encountered difficulties. especially when using advanced commercially hybrid varieties. Hybridization and seed germination of *Oncidium* is still not established yet. The objectives of this study were to obtain population of hybridization and to identify the best medium culture of seed germination and planlet development of a commercial *Oncidium* Orchid in Indonesia. The observations were made at a percentage of the success of crosses. seed maturity. the length of the protocorm formation. the effect of media type and sucrose concentration. In this study. the percentage of the cross-success of *Oncidium* was 15.7% (85 capsules) from 566 crossing and 6.18% (35 capsules) germinated. The fruit harvest age of *Oncidium* crosses varies between 165 days to 245 days after crossing. The duration of protocorm germination varies between 17-82 days after spreading seed. Protocorms were growth well and fast on medium Tsuchiya supplemented with 1 mgL^{-1} BAP and 0.25 mgL^{-1} NAA. and plantlet formation were promoted on the same based media Tsuchiya but supplemented using 0.5 mgL^{-1} BAP and 0.1 mg L^{-1} NAA. The optimized protocol required about 24–30 weeks from the spread seed to the plantlet formation. Seedling were grown at size 5-7 cm immediately planted as pot community. The time of acclimatization varies between 6-8 months after the last subculture. while individual time ranges between 4-5 months after acclimatization. Hopefully. the current study will assist with future development of *Oncidium* Orchid breeding in Indonesia.

Improvement of Shallots (*Allium Ascalonicum*) Cultivation on Paddy Fields to Increase Shallots Yields and Farmers' Income During The Covid-19 Pandemic

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Abstract. Shallots productivity can be increased through improved cultivation by using high-quality varieties and organic fertilizers. The objective of the present study was to determine the growth and yields of shallots with the application of "Kompota"; the organic fertilizers enriched with microbes (*Azospirurillum sp, Azotobacter sp,* and *Aeromonas sp*). The experiment was carried out from April to July 2020 in Panimbang Jaya village of Pandeglang Regency, Banten Province. The study used a randomized block design, consisting of 4 treatments and 8 replications. Treatment (P1): Urea 180 kg/ha+SP-36 100 kg/ha+NPK Phonska 500 kg/ha+KCl 60 kg/ha, (P2): chicken manure 5 ton/ha+Urea 180 kg/ha+SP-36 100 kg/ha+NPK Phonska 500 kg/ha+KCl 60 kg/ha, (P3): Petroganik 1 ton/ha+ Urea 180 kg/ha+SP-36 100 kg/ha+NPK Phonska 500 kg/ha+KCl 60 kg/ha, (P4): Kompota 1 ton/ha+ Urea 180 kg/ha+SP-36 100 kg/ha+NPK Phonska 500 kg/ha+KCl 60 kg/ha. The variety used was Bima. From the results, P4 gave the best plant growth with plant height 47.01 cm, the number of leaves 43.55 strands, the number of tubers 11.54 per clump, and gave the highest shallot yields (9.57 ton/ha). During the Covid-19 pandemic, with the average selling price of shallot bulbs of IDR 25,000/kg, farmers gained IDR 174.744.000/ha/season.

The performance of the brown planthopper (*Nilaparvata lugens*) population and predators on endemic lowland rice areas of Banten Province

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Abstract. Brown planthopper (BPH) are one of the main pests of rice plants, their abundance is influenced by biotic and abiotic factors such as the presence of predators (natural enemies). The aim of the study was to determine the relationship between the natural enemies' performance and the BPH performance. The study was conducted in BPH endemic areas in Serang and Lebak Regencies from March to July 2017. Sampling was carried out directly through visual observations based on four replications, where each replication consisted of 10 observation units. Data were analyzed descriptively in the form of tables and graphs, BPH performance was calculated based on existing population and corrected population. While predators are calculated based on the exsiting population that at the time of observation. Observations were made for five weeks, from 21 days after planting (DAP) to 56 DAP. The BPH population performance in Serang Regency was highest at 42 DAP (8.05 individual/clump) and in Lebak Regency at 35 DAPs (25.05 individual/clump). Paederus is a predator with the highest abundance in Serang District, while the highest abundance of predators in Lebak Regency is spiders.
Keywords : Endemic, natural enemies, population

Yield of Soybean and Corn Intercropping Farming in Rainfed Lowland in Central Lampung, Lampung Province

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Abstract. Soybean and corn are strategic commodities to meet community needs. As the population increases, the demand for these commodities tends to increase. A breakthrough innovation is needed to increase food production. The purpose of this study was to determine the yield of several varieties of corn and soybean growth using the intercropping system on rainfed lowland areas. The study was conducted in Central Lampung during the 3rd planting season from September to December 2019. The soybean varieties are Anjasmoro, Dena, Devon and local existing. Corn varieties are Nasa-29 and local existing. The intercropping system used corn-soybean pattern 2-7. The study involved 5 farmer cooperators. The results of the study indicated that the intercropping system provide the highest production of soybean and corn for local and existing varieties. The average corn production was 9340 kg/ha and the average soybean production was 1971 kg/ha. The intercropping system provides an increase in the cropping index from 100-150 to 200-300 on rainfed lowland

Yield Performance of Shade Tolerant Soybean Cultivars under Shaded Environment at Various Planting Densities

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Abstract. Expanding soybean [*Glycine max* (L.) Merr.] production under sub-optimum environment faces the problem of production under shaded environment. The aims of study were to evaluate the yield performance of shade-tolerant soybean cultivars under shaded environment condition at various planting densities, and to determine its related traits. A nested design field experiment was conducted at Banjar Sub-district, Pandeglang District, Banten Province Indonesia (lat. 6.37° S, long. 106.11° S) at the dry season from April to July 2019. Two field conditions, under coconut and banana plantation, which were identified as light-shaded (10-20 % shaded) and deep-shaded (40-50 % shaded) were used as main plots. Three soybean cultivars, Dena-1, as identified as shade-tolerant soybean cultivar, Detap-1 and Devon-1 were arranged at each environment with single row (40 x 20 cm; normal density; 12.5 plant m^{-2}) or double row (30 x 20 x 50 cm; high density; 14.5 plant m^{-2}). Research results showed that seed yield decreased from 248 g m^{-2} to 205 g m^{-2} by the difference of shading. The yield decrease was due to the decrease of total biomass (TDW), branch number, node number, pod number and seed number and stomatal density (N_{stoma}) without any changed in harvest index (HI) and guard cell length (L_{guard}). In plant arrangement, a better seed yield and TDW were resulted from normal density as compared to high density. Under deep-shaded condition, Dena-1 under normal density (230 g m^{-2}) was superior in seed yield, but declined significantly when it was grown under high density (161 g m^{-2}). Based on the above results, combining shade-tolerant soybean cultivar (Dena-1) and planting density (single row; 12.5 plant m^{-2}) is recommended to maintain soybean seed yield under shade environment.

A Model for Accelerating Rice Planting in Paddy Fields to Provide Food in Banten Province During the Covid-19 Pandemic

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Abstract. The Indonesian government continues to strive to ensure the availability of rice as a staple food through various programs, including optimization of paddy fields. Paddy field management is directed and encouraged more intensively by accelerating planting and minimizing idle land. The form of support and stimulation provided by the government to farmers is in the form of counseling and assistance, providing seed assistance and facilitation of agricultural machinery and other facilities so that rice fields can be more intensive and productive. The study was conducted in Lebak Regency and Serang City, Banten Province from April to August 2020. Data and information are obtained through surveys and interviews with farmers, extension agents, researchers and agricultural department officials. The research method used a systems approach based on soft systems methodology. The results of the study show the acceleration of planting as an indicator of the optimization of wetland land in Lebak Regency and Serang City has been achieved as targeted. The role of the extension worker as a driving force is very decisive in the achievement of additional planting area. The use of information technology, such as applications for monitoring standing crops, is very helpful for extension workers in detecting land to be planted, planting achievements and reported data. The system of coordination and guidance between agencies and officers to accelerate planting is quite effective and efficient. Support and facilities for agricultural extension agents need to be improved to achieve accelerated planting performance.
Keywords: Land, Productivity, Food and Covid-19 Pandemic

Potassium Nutrition Supply Affecting Early Growth and Chlorophyll Content of Shallot under micro sprinkle fertigation in Dry Land

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Abstract. Potassium (K+) is an essential nutrition plays high significant role on osmotic adjustment affecting plant growth. Maintaining adequate of K+ could be a drought mitigation in dry land. Therefore, we evaluated the effect of K+ nutrition on early vegetative stage on growth and chlorophyll content of shallot (*Allium cepa* L. var Aggregatum group) cultivated in dry land. The treatment consisted of Potassium of 50,75,100,125, and 150 kg.ha-1 under micro sprinkle fertigation system and 100 kg.ha-1 as basal dose recommendation under conventional irrigation system as control. The experiment was set in a Randomized Complete Block Design (RCBD) with 4 replications. The results revealed that plant height and number of leaves varied significantly due to the various level of Potassium from 2 to 4 weeks after planting. Plant height and number of leaves were maximum at 75 $kg.ha^{-1}$ of dose at 4 weeks after planting. At 50 $kg.ha^{-1}$ of dose showed the highest of total dry matter at 24 days after planting as well as Absolute Growth Rate (AGR), Crop Growth Rate (CGR) and Relative Growth Rate (RGR) during 12 - 24 days after planting. However, chlorophyll content response on the Soil Plant Analysis Development (SPAD) analysis showed an opposite trend of plant height, number of leaves, total dry matter, AGR, CGR and RGR. Correlation among the growth parameters showed a significant positive correlation.
Keyword: CGR, RGR, *Allium cepa* L. var Aggregatum group, vegetative stages

Characterization of Palm Plant Seeds (*Arenga pinnata* merr.) from Several Locations in Banten Province and Their Growth Response to the Provision of Liquid Organic Fertilizers

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Abstract. This research was carried out in stages, namely the first stage of characterization of aren seeds from different locations by using a quantitative description method and the next stage of the study used an experimental design namely Randomized Completely Block Design (RCBD) as factorial with two factors. The first factor was Origin location (L), Serang Regency (L1), Pandeglang Regency (L2), and Lebak Regency (L3). While the second factor was the type of Liquid Organic Fertilizer: Liquid Organic Fertilizer of NAP type (P1), Molasses Liquid Organic Fertilizer (P2), and Liquid Organic Fertilizer of Bioconversion type (P3). The results showed that from 54 accessions of palm seedlings had a genetic coefficient value ranging from 0.33 to 1.00, which had two cluster A with a genetic coefficient value of 0.80 or about 80% and cluster B with a coefficient value of 0.60 or about 60% which means they had a very close resemblance. A3 (Serang District) and C15 (Lebak Regency) are samples taken from different locations with different liquid organic fertilizer treatments but they had close similarities. And the result showed that the combination of treatment from the location of this research with the type of liquid organic fertilizer showed that the origin of the location had a significant effect on all parameters of the origin of the location and had no significant effect on the type of liquid organic fertilizer and the interaction of the origin of the location and the type of liquid organic fertilizer to all observed parameters.

Keywords: Characterization, Palm plant seeds, Liquid Organic Fertilizer and Growth

Increasing Planting Density of Maize Trough Double Row Cropping System to Improves Seed Yield

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Abstract. Maize as the second major crop in Indonesia has an important role in the national economy. Maize production in Indonesia is potentially to be improved by the use of appropriate cultivars and cropping system. The aims of study were to evaluate the yield performances of high-yielding maize cultivars under two different cropping system. An RCBD field experiment using five high-yielding maize cultivars, namely NK212, P21, BISI 2, BISI 18 and Bima 14 were conducted at Banjar Sub-district, Pandeglang District, Banten Province, Indonesia from April to July 2020. The plants were arranged into a single row (70 x 25 cm; 5.7 plant m^{-2}; J1) or double row (25 x 25 x 90 cm; 6.9 plant m^{-2}; J2) cropping system. Plant growth, yield and yield components for each cultivars and cropping system were observed. Across the cultivars, the seed yield of J2 (1.34 kg m^{-2}) was higher than that of J1 (1.71 kg m^{-2}) due to higher number of plant m^{-2} that resulted greater ear number and seed number m^{-2}. Even though J2 resulted smaller ear size (weight, length, diameter and seed weight ear^{-1}) as compared to J1, but those were offset with greater ear number per m^2 of J2. Across two cropping system, cultivar NK212 (1.75 kg m^{-2}) was superior in seed yield, and followed with BISI 18 (1.57 kg m^{-2}). All cultivars were consistently better under J2 than that of J1. We concluded that increasing planting density using double row cropping system, in combination with high-yielding cultivars resulted better seed yield, which is a promising way to improve maize production in Indonesia.

The Study of Composting System and Its Use in Supporting Vegetable Cultivation in Kepulauan Seribu-Jakarta

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Abstract. This study aims to test several organic fertilizer production technologies from household waste, and to have the authority to support the growth of vegetable plants cultivated in Kepulauan Seribu. Participatory assessment involving 10 selected cooperators. The assessment activity is carried out in two stages, namely: (1) testing of fertilizer production technology, and (2) testing of having fertilizers produced in crop system plants. Fertilizer production technologies studied include: (a) production technology using a mini composter, (b) production technology using a vermicompost system, and (c) production technology using a burial system. The variables observed included the speed of the production process based on the C/N ratio and fertilizer chemistry, including pH, macro and micro nutrient content. The plant treatment tests included: (a) selected solid fertilizer (compost) and (b) comparative compost (cow manure). The tested plants used included leaf vegetables (mustard greens, lettuce, kale and spinach), fruit vegetables (tomatoes and chilies), and root vegetables (shallots). The observation variables included the growth and yield variables. Observation data were analyzed using descriptive analysis. Based on the results of the study described above, it can be ignored that: (1) fertilizer production technology from organic waste using the vermicompost technology system produces organic fertilizer that is faster to produce, although not according to quality standards of organic fertilizers yet; (2) each of leaf vegetables (mustard greens, lettuce, spinach, and water spinach), and fruit vegetables (tomatoes and chilies), gave a good response to vermicompost, but had not to root vegetables (shallots).

Effect of Basic Fertilizer Doses on Soybean Grow and Production

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Abstract. The research aimed at examining the impact of fertilizer doses treatment on soybean yield. The hypotheses of this study was that basic fertilizer effectively influenced soybean yield. The research was conducted in Random Complite Block Design (RCBD) with basic fertilizer doses as treatments. Three basic fertilizer doses were applied (P1, P2 and P3). P1 is fertibio application, 450 kg.ha^{-1}, P2 is manure application, 750 kg.ha^{-1}, and P3 is mixture of ½ doses of fertibio + ½ doses of manure (210 kg.ha-^{1} + 375 kg.ha^{-1}) and each treatment was performed in triplicate, totaling 9 experimental plots. The results showed that basic fertilizer doses doses had significant effect on soybean grown and production, while P2 treatment at 75 DAP (days after plant) gave better result on soybean plant hight and branch number (89,388 cm and 19,600). For production of soybean, the better result for pod number in P2 treatment (20,029). Therefore, it can be conclude that manure can increase soybean grown and production.

Keywords: Soybean, basic fertilizer, grown and production.

Quality of Growth Media and Yields of *Allium ascolanicum* L. on Ultisol Soil Combined with Rabbit Manure

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Abstract. Onion cultivation in pots is a solution of limited land in urban areas. Nevertheless, the onion productivity is constrained by the quality of planting media. The utilization of rabbit manure is an alternative to improve the quality of planting media. This study was aimed to determine the effect of rabbit manure level in the planting media on the growth and yield of onion, as well as the effect of rabbit manure on planting media quality. The method used was a completely randomized design with one factor and 12 replications. The treatment was rabbit manure level on growth media i.e. 0%; 25%; 50%; 75%; and 100%. Parameters measured were leaf lenght, number of leafss, diameter and weight of bulbs, pH of planting media, Cation exchange capacity (CEC), Sodium, Phosphor and Potassium. The results showed that 25%-50% rabbit manure in planting media produced the best on leaf lenght, number of leafs, diameter of bulbs, and weight of bulbs. The application of rabbit manure on ultisol soil media was able to increase pH, nitrogen, phosphorus, and cation exchange capacity, vice versa decreased the content Potassium.
Keywords: growth media, rabbit manure, shallot, ultisol, urban farming.

Optimization of Annealing Cycle and Temperature SNAP T12 Primer Distinguishing Markers for Male, Female and Hermaphrodite Plants in Papaya (Carica papaya L)

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Abstrak. Papaya has three types of efflorescense which are male flowers, female flowers, hermaphrodite. That was difficult to determine in advance for the type of flower that appear. The molecular technology approach is an effort to quickly predict the types of flowers that will appear. SNAP primers were designed based on SNP on genomic sequences of male papaya and hermaphrodite DNA. This study aims to get the right cycle and annealing temperature so the PCR results are specific to the target. The research was conducted at the BALITBU TROPIKA in Solok Quality Test Laboratory from January to March 2020. The SNAP primer used was T12, The plants used were papaya varieties of Pomegranate and local cultivar from male and hermaphrodite aged 8 months trees. The results showed that an annealing temperature of 59 º C with a cycle of 28 times as effective in producing male DNA amplification on SNAP T2 reverse (R) primers and hermaphrodite DNA amplification plants appeared on alternate SNAP T12 primers (A) with a product size is 430 bp, while female plants did not occur. Amplification according to the SNAPT primary target 12.

Keywords: papaya, optimization, annealing temperature, cycle, snap primer.

Implementation of eco-friendly technologies to control Bacterial Leaf Blight of rice disease (*Xanthomonas oryzae* pv. *oryzae*)

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Abstract. Bacterial Leaf Blight (BLB) of rice (Xanthomonas oryzae pv. Oryzae) is one of the major diseases of rice which can cause 10-95% yield losses. One of the environmentally friendly control efforts is the implementation of a rice cultivation technology package using the *Paenibacillus polymixa* is biological agens. The purpose of this study is to determine the effectiveness of the technology package with the use of Paenibacillus for controlling BLB disease and increasing production also profit analysis of farming. The research was conducted in Malingping District, Lebak Regency, Banten Province on 4 ha of rainfed rice fields. The environmental design using Nested Block Design with the three treatment, are an environmentally friendly control technology package (*Paenibacillus polymixa*), a chemical control technology package (active ingredient methyl thiofanate) and farmers' existing technology (pesticide mixture). Each treatment consisted of 2 varieties, Ciherang and Inpari 33, which were repeated 6 replications. The results showed that the application of environmentally friendly technology packages in the Ciherang variety was able to reduce the intensity of damage by 40.91% greater than the application of pesticides by farmers with an increase in production of 8.31-12.00%. The difference in the profits of farming is 10.52-19.98%.

Application of New Superior Varieties of Irrigated Land Rice within Integrated Crop Management

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Abstract. Rice is an important food crop commodity and a priority of the agriculture program in Riau Province. In Siak Regency, the total production of irrigated land rice in 2018 was 21,937.02 t Milled Dry Grain (MDG) with average productivity of 5.47 tonnes/ha of Harvested Dry Grain (HDG). In general, the productivity of irrigated land rice in Siak Regency is quite high, with varies between locations (4.68-6.60 tonnes/ha HDG). According to the results of research on irrigated land rice production of new superior varieties (Logawa, Ciherang and Inpari 42) in integrated crop management (ICM) obtained an average production of 8.50 tonnes/ha HDG. Low productivity of rice is caused by (i) the use of inferior quality varieties, (ii) the use of fertilisers that are not following the recommendations, and (iii) the location-specific technology has not been applied yet. Increasing rice production and productivity can be carried out by using new superior varieties within ICM. The results showed that the application of new superior varieties within ICM resulted in higher HDG production (8.25 - 8.90 tonnes/ha) compared to non-ICM (6.20 - 6.50 tonnes/ha). The increase of HDG production are ranging from 2.05 - 2.40 tonnes/ha (33 - 37%) compared to non-ICM. The application of new superior varieties within ICM increasing profit of Rp 21,963,750 - 24,609,000 (30 - 33%) each planting season/ha. The total costs incurred by ICM farmers for one planting season are Rp. 15,161,250 - Rp. 15,441,000/ha with an income of Rp. 37,125,000 -Rp. 40,050,000/ha/season and RCR value of 2.45-2.59 and BCR of 1, 23 - 2.59.
Keywords: Superior Varieties, Rice, Irrigated Land, Integrated Crop Management

The Success Factor In Developing an Energy Independent Village In Klaten Central Java

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Abstract. The production of renewable energy source is urgently needed because of the serious problem associated with the supply of energy-based primarily on fossil and nuclear fuel. This phenomenon shows the increasing of importance of developing renewable energy. One of the villages in the Klaten district, Central Java has developed renewable energy to meet daily needs. Renewable energy comes from cow feces which are processed into biogas. This paper describes a qualitative interview analysis of success factor for bioenergy village implementation. This study used a qualitative method with data collection technique through in-depth interview. Interview was conducted with communityy who use biogas selected by the purposive sampling. We found the success factor in developing Renewable Energy those are support and cooperation with multiple institutions, the participation of an initiator, direct engagement in activities, the implementation of the principles of transparency and communication. Besides that, it is also driven by the increasingly expensive and scarce price of fuel oil. So for now, the inhibiting factors are public funding, unsupportive policies, and doubts from the public. However, the people are proud of the development of this renewable energy, and their quality of life is improving. Besides that, their village also received awards, so that many visitors from outside come to the village. The community wishes to expand it into a tourist village in the future.

Interaction of Genetic and Zn Fertilizer Application on Rice Yield and Grain Zinc Content

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Abstract. The prevalence of Zn deficiency in Indonesia is considerably high. Development of variety having high nutrient or called as biofortification supposed to be effective and efficient to combat malnutrition such as Zn deficiency. Zn fertilizer application was reported to be effective to increase rice Zn content. ICRR in collaboration with IRRI and Harvest Plus had initiated testing rice genotypes having high Zn content. Aim of this research is to initially study of Zn fertilizer, especially ZnSO4, effect to Zn content in the rice grains and to select genotypes having high the Zn content. The trial was conducted during Wet Season 2016 in Subang, West Java following split plot design of three replications with main plot of two level ZnSO4 fertilizer applications and sub plot of 24 rice genotypes. Transplanting was conducted at 21 days after sowing into 2 m x 3 m plot with planting space of 20 cm x 20 cm. The results showed that there is interaction between genotype and Zn fertilizer on yield but not on Zn content in rice grains. Zn fertilization tends to increase grain Zn content and yield. IR97477-115-1-CRB-0-SKI-1-SKI-0-2 (5.45 t/ha, 33.65 ppm), IR97477-81-2-CRB-0-SKI-0-SKI-0-2 (5.30 t/ha, 33.40 ppm), and IR97477-115-1-CRB-0-SKI-3-SKI-0-2 (5.56 t/ha, 32.48 ppm) has either high yield or Zn content and prospective for further testing. Correlation analysis showed that Zn is strongly correlated with Fe content. Yield is positively correlated with tiller number and Fe content and negatively correlated with heading date, maturity, plant height, and number of unfilled grain/panicle.

Correlation Study of Soil Test on Phosphorus in Ultisol Soil for Shallots (*Allium ascalonicum* L.)

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Abstract. The research objective was to determine the best soil P extraction method for shallot plants in Ultisols. This study used a single location approach. The selected location was in Kentrong village, Malangsari Village, Cipanas, Lebak, Banten Province. The research was conducted from March 2015 to May 2016, consisting of two stages, namely the creation of P nutrient status and correlation testing through planting in polybags in a greenhouse. Preparation of soil P nutrient status using phosphoric acid (H3PO4) from very low to very high (0X, 1 / 4X, 1 / 2X, 3 / 4X, and X), where X is half of the maximum absorption of 1033.3 kg P ha^{-1} . Fertilizer P was incubated for three months, then taking soil samples in each plot for analysis of soil P content. Soil P content analysis used five different extraction methods, namely Bray I (0.025 N HCl + 0.03 N NH4F solution), Bray II (NH4F 0.03 N + HCl 0.10 N), Mechlich I (0.0125 M H2SO4 + 0.05 M HCl), Morgan Wolf (NaC2H2H3O2.3H2O; pH 4.8), and Truog (0.02 N H2SO4 + (NH4) 2SO4). The planting of shallots in polybags was carried out in the greenhouse of Jakarta Assessment Institute for Agricultural Technology, using a completely randomized design (CRD), with five replications. The results showed that the best soil P nutrient extraction method for shallot plants in Ultisols was the Truog method with a correlation coefficient of 0.77 and 0.84 for the correlation between soil P content and relative yields of plant dry weight and the correlation between soil P content and Uptake P. The results of this study can be used to determine recommendations for P fertilization on shallots in an Ultisol soil.

Morphological Characterization and Development Potential Beneng Variety (*Xanthosoma undipes* K. Koch) Pandeglang-Banten

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Abstract. Beneng variety is a Banten local taro that arise around the Gunung Karang areas. Beneng very high potential developed as a cultivation, derivative processing products and market demand. The research was conducted from 2017-2018, the aim this research for characterizing morphologically of Beneng and studying its development potential. The research was conducted in Juhut Village, Pandeglang Regency, Banten Province. The data used are primary data, by means of the characterization of existing plants and interviews with beneng farmers. Beneng is unique in its leaves, tubers and stems, with yellow tuber color and large size. Almost all parts of Beneng can be used and have high economic value. The Beneng agroecosystem is also unique, where it is easy to grow and adapt well under the plant shade (intercropping systems). Another advantage is that the tubers have a high carbohydrate content (78%) which can be sold fresh and processed (cassava, flour and chips). And the other hand, beneng dried leaves are also very potential to be used as herbal teas and tobacco. This causes beneng to have a comparative and competitive advantage compared to other types of taro. Currently Beneng is an export commodity with quite high demand. The export demand for beneng taro for tubers reaches 60-80 tonnes / month, 200 tonnes of flour / month and 300 tonnes of dry leaves / month. Other results show that taro beneng is capable of producing tubers of 10-15 kg / plant, equivalent to 100-150 tonnes /Ha. The productivity of dry leaves reaches 2 kg/tree, equivalent to 20 tonnes / ha in a population of 10,000 plants / ha.

Increasing shelf life of rhizobacteria formula with alginat on encapsulation during storage

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Abstract. Rhizobacteria are biological agents reported to be able to increase plant growth and suppress plant diseases (Plant Growth Promotin Rhizobacteria). In general, the use of biological agents in various rhizobacterial formulas in the soil is still not effective. This is due to the decrease in population during storage. This research aims to obtain rhizobacterial formulations, therefore it requires a rhizobacterial formulation technique so that the population can be maintained during storage so that it remains effective in suppressing disease development and plant growth. This study was conducted Factorial (rizoplan and storage time) with three replications. This treatment consisted of thirty treatment combinations (ten rhizobacteria and three types of storage time). The results showed that the population density could be maintained until 2, 4 and 8 weeks of storage with the alginate carrier, namely 10^6 CFU.gr^{-1}.

Studies on Cultivation of Several Varieties of Onion (*Allium ascalonicum* L.) in Polybag During Rainy Season in Jakarta

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Abstract. Onion (*Allium ascalonicum* L.), as one of strategic commodities in Indonesia, still occupied an important position which have to developed in all over areas. Onion has a high economic value and has been considered as one of inflation triggers in Indonesia. Particularly it is due to the influence of weather condition at cultivating time. Onion cultivation at the rainy season may affect the productivity which impacted on the price value fluctuation. Therefore, it was necessary to determine the best onion cultivation technology during the rainy season. The study was conducted at Jakarta's BPTP, within November 2018 to February 2019. This research was conducted to determine the effect of plastic shade on the growth and yield of several onion varieties during the rainy season in DKI Jakarta. The research arranged as a split plot design with two factors and four replications. The first factor was the plastic shade utilization, while the second factor was the onion varieties, namely Mentes, Bima and Trisula varieties. The results showed that the treatment without using a plastic shade provided the best effect on plant height parameters at 63 day after planting (42,57 cm). The number of tubers / plants with an average of 9.33 tubers. Wet weight / average plant 41.31g. Diameter / average tuber of 18.85 mm. The treatment of varieties showed that the best average height was obtained by Bima variety (40.55 cm) at 56 days. The mean number of leaves of Mentes and Bima varieties was 63 days after planting (26.75 and 25.37 pieces). The highest number of tubers / plants was found in the Mentes variety (9.87 tubers), the best compared to Bima and Trisula. Meanwhile, the mean wet weight of Bima variety (31.59 gr) was not significantly different from the wet weight of Mentes and Trisula varieties.

Heavy Metal Uptake and Transition Across the Links of Soil-Plant-Animal-Food Chain

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Abstract. Increasing level of environment pollution with toxic substances contributes to their accumulation in the links of the soil-plant-animal system. An ecosystem in areas with various technogenic load was analyzed and most common environmental pollutants for each area were identified. The coefficients of the transition and accumulation of heavy metals in the links of the food chain were calculated and a strict correlation of animal welfare and dairy quality with environmental condition was shown. The study of the transfer coefficient of heavy metals in the soil-plant-animal-food chain is important for the development of new methods for reducing the level of heavy metals in livestock products.

Diversity Assessment of Mango (*Mangifera* spp) Plant Collection of Cibinong Germplasm Garden Based on Leaves Morphology and RAPD Markers

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Abstract. Mango genetic diversity becomes the successful key factor of the mango breeding program. To obtain higher genetic diversity can be done through explorations of mango germplasm. The objective of this study was to characterize the mango plant collection of Cibinong germplasm garden. The morphology analysis was carried out on the leaves character quantitatively and qualitatively while the genetic analysis was conducted using the RAPD marker. The data was analyzed using *PAST 3.25* and *PowerMarker 3.25 software*. The results on the seven mango plant's qualitative morphological analysis showed that 7 out of 11 characters has diverse variation. The qualitative morphological observation showed that leaves of Kweni variety have the largest shape among the others. The first principal component analysis with *eigenvalue* >1 explained that the diversity index of examined material was 51.4%. The Colour of young leaves character became the most influential character in leaves morphology diversity. The genetic analysis results using 13 RAPD markers showed the average of alleles number, main alleles frequency, genetic diversity, heterozygosity, and PIC values were 7.1; 0.47; 0.72; 0.99; and 0.70, respectively. The most informative marker used in the study of mango plants was OPA18. Phylogenetic analysis based on leaf morphology and RAPD markers divided seven mango plants into two groups, and the first group consisted of Manalagi69, Arumanis143, Cengkir Indramayu, Sibadak, Gedong Gincu, and Kweni, while the second group was Apel. The similarity index showed that Cengkir Indramayu and Sibadak has 85% similarity, while Apel has the lowest similarity with Arumanis143 and Kweni by only 68%. The morphological and genetic analysis in this study was expected to be the basis for developing new superior variety and conservation of mango plants collection of Cibinong germplasm garden.

Genetic Diversity of Some Indonesian Local Rice Varieties Based on SSR Marker Related to Aromatic Genes

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Abstract. Rice plant (*Oryza sativa* L.) has various varieties. People generally prefer rice with good taste and aroma. The aroma is part of the physicochemical properties of the rice plant. The aroma of rice arises because of the gene that controls the nature of the aroma. PCR (polymerase chain reaction) is an in vitro method for generating a large amount of specific DNA fragments with defined lengths and sequences in a small number of complex templates. The selected Simple Sequence Repeat (SSR) primers associated with aromatic genes were: RM 484, RM 410, RM 251, RM 247, RM 223, and RM 9. Based on the DNA band pattern, 6 primers were derived, in which there were 14 loci related to the aromatic gene. The resulting dendrogram showed that two main groups of rice achieved a 57% similarity. Group A consisted of aromatic rice accessions, i.e. Rojolele, Rabeg, Rumbah, Cere Lintang, Manikin, Cao, Jawara Hawara, Jalawara, Pare Racik, Godok, Mayang, Caragol, Segubal, Konjal, Beuruem Batu, Tambleg, Parajaketra, Pondok Leger, Seungkeuhan, Waren, Pare Emas, Kapundung, and Cireh Hudang. Group B consisted of non-aromatic rice accessions, i.e. Ciherang, Care Wari, Care Beuruem, Cokrom, Kewal Bulu Hideung, Maninjau, Seren, Sidenuk, Tampai Beureum, Mira, and Pare Caok.
Keywords: rice; local varieties; aromatics; SSR

Ramifications of the Solution of Neem (*Azadiracta indica*) to the Pathogenicity of the Cocoa Pod Borer (*Conopomorpha cramerella*) Given the Biosurfactant Dietanolamide Palm Olein and Different Fruit Sizes

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Abstract. Mayor pest of cocoa is cocoa pod borer (*Conopomorpha cramerella*). Botanical insecticide continues as alternative to synthetic insecticide in cropping management system to control CPB attack. The primary active ingredient of most neem (*Azadirachta indica*)-based pesticides is *azadirachtin, meliantriol, salanin, nimbin,* and *nimbidin*. The effect of *azadirachtin* is instead of killing the pests, affects the life cycle of the pests, anti-feedant, and as repellent. The aim of this research was to find out of young leaf and seed neem-based pesticides which had added diethanolamide (DEA) based on palm olein and different size of cocoa to CPB attack in acreage. The research was conducted at Laboratory of Basic Science and Plant Protection, Departement of Agriculture, University of Sultan Ageng Tirtayasa and Sukalaba Village, Gunung Sari District, Serang Regency, Banten Province from November 2019 to April 2020. The research was using completely randomized design with 9 treatments combination. That is control, concentration extract of young leaf and seed neem 15%, 25% and 35% added DEA 5 % combined with size of cocoa that 0,1-2,0 cm and 8,0-10,0 cm. Each treatment was repeated 4 replications. Data were analyzed with Anova followed by DMRT test. The results showed that the lowest percentage of intencity attack was on P3 (extract of young leaf and seed neem 15% added DEA 5 % and size of cacao 0,1-2,0 cm) but treatment not gave effect to number of damage, and cocoa bean damage.

Keyword: Botanical Pesticides, Cocoa Pod Borer (CPB), Diethanolamide (DEA) Based on Palm Olein, Neem, Size of Cocoa.

Development of Seed Mass Production of Snakehead (*Channa striata*) in Indonesia

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Abstract. Snakehead (*Chana striata*) has a strategic position in contributing to the national economy due to its albumin content which has been proven to have been used as biopharmaceutical for postoperative treatment. This has led to an increase in the exploitation of snakehead in nature which has depressed its population. The snakehead culture is the right step in supplying material demanded for biopharmaceutical industries. The success of the development of this snakehead culture requires support, among others, of the availability of sufficient seeds in number and time as well. This paper, therefore, discusses the strategy to develop seed mass production of snakehead in a controlled condition in Indonesia. The method used is a desk study, collecting published papers and personal observations related to snakehead hatchery. The data were analyzed descriptively. The results of the study indicate that the bio-reproduction information of snakehead in nature can be used as a reference in the process of broodstock management and larval culture under controlled conditions. Commercial and / or home-made fish diet containing protein of 38–42% can ripen gonads and spawn snakehead brooder using hormone stimulation in a hatchery. Water sources can use ground water and / or pipe that has been previously treated, especially setting the pH, alkalinity, hardness, and water temperature. Proper feeding strategies can increase the growth and production of snakehead fish seeds. This snakehead hatchery can be done both inside and outside its habitat.

Penetration of Microplastics (Polyethylene) to Several Organs of Nile Tilapia (*Oreochromis niloticus*)

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Abstract. Microplastics are a severe problem in several countries. Microplastics spread throughout the ecosystem both on aquatic and terrestrial. Those are very difficult to overcome as well as have an impact on the environment and affect food safety. This study aimed to know the penetration of microplastics into several organs in Nile tilapia. The experiment was conducted by given 30 grams of microplastic (a type of polyethylene scrub) into an aquarium (15 L) containing five fish (consumption size) for seven days. The results showed that microplastic penetration occurred in the blood, gills, gonads, intestines, liver, muscles, and stomach. These results explain that during a week of rearing, the fish have been exposed to microplastics. It was very dangerous for human health issues if consumed.
Keywords. Microplastics, Nile Tilapia, Polyethylene

Economic Resilience of Fishermen Community during Covid-19 Pandemi around Karangantu Archipelago Fishing Port

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Abstract. The Covid-19 pandemic has had an impact on the fisheries sector, especially the distribution process of caught fish, including the potential paralysis of economic life in the form of declining revenues due to the dissolution of the marketing chain of fish from the fishermen to consumers. This study aims to analyze the economic resilience of fishermen communities; and Identifying their adaptation patterns. The method used in this research is qualitative descriptive analysis. The result divided into two acts, the act of fishing-related operations and actions outside the fishing activities. In the fishing activity, most actions performed by the fishermen are fishing frequency (33.6%), adjustment of fishing cost (28.9%) and the adjustment of the number of crew (37.5%). For actions outside of fishing activities, most fishermen during this pandemic often borrowed money from customers (48.7%) and from relatives (46.9%). In addition, some fishermen also pawned their assets (2.5%) and some even sold their assets (1.8%). Fishermen resilience actions in the Karangantu ANP are classified as low, namely 69.6%. The factors that influence the number of resilience measures are the government assistance dummy, ship/vessel ownership dummy, and there is a patron-client relationship.

Aquaculture in the World and in Russia: State and Prospects

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Abstract. The consumption of fish and seafood occupies a significant place in the world supply of food to the population. According to FAO, fish accounts for 17% of animal protein in the diet of the world's population and 7% of all protein consumed. The consumption of fish products is also growing against the background of the active development of aquaculture. The subject of the study is aquaculture in the world and in Russia, the purpose of the work is to analyze the state and generalization of Russian experience, as well as measures and tools to support the development of the industry. In the preparation, statistical information from FAO, state statistics of Russia, statistics from scientific institutions of the Russian Academy of Sciences, scientific monographs, and scientific papers were used. To achieve this objective, the global and domestic state of the aquaculture industry, foreign experience of state and non-state support for the development of aquaculture, as well as measures and instruments of state, federal and non-state support provided to producers were analyzed. The problems of world and Russian aquaculture were identified and proposals were made to support the development of aquaculture in Russia.

Characteristics of Oil in Water (o/w) Type Lotions Incorporated with Kappa/Iota Carrageenan

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Abstract. Increasing public demand for cosmetics, especially those derived from natural materials, has provided seaweed opportunities as raw material for cosmetics. Kappa and iota carrageenans produced from red seaweed (*Rhodophyceae*) can be used as a thickener and stabilizer in lotion formulations. This study aimed to determine the characteristics of lotion oil/water (o/w) type using kappa and iota carrageenan in the formulations. The research started with the optimization of lotion formulas. Four formulas obtained were 0% carrageenan (without carrageenan), 0.2% of kappa-carrageenan, 0.2% of iota-carrageenan, and a mixture of 0.2% kappa-carrageenan and 0.1% iota-carrageenan (2:1). Parameters observed were the organoleptic test, pH, viscosity, spreadability, microbial contamination, and a hedonic test. The results showed that kappa and iota carrageenan could be used to formulate lotion o/w type with a concentration of ≤0.2%. The best formulation that meets the Indonesian National Standard (SNI) based on physical evaluation and hedonic test (parameters of moisture and sticky feeling) was the lotion formula with 0.2% of iota carrageenan.

The Development Design of Venturi Type Protein Skimmer for Mariculture Land Base System

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Abstract. The sustainability of mariculture activities is very dependent on how water is managed. One of the important qualities of water is dissolved oxygen which can be dissolved from the diffusion of air bubbles released by the diffuser. The use of conventional aeration (stone aeration diffuser) has problems due to the macro size of the air bubbles. One solution is to use venturi which produces microbubbles. Therefore, this research aims to analyze the skimmer design using venturi and the resulting dissolved oxygen values. As a comparison also observed DO from the stone aeration diffuser. Research without using test organisms. The results showed that venturi can create fine air bubbles. The dissolved oxygen value in the skimmer system using the venturi is higher than the stone aeration diffuser.

Combination Effect of Solid Waste of *Gracilaria* Extraction and *Sargassum* Powder on Nitrogen Content of Bio Fertilizer

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Abstract. The solid waste of *Gracilaria* extraction contains agar, while *Sargassum* contains alginate. Both contain cellulose, hemicellulose, lignin, cellite, micro and macronutrients, and plant growth promoters. In research, the two ingredients were formulated to produce bio fertilizers. The treatment given was a combination of solid waste of *Gracilaria* extraction (39, 48, 56, and 68%) with *Sargassum* flour (29, 20, 12, and 0%), while other organic matter became a fixed variable. The aim of this research is to get the best combination of solid waste of *Gracilaria* extraction and *Sargassum* flour which produces the highest N content. The results showed that the best combination to produce the highest N content was LIA1 (39% solid waste of agar extraction and 29% *Sargassum* flour). However, LIA3 treatment (56% solid waste of agar extraction and 12% *Sargassum* flour) is close to the technical requirements of solid organic fertilizer. The characteristics of LIA3 fertilizer are 0.75% N content, 47.08% moisture content, 8.80 acidity degree, 6.85×10^9 cfu/g total bacteria and 41.95×10^4 cfu/g total mold.

The Effect of Addition Glycerol Against Nori Characterization from Gracilaria sp and Ulva Seaweeds

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Abstract. Nori based on from seaweed form sheet and edible seaweed. This study nori making from mixture *Gracilaria* sp. and *Ulva lactuca* seaweeds with ratio 1:1. The glycerol using to addition plastizing biopolymer for food packaging materials. The goal of this study was to evaluate characteristic of nori from mixture *Gracilaria* and *U. lactuca* seaweeds with addition of glycerol concentration (0.4; 0.6; 0.8; 1.0 percent) as a plastizer on the nori. The parameter of characteristic nori such as: elongation percentage, tensile strength, WVTR, thickness and water content. Based on research glycerol concentration of 0.8 percent was the best formula with a basis of seaweed nori sheet produced with the following characteristics: percentage elongation of 12.15%; tensile strength of 2.67 M.Pa; WVTR of 2268 g/m^2 day, thickness of 328.93 µm, the water content of 12.75%.

Business Analysis of Soy Sauce from Chicken Feather Fish (*Coilia dussumieri*) in Bagansiapiapi, Rokan Hilir Regency, Riau Province

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Abstract. A fishery business that will be carried out or run by an entrepreneur must generate sustainable profits. This business that is carried out needs to perform business analysis calculations. Business analysis is a way to determine the worthiness of a business. Business analysis in a fishery business is very necessary given the uncertainty of a large amount of business, especially business in the field of fishery product processing which is strongly influenced by the fishing season. This study aims to determine the level of profit or loss of a business, the relative advantage of the costs used in one year, the rate of return on investment, the limit of production value or production volume to break even or the business condition does not experience a profit and does not experience a loss in soy sauce processing. of Chicken Feather fish in Bagansiapiapi, Rokan Hilir Regency, Riau Province. The method used in this research is a survey method by making direct observations in the field. Analysis of the data used in this study by analyzing financial calculations by using the criteria R / L, R / C, PP and BEP production and BEP price. From the results of this study, the total cost required in making fish sauce is Rp. 15,702,000.00. The profit obtained is Rp. 92,823,000.00 in one year. The value of R / C (Racio / Cost) is 2.59. The Payback Period (PP) value is 0.02. The production Break Even Point (BEP) value was obtained at 11672.4 / pack and the BEP value for the price was Rp. 64,846,667 / pack. Based on the various eligibility criteria, it can be concluded that the business of processing the soy sauce from chicken feather fish is feasible to be developed and continued.

Keywords: Fish sauce; qwilfish; business analysis

Comparison of Gel Preparation Methods on Gel Strength Measurement of Carrageenan

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Abstract. This study aims to develop a carrageenan gel strength test method with an emphasis on the carrageenan gel preparation method for measurement. The gel was prepared by comparing the two heating temperatures (80 °C and 90 °C), heating devices (waterbath and hotplate) and measurement (with container and without container). The results showed that there were no difference between cooking temperatures of 80 °C and 90 °C, but heating at 80°C obtained a lower deviasi standard. The use of hotplate and waterbath were not significantly different resulted in gel strength, but the use of hotplate had a slightly larger variation than waterbath. Measuring the strength of the gel that was still in the crystal container and removed from the container were not significantly different, but measurements with the gel condition were still in the container obtained more accurate test results. Based on the results of this study it can be concluded that the carrageenan gel preparation technique by heating at a temperature of 80 °C using a waterbath or hotplate is the best preparation test method. Meanwhile, the gel does not need to be removed from the container before being measured using a texture analyzer. The development of this method can be used as a standard gel preparation method for measuring the strength of carrageenan gel.

Measurement of Fish Gelatin Using Rotational Viscometer: an Alternative to Conventional Pipette Method

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Abstract. The pipette method is a conventional method commonly used for determining the viscosity of gelatin. The purpose of this research was to study the use of a rotational viscometer to measure the viscosity of fish gelatin. Rotational viscometer has a wide measuring range and a limitation on low viscosity liquid measurements such as fish gelatin, so it is necessary to verify the sensitivity of the rotational viscometer to measure the viscosity of fish gelatin. In this study, low range manual rotational viscometer (MLV), low range digital rotational viscometer (DLV), low range digital rotational viscometer with low viscosity adapter (DLV + UL) were tested for their sensitivity to read standard solutions of 5 cP and 50 cP. The results show that DLV + UL generated a high accuracy in reading 5 cP and 50 cP standard solutions with the recovery value 102.5% and 99.5%, respectively. Measurement the viscosity of commercial fish gelatin seven times obtained a coefficient of variance of 2.98% indicating a high degree of precision, with a recovery value of 103.54% of the value of the secondary reference material analysis certificate. The number of samples required for DLV + UL is 16 mL, while the conventional method requires a sample of 100 mL. We propose using DLV + UL for testing the viscosity of fish gelatin.

Effect of Trichoderma Addition on Sargassum Organic Fertilizer

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Abstract. Trichoderma is a fungus that can function as decomposers, biological agents and stimulators of plant growth, biofungicides so that agricultural plants can avoid diseases caused by poisonous fungi. This fungus can live in media containing seaweed by breaking down the seaweed's carbohydrate macromolecules into simple sugars. Sargassum seaweed is now starting to be used as raw material for organic fertilizers and Trichoderma can be added to a certain amount of organic fertilizer formulations to produce biological fertilizers. For this reason, this study aims to find the best time to obtain the highest density of Tricodherma in organic fertilizer Sargassum and its characteristics. The highest density of Trichoderma in Sargassum SLF which received additional silage was obtained on the 21st day namely $1.3x10^6$ cfu/mL, whereas in Sargassum SLF without silage on the 7th day namely $46x10^6$ cfu/mL. Based on the comparison of chemical parameters between Sargassum SLF without silage and commercial SLF, it is known that Sargassum SLF is better in terms of c-organic content, macronutrients (P and K), and minerals (Na, Mg, S, Fe, Mn, Cu, Zn, B , Al, Cd, and Mo).

Combination of Fish Oil with Rubber Seed Oil to the Growth Performance of Catfish (*Clarias sp*.)

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Abstract. The rubber seed oil contains essential fatty acids which may be required by cultured freshwater fish. Therefore, the research aimed to determine a combination of fish oil and rubber seed oil for catfish's best growth performance (*Clarias* sp.). Isonitrogenous (33.23 ± 0.19%) and isoenergy (266.50 ± 0.09 DE kcal/100g) tested diets were used in the experiment. The fish oil was replaced by rubber seed oil at 0%, 15%, 25%, 35%, and 50%, respectively. Cyanide acid of rubber seed oil was reduced its content by stirring at 110 °C for 90 minutes to have as high as 0.47 ppm. Catfish fingerlings of 6.56 ± 0.23 g in individual weight were randomly distributed into 15 aquariums (60x40x40cm) each at a rate of 20 fingerlings and fed on the tested diet at ad satiation for 40 days during the experimental period. The results showed that the increase in rubber seed oil to replace fish oil in the feed was not significantly different from the survival rate and nutrient retention in body catfish (P> 0.05). Furthermore, catfish were not poisoned by cyanide acid, as indicated by the blood profiles of catfish being in the normal range at the end of rearing. The combination of fish oil and rubber seed oil by 50% gives optimal growth in catfish.

Effects of Water on Hydrophobization and Mechanical Properties of Thermoplastic Agar

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Abstract. Thermoplastic agar (TPA) was prepared by melt extrusion process and the effects of water contents on the material properties of these foams were investigated. Bioplastics were produced by mixing agar, glycerol and water at ratio agar;glycerol:water was 5:3:2; 5:3:3; and 5:3:4 through the melting process at 120 °C and 18 rpm. The addition of water affect extrusion process more easy, so the pellet can move easily from extruder, but the moisture content of TPA increased with water addition. Then, TGA analysis showed that no different about decreasing mass in sample with water addition. Permeability of bioplastics increased with water addition. Transparance value for TPA is ranged from 0.066±0.012-0.071±0.025. The FTIR curves indicate that the interaction between water and agar may form much more hydrogen bonds. After the addition of water, the elongation at break significantly increased by about 125%, while the tensile strength did not decrease. The melting transition temperature did not change significantly. Due to the addition of water and water vapor transmission rate of thermoplastic agar are decrease. Besides, the water contact angle, moisture content, density of the thermoplastic agar increase with the content of water increased.

The Effect of Adding *Bacillus* NP5 to Feed on Growth, Survival Rate, and Protection Against *Aeromonas hydrophila* of Catfish (*Clarias* sp.)

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Abstract. Probiotics are useful organisms in preventing the spread of disease in aquaculture. Therefore this study aims to evaluate the effect of administering *Bacillus* NP5 on the growth, survival rate, and histology of catfish with *Aeromonas hydrophila* infection. To achieve this, catfish (7.75 ± 0.02 g) were reared for 45 days with a density of 20 per tank. Furthermore, the study consisted of 4 treatments and 3 replications, namely K+: 0% *Bacillus* NP5+0.1 mL A. *hydrophila* injection, K-: 0% Bacillus NP5 + without A. *hydrophila* injection, A: 0.3% *Bacillus* NP5, and B: 0.8% *Bacillus* NP5. The results showed that the addition of probiotics significantly increased the growth and survival rate of catfish ($P < 0.05$) compared to K+. The higher value of specific growth rate was found in treatments A and B (0.22 ± 0.03 and 0.23 ± 0.03% day-1, respectively) and the lowest in K+ (0.14 ± 0.03% day-1). Also, the tissue damage in K+ was higher than the probiotic treatment. In addition, hyperplasia, congestion, and secondary lamella fusion in the gill tissue were found in the K+, while other treatments were found only in hyperplasia. Melanomacrophages occurred in catfish kidney tissue for all treatments, however, hydropic degeneration was found in the control treatment. The addition of Bacillus NP5 in feed resulted in higher growth, survival, and tissue damage compared to K+. Also, the addition of 0.8% Bacillus NP5 resulted in less catfish tissue damage.
Keywords: *Bacillus* NP5, catfish, histology, probiotic.

Tekpang

Hazard Analysis and Critical Control Point of Milkfish Floss Production as Indigenous Food from Banten Province

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Abstract. Milkfish floss is indigenous food from Banten which produced by Small and Medium Enterprise (SME). Milkfish floss is potential to be developed due to the high demand from outside Banten areas, but it is very easy to get rancidity, spoilage by the microbes, or existing of dust and hair. Therefore, milkfish floss production process still needs to improve the processing method according the standards to produce a safe and good product. Quality assurance is done by compiling hazard analysis and control point (HACCP) document. The aim of this study was to identify hazards of raw material and production chain, determine CCPs in every chain, and create HACCP document plan. The research method was conducted by interview, observation, laboratory analysis, and literature review. The compiling of the HACCP document is carried out in several steps including creating of HACCP team, identification of consumers and product descriptions, making processing flow diagrams, identifying hazards, determining critical control points (CCPs), determining the critical limit, monitoring, and correcting action. The hazards that may occur in milkfish floss are residues of heavy metals, pathogenic microbes, thorns, dust, and hair. The CCPs of raw material are fish, lemongrass, lime leaves, shallot, and garlic, while the CCPs of the processing are the acceptance of fish, cleaning, steaming, frying, draining, and packaging.
Keywords: milkfish floss, HACCP, food quality, food safety

The use of plant proteins in the technology of fermented dairy-free products

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Abstract. It is proposed to use plant raw materials in the production of fermented products that do not contain milk. The possibility of using oats and buckwheat as milk substitutes is shown. Experimental samples of fermented products were obtained and their sensory, physical and chemical and microbiological parameters were studied.

Development of Functional Beverages from Herbs: Aspect of Nutrition, Processing and Safety

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Abstract. Indonesia has various of herbal plants which potentially developed as functional food. Herbal plants such as ginger, lemongrass and pandan leaves can be processed into functional beverages as immune system booster. Functional beverages must fulfill two main functions, first having nutritional content and second, providing acceptable sensory such as good taste and texture. The processing of herbal plants into functional beverages requires knowledge of the bioactive compounds content, the ability of these compounds to boost immune system and the safety of the resulting products. The safety of functional drinks products can be analyzed through the determination of the critical point (Critical Control Point) for the functional drinks processing.
Keyword: Herbs, Functional drinks, safety.

Quality of Red Tuna (Yellowfin Tuna) Fishball, White Oyster Mushroom (Pleurotus Ostreatus) on Different Types of Packaging and Storage Time

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Abstract. This study aims to determine the effect of packaging type and storage time on the quality of red tuna (Yellowfin tuna) white oyster mushroom (Pleurotus ostreatus) meatball. This research was conducted at the Laboratory of Agricultural Product Technology, Ekasakti University, Padang, Laboratory of Instrumentation and Laboratory of Microbiology, Faculty of Agricultural Technology, Andalas University. The study was conducted for 2 months, from April to May 2019, using a Factorial Completely Randomized Design (CRD) consisting of 2 factors with 3 replications. The first factor is the type of packaging (without packaging, styrofoam packaging, wrap packaging), and the second factor is the storage time (0 hours, 12 hours, 24 hours). Observation data were analyzed using ANOVA with the F test followed by the Duncan Multiple Range Test (DMRT) at the 5% real level. The results showed that the type of packaging with storage time had a very significant effect on moisture content and protein content and had no significant effect on ash content. The type of packaging and storage time for the best white oyster mushroom tuna red tetelan meatball based on water content, ash content, protein content, ALT, Salmonella sp and Organoleptic bacterial contamination is the best use of Wrap packaging with a storage time of 12 hours.

Keywords: packaging, storage, oyster mushrooms, meatballs.

Analysis of Glutamine Synthetase Activity from *Lactobacillus Hilgardii* LMG 7934

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Abstract. Lactic acid bacteria (LAB) are Gram-positive, non-spore forming, facultative anaerobic or microaerophilic bacteria living in various nutrients-rich ecological niches and are widely used for dairy food and silage production as well as probiotics for the Human and animals. While bacteria can assimilate various nitrogen-containing compounds, the glutamine and ammonium are the most preferred nitrogen sources since they could be directly involved into the nitrogen metabolism of the cell. In bacterial cells, the glutamine can by synthetized from glutamate and ammonium ions by the metalloenzyme glutamine synthetase (GS). In contrast to other bacteria which generally have one gene encoding for the glutamine synthetase, two genes encoding proteins with 53% mutual identity and predicted glutamine synthetase activity were found in the genome of *Lactobacillus hilgardii* LMG 7934. One gene *(glnA_2*) is located in the *glnRA* operon with the transcriptional factor GlnR gene (*glnR*) similarly to GS genes from other bacteria. The second GS gene (*glnA_1*) is monocistronic. While the biosynthetic activity glutamine synthetases could be detected in *L. hilgardii* cells, which protein plays the major role is still unclear.

Design Formula and Product Prototype of Beverage Made from Tamarillo (*Solanum betaceum*) Fruit and Sappan Wood (*Caesalpinia sappan*) Using Kano Method

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Abstract. People's awareness of healthy foods and beverages was continued to increase. This phenomenon was encouraged new product innovation of beverages with a health benefit. To be developed as a functional beverage, tamarillo fruit and sappan wood were well-known to their anti-hyperglycemic functionality. This study aimed to determine the design prototype of a beverage product from tamarillo fruit and sappan wood and determine the best formulation using the Kano method. The product design method was conducted using the Kano method, then the resulted data was used to formulate products. The results revealed four attributes categorized as one-dimensional, five attributes as attractive, one attribute as indifferent and one attribute as must-be. The optimum formula based on hedonic and product cost analysis was X3 formula, consisting of 58.97% tamarillo extract, 9.83% sappan wood extract, 29.49% water, and a 1.7% stevia sweetener. The product prototype has several preferences criteria including ready to drink beverage, liquid-formed, bright-colored, using PET bottle as packaging, the inclusion of halal and nutrition fact label.

Keywords: Product design, tamarillo, sappan wood, beverage, Kano model.

Shrimp Paste Crackers as Potential Product Development for Small and Medium Enterprise (SMEs)

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Abstract. There are many Small and Medium Enterprises processed food in the marine and fisheries sector in Central Java Province area, such as Demak Regency, Semarang City, and Pekalongan Regency. However, some business actors have not dared to innovate their products. Shrimp paste is one of the marine products that is processed by fermentation. Generally, shrimp paste is made from shrimp or small fish and is used as a spice in chilli sauce. The addition of shrimp paste to crackers is intended to increase its utilization as a marine product in the product development of Small and Medium Enterprises. This study aims to determine the effect of adding shrimp paste on its chemical properties (moisture, protein, and fat content) and consumer acceptance through sensory testing. The ratio of tapioca flour and shrimp paste used in this study were T0 (100: 0), T1 (100: 5), T2 (100: 10), and T3 (100: 15). The results of the sensory analysis showed that the T3 formulation with a ratio (100:15) was the most preferred formulation by the panellists. Based on the results of chemical analysis, the moisture content of crackers before and after frying T3 was 8.84% ± 0.14 and 1.85% ± 0.26. Fat and protein contents at T3 were 43.63% ± 4.23 and 1.67% ± 0.12 while those in the control (T0) were 26.46% ± 3.67 and 0.63% ± 0.70. Sensory evaluation data showed that consumer could accept this shrimp paste cracker as a potential food product.

***Keywords**: Product Development, SMEs, Shrimp Paste, Shrimp Paste Crackers*

Whole Genome Sequence Data of Lactobacillus Fermentum AG8, the Producer of Antibacterial Peptides

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Abstract. Lactic acid bacteria are widespread in various ecological niches and are widely used in various biotechnological processes like dairy food and silage production. While a number industrial strains of Lactobacillus available to the date, a screening of new ones is still challenging. The *Lactobacillus fermentum* AG8 strain was isolated from the 4-monthes old fermented silage and characterized as producer of antimicrobial peptides. The genome has been sequenced by using Illumina MySeq platform with the coverage of 65x. Finally 277 contigs with total length 2.28 Mb has been obtained and 219 of them were linked in 1 segment with 1.96 Mb length. The analysis of the genome by RAST web-service has revealed 4273 coding sequences encoding for proteins including 2337 proteins without known function and 64 genes encoding for RNAs and 706 from genes were divided in 22 subsystems groups, while 1631 of them were not in any subsystem. The NCBI Bioproject has been deposited at NCBI under the accession number SUB8124387 and consist of full annotated genome and raw sequence data.

Effect of the Formulation of Fermented White Corn Flour and Glutinous Rice Flour on the Quality of Instant Cream Soup Powdered

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Abstract. Cream soup is a product that is quite popular as a breakfast menu, a hot appetizer, a warm meal during cold weather, and a snack. The purpose of this research was to study the characteristics of instant cream soup powder and cream soup products made from fermented white corn flour that achieve from RSM optimization and glutinous rice flour formulas. The formulation of fermented white corn flour and glutinous rice flour were 0:100; 55:45; 70:30; 85:15; and 100:0. The qualities of instant cream soup prowder were determined by rehydration power and moisture content. The qualities of cream soup product were determined by viscosity and sensory analysis (color, aroma, viscosity and taste). The results showed that the cream soup can be made until the formulation of fermented white corn flour and glutinous rice flour is 100: 0. The characteristics of the instant cream soup powder were 1,91 mL/g rehydration power and 5,97% moisture content, while the cream soup product had 551,23 cP viscosity, white color (score 4,62), a slightly strong corn aroma (score 3,75), a slightly thick consistency (score 3,98), a slightly strong corn taste (score 3,9) and favored by the panelists (score 4,27).

Performance Test and Economic Analyses of Semi Mechanic Corn Sheller

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Abstract. Corn seed Sheller could be done manually or using mechanized Sheller. Limited number of available Sheller machine become limiting factor to produce seed with appropriate physical quality. Manual Sheller would require enormous time and labour while mechanized Sheller would require higher production cost. Simple corn Sheller could help small scale farmer. Its material was easy to get that consist of pipes connector and screws, with production cost only Rp. 20.000/ unit that could be manufactured by famer themselves. This study aims to test tools performance and to study labour efficiency from simple corn Sheller tools. This study design with two treatments that with and without using corn Sheller. The study was carried out by 10 farmers with 3 times replication for each treatment. Each study was carried out using 10 kg dry weight corn. Collected data were shelling time and yields. Data analyses were done using descriptive methods and ANOVA. Technical economic analyses were done to evaluate simple corn Sheller suitability. This study showed that Simple corn Sheller from 2" pipe were more efficient 59 minutes 4 second compared to manual labour from time aspect and reduce labour cost by 38%. Average tools capacity were 12.50 kg/hours and manual labour were 5.63 Kg/hours. Tools effectivity from yields; simple corn Sheller was 75.7% while manual labour was 82.8%. Based in economy analysis, tools price was Rp. 20.000 with cost Rp. 800,6/kg and Break-Even Point were 90 Kg/ year.

Mitigation of Human-Orangutan Conflict in Orangutan Reintroduction Area at Suo-suo Village, Buffer Zone of Bukit Tigapuluh National Park

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Abstract. Indonesia develops rehabilitation and reintroduction program of Sumatran Orangutan (Pongo *abelii*) to increase its population. This study was aimed to determine the potential of human-orangutan conflicts within the rehabilitation and reintroduction program in Bukit Tigapuluh National Park. Data collection was carried out using questionnaires, structured interviews and Participatory Rural Appraisal (PRA) from August to November 2016 at *Suo-suo* village which is located around releasing site in the buffer zone area of the park. We used frequency tables to determine the socio-economic characteristics of the community, such as education, livelihoods, gender and income. We also depicted potential conflict such as social and economics disturbances due to orangutan release. This study recorded that *Suo-suo* village is inhabited by a 2,887 population in 2016. According to education level, the majority population (57,74%) has not completed elementary school due to limited education facilities. The primary livelihood in *Suo-suo* Village is shifting farming and also harvesting forest products from that surrounding park. This condition contributed to the potential conflict of human-orangutan because unsocialized rehabilitation program to the communities, competition in utilizing forest edible fruits and unintended entrance of orangutan in community's cultivated lands. We suggest the authority of orangutan rehabilitation program to extend the socialization of its program the local community, to prevent orangutans disturbing on community's farming, to compensate community's damaged crops, and to develop alternative livelihoods for a community that reducing their dependency on forest resources.

Visitor's Perception of Cultural Technology Innovation in Taman Agro Inovasi, BPTP Jambi

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Abstract. Taman Agro Inovasi is a forum for developing various superior technologies from Badan Litbang Pertanian. The services provided are complemented by a library, a consultation area, a training arena and a playground. This material aims to determine visitor perceptions of several implemented technological innovations. The data displayed is in the form of park arrangement, various technological innovations, the number of visitors, perceptions of visitors and apprentices for the period 2018, 2019 and 2020. The location of the Taman Agro Inovasi is in the Sungai Tiga IP2TP office area, Pondok Meja Village, Mestong District, Muaro Jambi Regency, Province Jambi. This park was built in 2015, planted several types of plants with various adaptive and innovative technologies, ranging from short-lived plants such as leaf-producing vegetables, Medium-aged plants such as fruit-producing vegetables and long-lived plants such as perennials and equipped with medicinal plants. There was an increase in the number of visitors and internship students from 2018 to 2019, but until July 2020 there was a decline. This happened due to the Covid-19 pandemic which resulted in the temporary closure of parks for visitors and apprentices. The perception of visitors to the service was 20% satisfied and 80% said they were very satisfied. Of the various technological innovations implemented, 88% of visitors stated that they were very interested in park management and 75% were very interested in hydroponic technology innovations.
Keywords: Perception of visitors, cultivation technology, Taman Agro Inovasi

Ethnopharmalogical Properties of Essential Oils from Natural Forests in Northern Sumatra

A Aswandi* and C R Kholibrina

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Abstract. The Covid-19 pandemic has raised global awareness for boosting the body's immune system through organic products utilization and complementary therapies. This condition encourages re-disclosure of local wisdom in herbal medicine application which involves essential oils in diseases prevention and treatment. This paper describes the local wisdom of various forest essential oils utilization, to identify the phyto-pharmaceutical content, and potential for herbal medicine. The research was carried out through exploration and in-depth interviews with 30 local community respondents who applied essential oils in traditional medicine in Humbang Hasundutan, North Sumatra; and Singkil, Aceh in 2019. This review also explored various literature regarding phyto-pharmaceutical content and safety issues of various plants used in traditional medicine. The study results identified at least 17 essential oils as main therapeutic agent, including Sumatran camphor (*Dryobalanops aromatica*), benzoin (*Styrax sumatrana*), nutmeg (*Myristica fragrans*), andaliman (*Zanthoxylum acanthopodium*), and lemo (*Litsea cubeba*). The essential oils are extracted from leaves, fruit, flowers, bark, stems, roots and resin in various ways. Some of main compounds identified include a-pinene, camphene, limonene, 1,8-cineole, and p-cymene. In aromatherapy applications, essential oils aroma has a relaxing effect and offer relief to a congested respiratory system. The essential oils can also relieve inflammation, irritation, insect bites, itching, rashes, sprains, and muscle aches in topical application. Local wisdom reveals essential oils utilization to treat indigestion, headaches, and insomnia. The compound 1,8 cineole is potential as anti-viral, anti-bacterial and anti-fungal, expectorant, boosts the immune system, and prospective for respiratory and blood vessels treatment.

The Consumer Preferences for New Sumatran Camphor Essential Oil-Based Products Using a Conjoint Analysis Approach

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Abstract. Camphor resin has been harvested from Sumatran camphor tree (*Dryobalanops aromatica*) since the seventh century on the western coast of Sumatra, Indonesia. High beneficial compound contained, *a-pinene*, 1,8-*cineole*, *camphene*, *limonene*, and *p-cymene* reveal the opportunities for prospective utilization as an anti-viral, expectorant, and immune system booster with a relaxing fragrance. The objective of study is to determine consumer preferences for new Sumatran camphor essential oil-based products. Fifty consumers were asked to provide an assessment of personal care products combination. A conjoint analysis approach was assisted by computer with SPSS 14.0 program. The influence of five product profiles on consumer preferences including functionality, scent variant, packages, volume, and prices were examined. The results show that higher utility values indicate a greater preference. The highest utility value is indicated by scent variant, this illustrates respondent's preferences for their preferred scent. Moreover, the scents (importance value 52.15) is the most influence on overall preferences. This means that there is a large preference differentiation between product profiles containing by most and least desired scents. This is due to the preference for a particular scent is personal and unique which might have affected by personal perception, which is closely related to initial recognition for a particular scent as an olfactory memory. The highest consumer's preference is an inhaler product with floral scent, package roll-on, volume 6 mL, and price IDR50,000. Products with inhalation functions are intended to obtain a relaxing effect, reduce anxiety and calm the mind, improve the respiratory system and immune system.

Gender Adaptation Strategy to the Impact of Forest and Land Fire in Kelampangan Village Peatland, Sebangau, Central Kalimantan

Sari Marlina[1]; Bambang Supriyono Lautt[2]; Aswin Usup[3]; and Revi Sunaryati[4]

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Abstract. Climate change that occurs in Central Kalimantan mostly caused by forest and land fire has led to season shifting and gender life order changing. Thus, it is resulting in a poor impact on the gender life sustainability that is difficult to be recovered in a short time. This research aims to identify and evaluate the adaptation of women to forest and land fires in Palangkaraya and to express solutions that can improve gender equality. The research was conducted in Kalampangan, Sabangau. This research used interview method with purposive sampling technique, and conducted descriptive analysis which emphasize climate change condition in recent years. Climate change causes land changing due to forest and land fire. Therefore, it is also able to change gender roles (women) to take a responsibility in order to support family economic condition. This condition creates a double burden that must be borne by women, so this condition requires a choice of adaptation for women in dealing with it. The intended strategic choices are (1) surviving with these conditions and utilizing modest agricultural products; (2) changing land, using a traditional system while the restoration of burned land is processed; (3) forming post-fire farmer groups by gradually changing their mindset.

Keywords: climate change, land fire, gender

The 2nd International Conference on Agriculture & Rural Development

The 2nd International Conference on Agriculture and Rural Development (ICARD)

Acceptance of Abstract Submission

Signed below is a Chief of Editor of "The 2nd International Conference on Agriculture and Rural Development (ICARD)" explained that the detail informations of article below:

Title : **Quality of Red Tuna (Yellowfin Tuna) Fishball, White Oyster Mushroom (*Pleurotus ostreatus*) on Different Types of Packaging and Storage Time**

Authors : **I Ketut Budaraga, Viscensius Saibuma, and Leffy Hermalena**

Already **"accepted"** and for the next step please prepare your full paper draft and submit it before October 31th, 2020.

Serang, September 10th, 2020
Chief of Editor

Dr. Adi Susanto

The 2nd International Conference on Agriculture and Rural Development (ICARD)

Faculty of Agriculture, University of Sultan Ageng Tirtayasa
Jl. Raya Jakarta km.04, Serang City, Banten Province-Indonesia

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Unique ID	:	ICARD0042
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Affiliation	:	Universitas Ekasakti at Padang City
Email	:	budaraga1968@gmail.com
Scope	:	Food Sciences and Agricultural Product Technology
Time	:	9/10/2020

Warm regards,

Conference Committee

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Quality of Red Tuna (Yellowfin Tuna) Fisball, White Oysters Mushroom (Pleurotus Ostreatus) on Different Types of Packaging and Storage Time

By :
I Ketut Budaraga
Viscensius Saibuma
Levy Hermalena

The 2 nd International Conference on Agriculture and Rural Development (ICARD)

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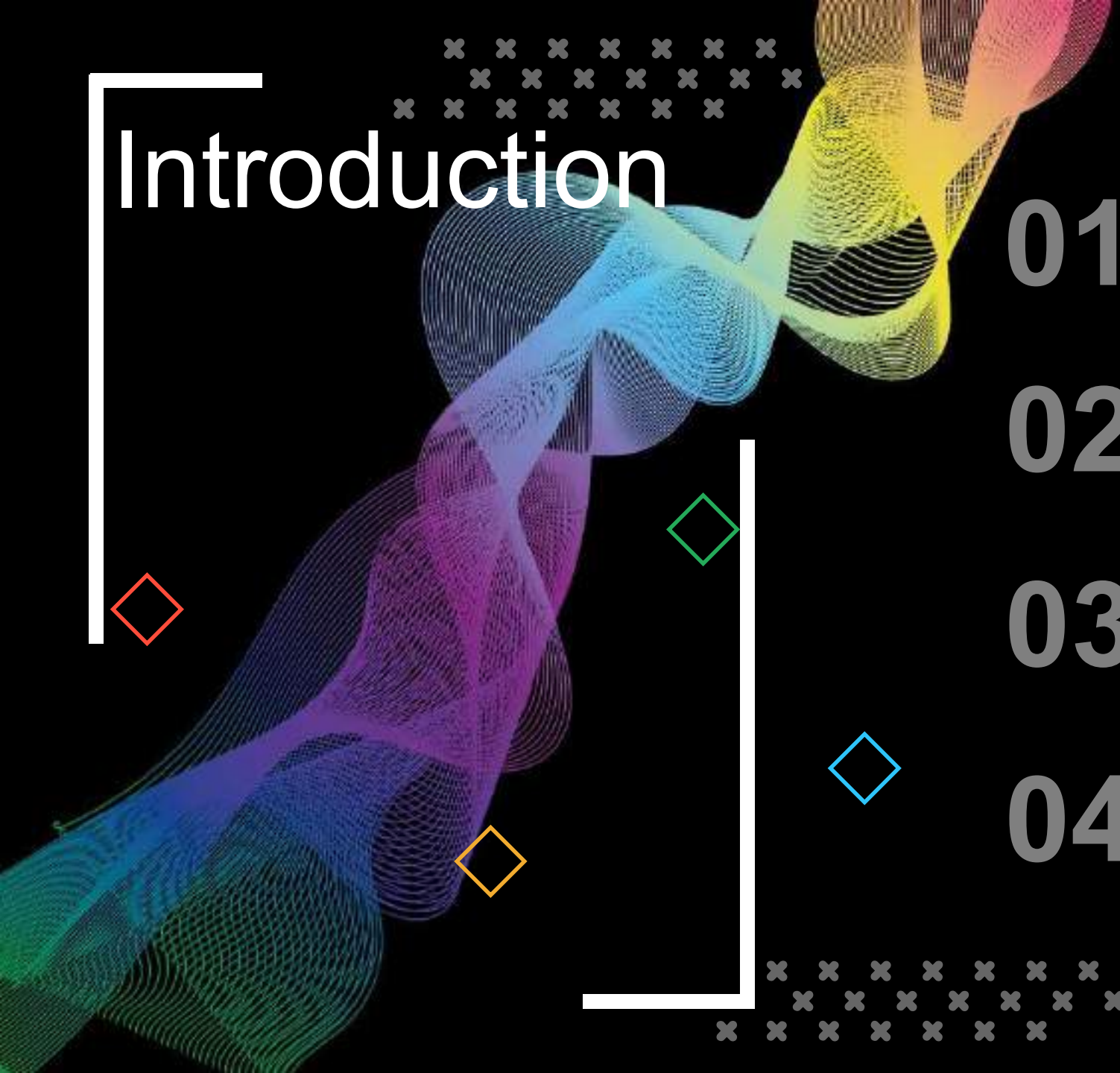
Introduction



01 Fish as a source of protein

Fish is a potential food material as a source of protein, fat and several vitamins

02 Fish quickly decompose

The spoilage is caused by enzymes, both from the fish itself and by microbes

03 Fish need handling

in addition to preventing damage to fish so that it can extend the shelf-life as well as to diversify processed fishery products.

04 Food Processing

Fish meatballs are processed fishery products with raw materials for whole fish or minced or surimi.

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Introduc-ti on

05 Diversification

White oyster mushroom (Pleurotus ostratus) can increase nutritional value, especially fiber and vegetable protein as well as to get a chewy texture and reduce the fishball odor in meatballs.

06 Quality deterioration

The deterioration in the quality of meatballs that can be observed is the appearance of mucus, a distorted aroma and the emergence of gas

07 Shelf life

One method of preserving meatballs that can be done is preserving meatballs by packaging

08 Packaging and Storage

the use of Styrofoam packaging, and plastic wrap

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Formulation of the problem

First

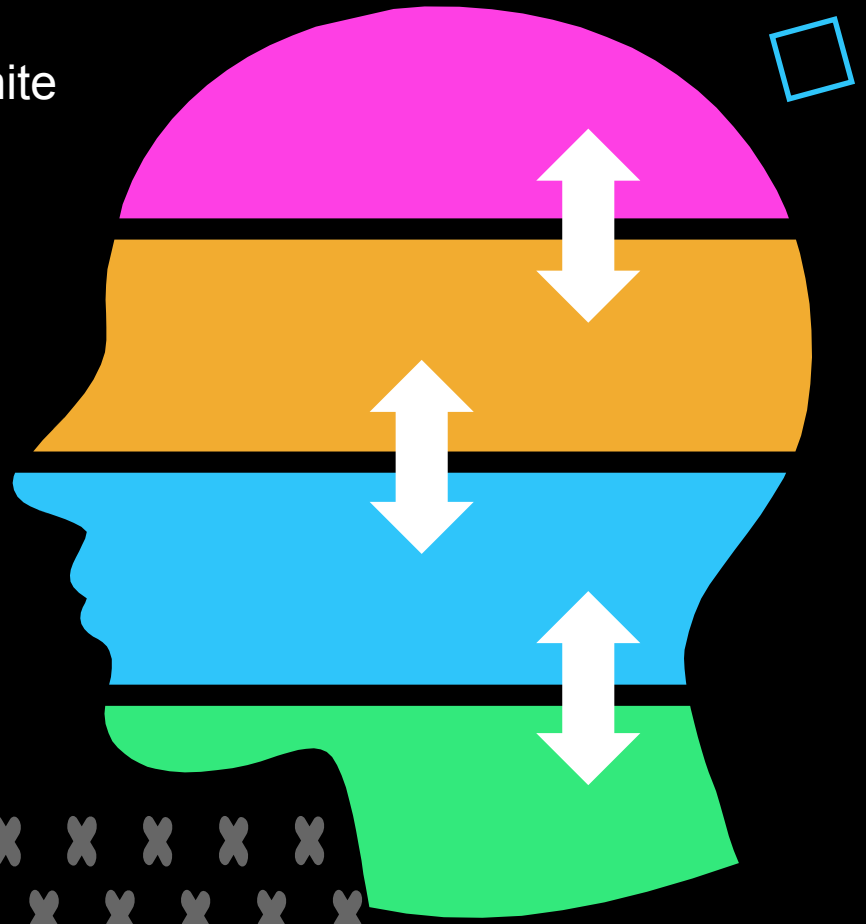
How does the type of packaging affect the quality of white oyster mushroom tuna red tetelan meatballs?

Second

How does the long shelf life affect the quality of the red oyster mushroom

Third

How is the combination of packaging type and storage time that is right for the quality of the red tuna, white oyster mushroom meatballs?



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Research purposes

First

To determine the effect of the type of packaging on the quality of white oyster mushroom tuna

Second

.To determine the effect of storage time on the quality of white oyster mushroom tuna, red tetelan meatballs.

Third

To find out the combination of the type of packaging and storage time that is right for the quality of the red tuna,

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Benefits of Research

01

College

As a reference material for Higher Education in the learning process of determining the right packaging and storage time for foodstuff products

02

researcher

To add insight in choosing the right packaging and storage time for the red tuna, white oyster mushroom meatballs.

03

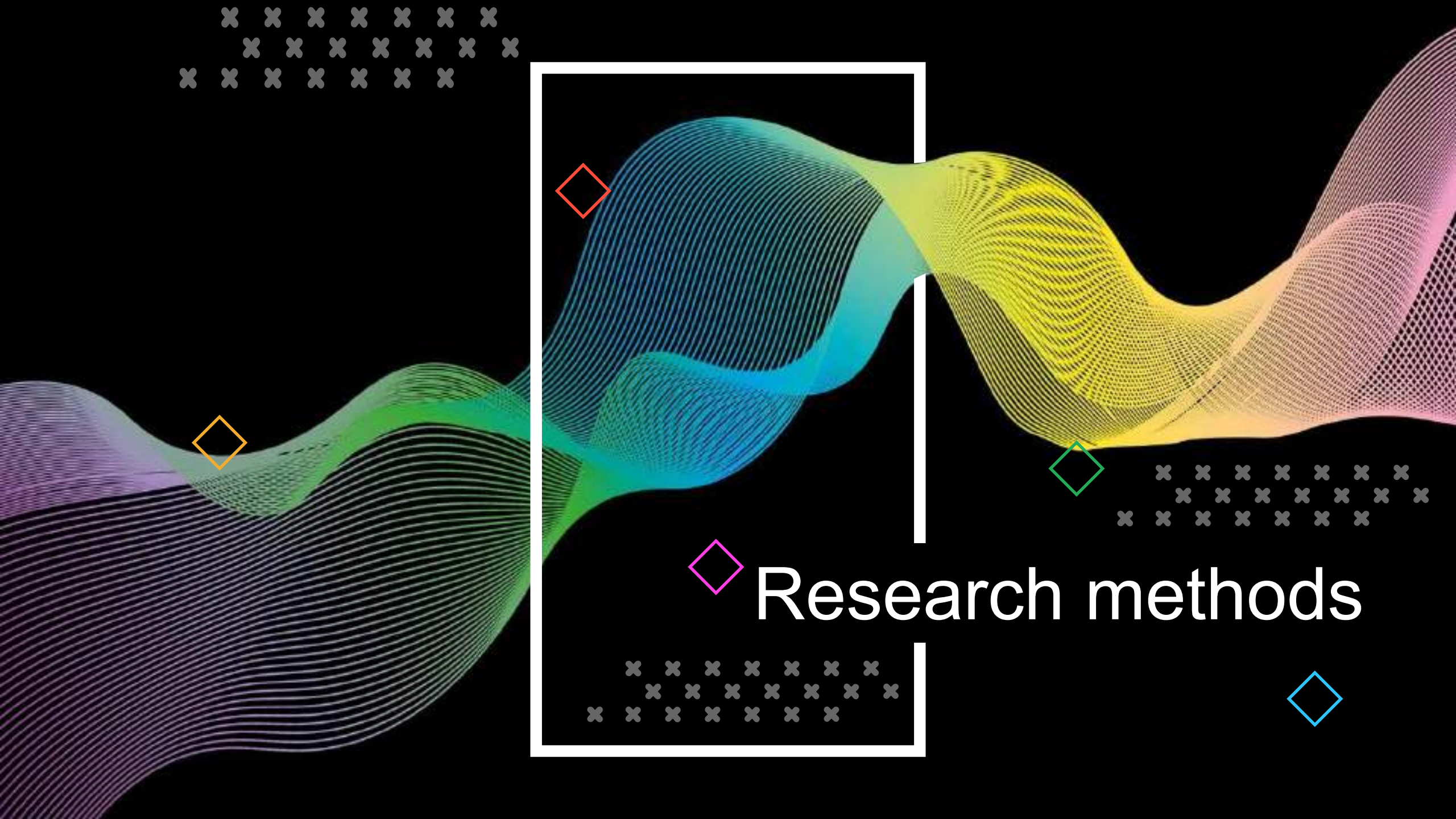
Public

Providing information for the public about the effect of the type of packaging and storage time on the characteristics of red tuna, white oyster mushroom meatballs.

04

Government

a reference for the government to create food security by choosing the right packaging and storage time for fish meatball products.


Research methods

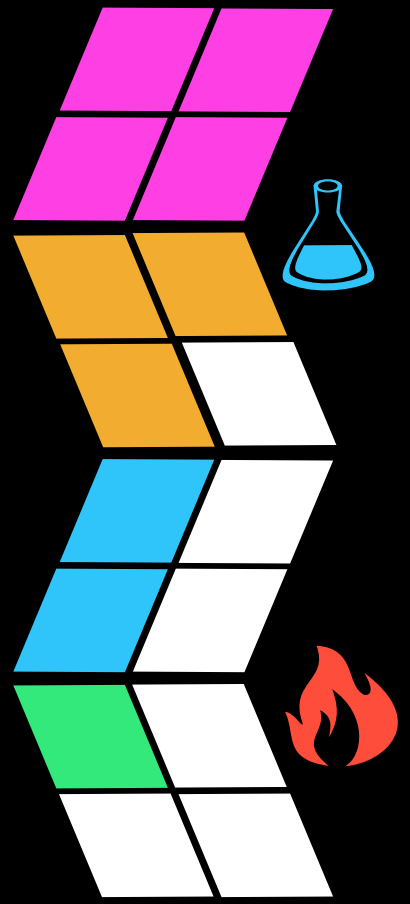
Place and time

Place

Ekasakti University Agricultural Product Technology Laboratory, Padang
Instrumentation laboratory Microbiology, Faculty of Agricultural Technology, Andalas University

Time

This research was conducted from April 2019 to May 2019.



Raw and Tool

Raw

Yellowfin tuna red droplets.
White oyster mushrooms

purebred chicken eggs, tapioca flour, garlic seasoning, shallots, table salt, ice cubes, and water.

Tool

Meatball making tools
Water content test equipment
Ash content test equipment
Protein test kits
ALT test equipment Salmonella sP identification tools

Research design

RAL

FACTORIAL

2 factor

3x3

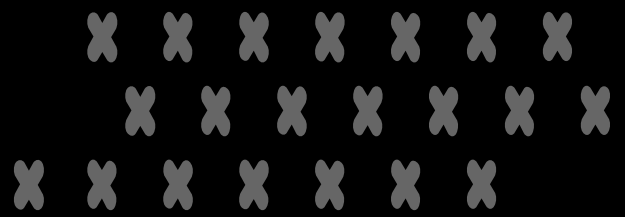
Factor A	FACTOR B		
	B_1	B_2	B_3
A_1	A_1B_1	A_1B_2	A_1B_3
A_2	A_2B_1	A_2B_2	A_2B_3
A_3	A_3B_1	A_3B_2	A_3B_3

Factor A : Type of packaging

A_1 = non packaging

A_2 = packaging by *Styrofoam*

A_3 = packaging by plastic *Wrap*



Faktor B : Storage Time

B_1 = 0 hour

B_2 = 12 hour

B_3 = 24 hour

Meatball ingredient formulation

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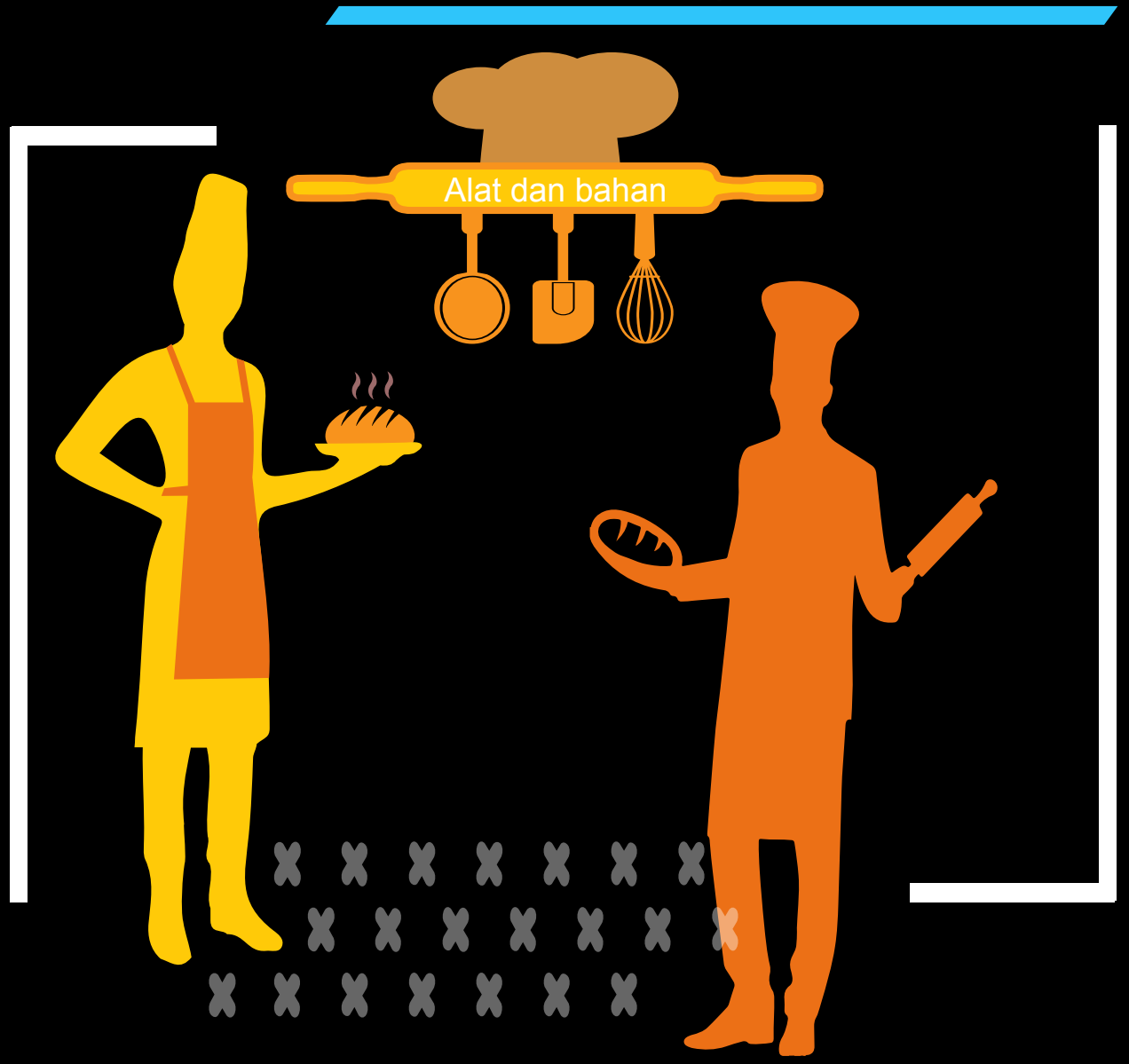
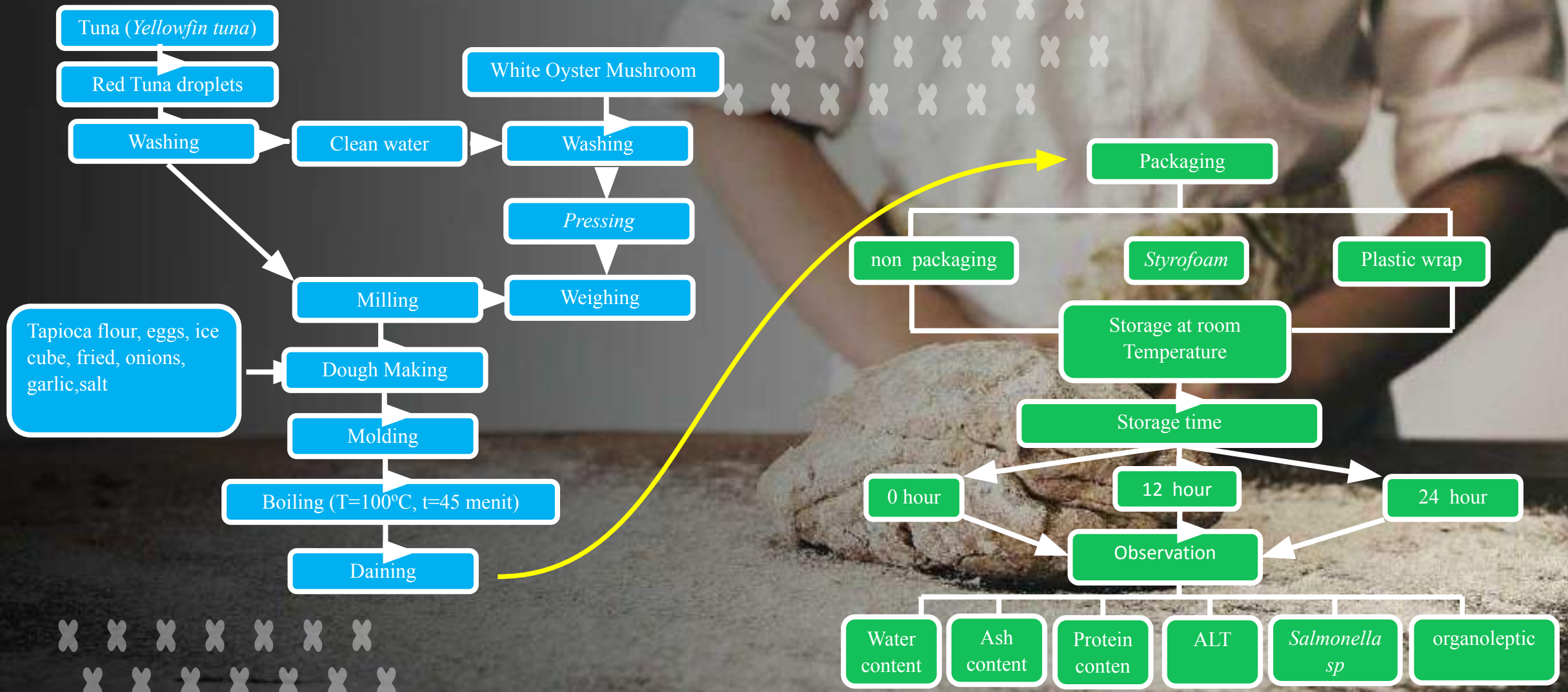
Material	unit	Amount
Red tuna droplets	g	700
White oyster mushroom	g	300
Tapioca flour	g	200
Chicken eggs	butir	1
Fried union	g	6
Garlic	g	8
Pepper	g	1
Table salt	sdt	2
Ice cube	ml	50
Water	ml	40



Meatball making diagram



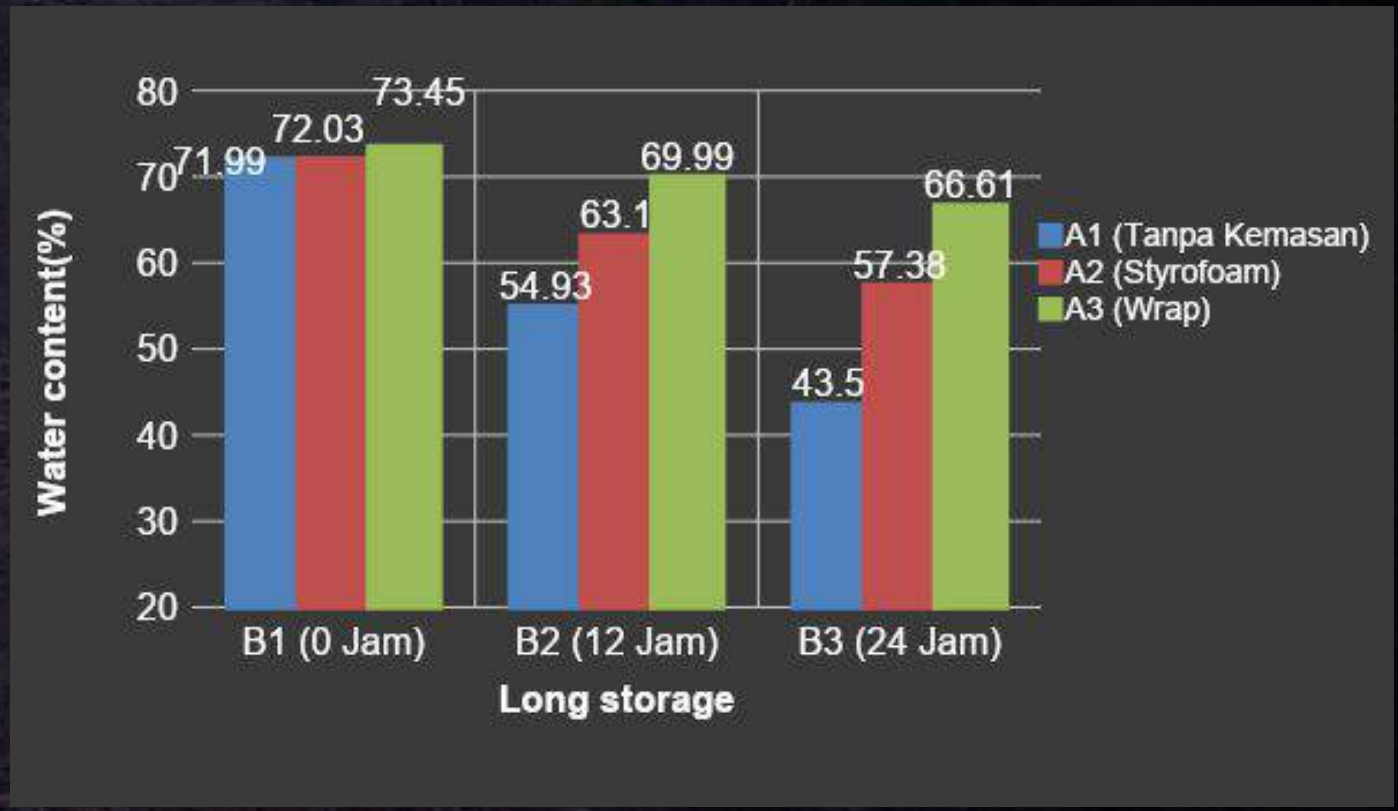
Result and Discussion

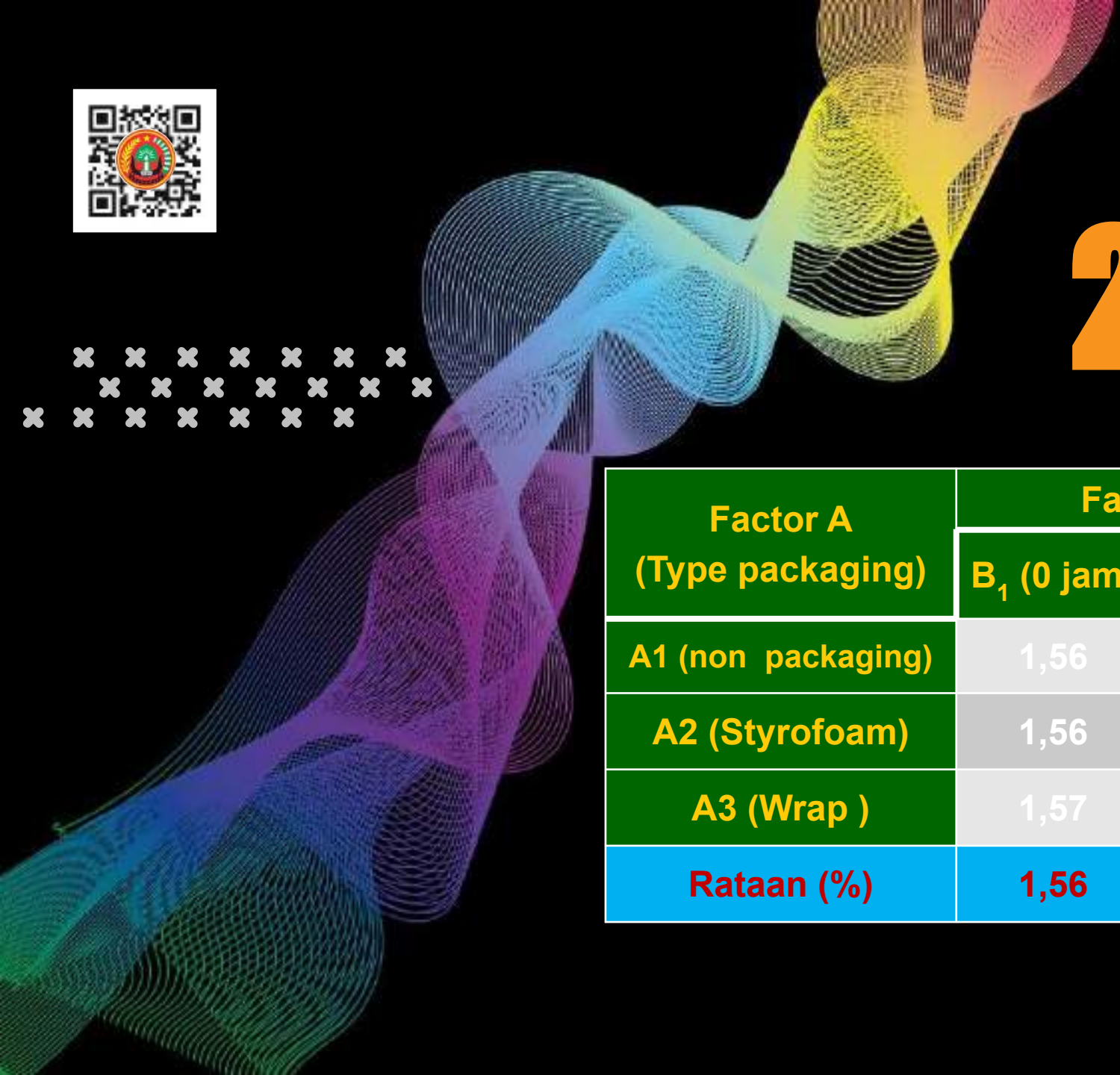
1 Water content

Factor A (Type Packaging)	Factor B (Long Storage)		
	B_1 (0 hour)	B_2 (12 hour)	B_3 (24 hour)
A_1 (Non Packaging)	71,99 A a	54,93 B a	43,50 C a
A_2 (Styrofoam)	72,03 A b	63,10 B b	57,38 C b
A_3 (wrap)	73,45 A c	69,99 B c	66,61 C c

1 Water content

Downward trend





2 Ash content

Factor A (Type packaging)	Factor B (long Storage)			Rataan (%)
	B_1 (0 jam)	B_2 (12 jam)	B_3 (24 jam)	
A1 (non packaging)	1,56	1,54	1,48	1,53
A2 (Styrofoam)	1,56	1,55	1,51	1,54
A3 (Wrap)	1,57	1,56	1,54	1,56
Rataan (%)	1,56	1,55	1,51	1,54

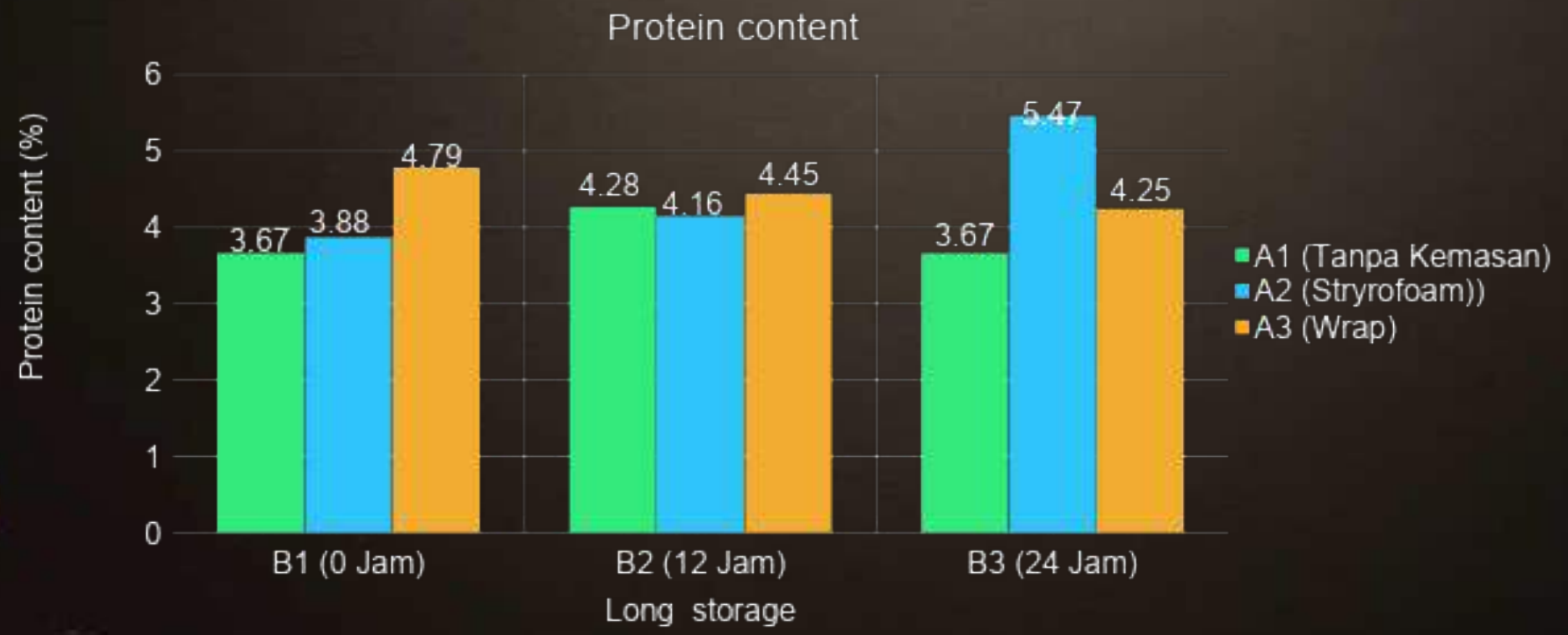
2 Ash Content

3 Protein content

Factor A (type packaging)	Factor B (long storage)		
	B_1 (0 Jam)	B_2 (12 Jam)	B_3 (24 Jam)
A_1 (Non Packaging)	3,67 a A	4,28 a A	3,67 a A
A_2 (Styrofoam)	3,88 a A	4,16 a A	5,47 b B
A_3 (Wrap)	4,79 a A	4,45 a A	4,25 a A

THP UNES

3 Protein content



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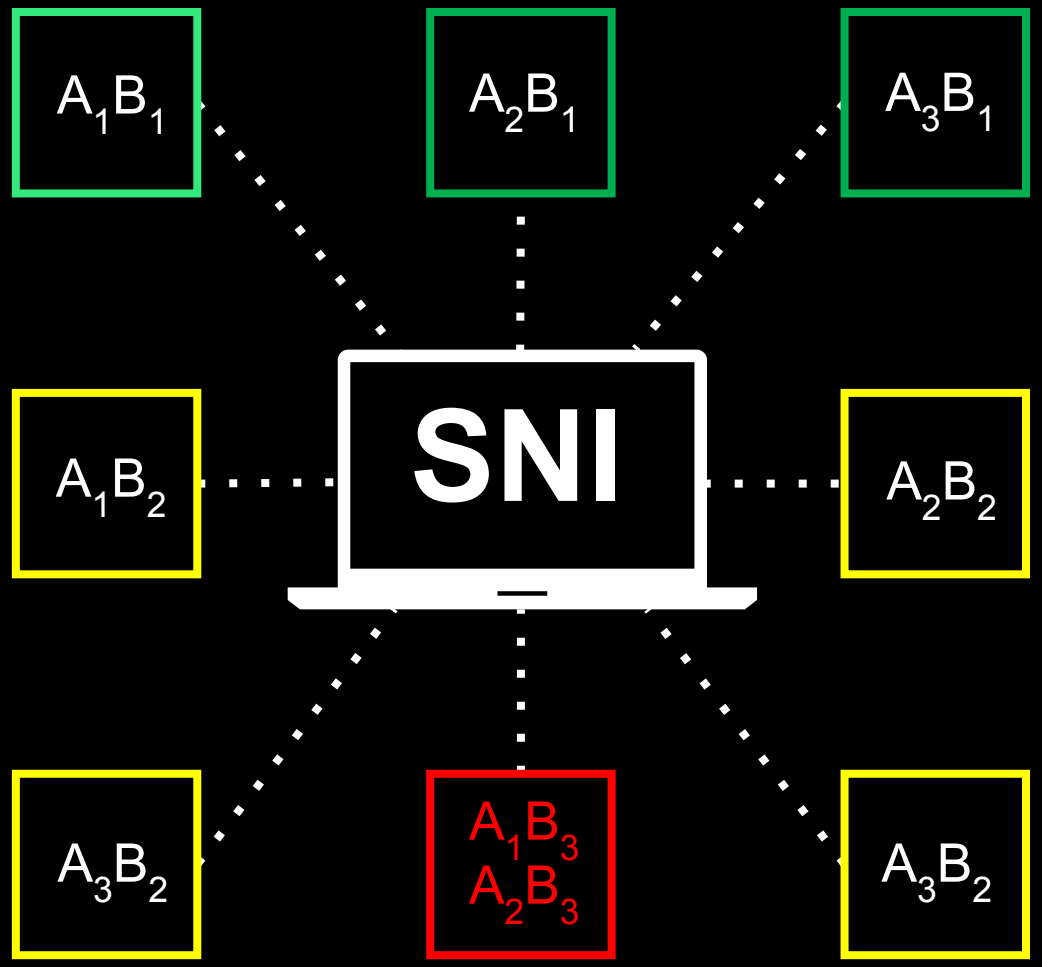
4 Total Plate Count (TPC)



Factor A (Type packaging)	Factor B (Long Storage)		
	B_1 (0 Jam)	B_2 (12 Jam)	B_3 (24 Jam)
A_1 (Non Packaging)	$9{,}2 \times 10^3$ cfu/g	$8{,}6 \times 10^4$ cfu/g	$3{,}0 \times 10^5$ cfu/g
A_2 (Styrofoam)	$1{,}0 \times 10^3$ cfu/g	$2{,}1 \times 10^4$ cfu/g	$2{,}8 \times 10^5$ cfu/g
A_3 (Wrap)	$4{,}3 \times 10^2$ cfu/g	$1{,}2 \times 10^4$ cfu/g	$1{,}2 \times 10^4$ cfu/g

The higher number of microbes was caused by the type of packaging that was unable to control the conditions of moisture, temperature and air during storage

The number of microorganisms in processed food is influenced by water content, water activity, pH, temperature, and length of time

High microbial growth is caused by the availability of oxygen, free water and sufficient air to support optimal microbial growth

5 Salmonella sp

Meatballs with wrap packaging and storage time of 24 hours (A3B3) were not indicated by Salmonella sp, meaning that the use of wrap packages with a storage time of up to 24 hours was still able to protect the meatball products from Salmonella sp bacteria.

Treatment	10^1	10^2	SNI	information
A_1B_1	Negatif	Negatif	NEGATIF PER 25 g	Match SNI
A_2B_1	Negatif	Negatif		Match SNI
A_3B_1	Negatif	Negatif		Match SNI
A_1B_2	Positif	Positif		Non match SNI
A_2B_2	Positif	Positif		Non match SNI
A_3B_2	Negatif	Negatif		Match SNI
A_1B_3	Positif	Positif		Non match SNI
A_2B_3	Positif	Positif		Non match SNI
A_3B_3	Negatif	Negatif		Match SNI

Salmonella sp can grow in a temperature range of 5−47 ° C with the optimum growth temperature is 37 ° C and the maximum temperature is 45.6 ° C

Amount sample : 9
Amount positif (+)% : 44,44%
Amount negative (-)%:55,56%
Total :100%

KOMPREHENSIF

6 Organoleptic

sample	appearance	Smell	texstur
A1B1	8,60	8,33	8,47
A2B1	8,60	8,60	8,60
A3B1	8,60	8,73	8,60
A1B2	6,33	6,87	7,00
A2B2	7,00	6,47	7,00
A3B2	7,53	7,93	7,13
A1B3	4,47	4,87	6,07
A2B3	5,53	4,47	6,07
A3B3	6,87	6,07	6,60

Smell

Rahmadana (2013), a change in a sharp fishy odor is a sign of protein decomposition in fish. 7 specifications = less product specifics

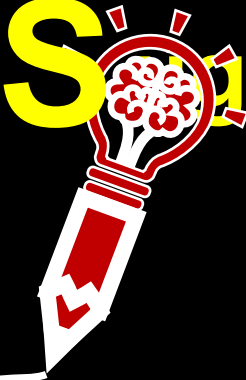
Appearence

The high value of the appearance test is due to the testing carried out before the product experiences storage and the type of packaging used. Specification. 7 = the surface is less smooth, slightly hollow, less

Texstur

During storage, changes in the texture of food can occur due to changes in water content, temperature and microbiological activity which can lead to a decrease in food quality (Purnomo 1995). Specifications 7 = compact rather springy solid

Conclusion & Suggestion



Conclusion

01 The type of red oyster mushroom tuna red meatball packaging based on water content, ash content, protein content, ALT, Salmonella sp and Organoleptic bacterial contamination is the best use of Wrap packaging.

02 Storage time for red tuna, white oyster mushroom meatballs based on water content, ash content, protein content, ALT, Salmonella sp and Organoleptic bacterial contamination, the best is 12 hours storage.

03 The combination of treatment for the Quality of Red Tuna and White Oyster Mushroom Meatballs is the use of wrap packaging with a storage time of 12 hours.

Suggestion

It is recommended to conduct further research on the Escherichia coli bacteria contained in the red tuna, white oyster mushroom meatballs so that it can be produced into food worthy of consumption.

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THANK YOU

Tabel 1. Komposisi nilai gizi beberapa jenis ikan tuna per 100 gram daging.

No	Komposisi	Satuan	Jenis Ikan Tuna		
			Blue fin	*Skipjack*	*Yellow fin*
1	Energi	kal	121,0	131,0	105,0
2	Protein	g	22,6	26,2	24,1
3	Lemak	g	2,7	2,1	0,1
4	Abu	g	1,2	1,3	1,2
5	Kalsium	mg	8,0	8,0	9,0
6	Fosfor	mg	190,0	220,0	220,0
7	Besi	mg	2,7	4,0	1,1
8	Sodium	mg	90,0	52,0	78,0
9	Retinol	mg	10,0	10,0	5,0
10	Thiamin	mg	0,1	0,03	0,1
11	Riboflavin	mg	0,06	0,15	0,1
12	Niasin	mg	10,0	18,0	12,0

Sumber : *Departemen of Health Education and Walfare*, 1972 *dalam* Maghfiroh, 2000.


Garis biru ramping dan
ditandai garis keemasan
Tonjolan
bentuk
"V"
finlet kuning
dengan tepi hitam tipis
Derétan garis dan setrip
berbaris rapat
Sirip dada menzapai
pangkal sirip punggung 2
dengan ujung melancip

Gambar 2. Tetelan merah tuna

Gambar 3. Jamur tiram putih (*Pleurotus ostratus*)

Tabel 2. Komposisi dan kandungan nutrisi jamur tiram per 100 gram.

Zat gizi	Satuan	Kandungan
Kalori (energy)	kal	367
Protein	%	10,5-30,4
Karbohidrat	%	56,6
Lemak	%	1,7-2,2
Tannin	mg	0,2
Riboflavin	mg	4,7-4,9
Niasin	mg	77,2
Ca (calsium)	mg	314
K (kalium)	mg	3,793
P (posfor)	mg	717
Na (natrium)	mg	837
Fe (zat besi)	mg	3,4-18,2
Serat	%	7,5-8,7

Sumber : Direktorat Jenderal Hortikultura Departemen Pertanian *cit* Sumarni (2006)

Tabel 4. Persyaratan mutu dan keamanan bakso ikan menurut SNI 7266:2014

	Parameter Uji	Satuan	Persyaratan
a	Sensori		Min 7 (Skor 1-9)
b	Kimia		
	- Kadar air	%	Maks 65
	- Kadar Abu	%	Maks 2,0
	- Kadar Protein	%	Min 7
	- Histamin *	mg/kg	Maks 100
c	Cemaran mokrobiologi		
	- ALT	koloni/g	Maks 1,0 x 10^5
	- *Escherichi coli*	APN/g	< 3
	- *Salmonella*	per 25 g	Negatif
	- *Staphylococcus aureus*	koloni/g	Maks 1,0 x 10^2
	- *Vibrio cholera***	per 25 g	Negatif
	- *Vibrio parahaemolyticus***	per 25 g	Negatif
d	Cemaran logam		
	- Kadmium (Cd)	mg/kg	Maks 0,1
	- Merkuri (Hg)	mg/kg	Maks 0,5
	- Timbal (Pb)	mg/kg	Maks 0,3
	- Arsen (As)	mg/kg	Maks 1,0
	- Timah (Sn)	mg/kg	Maks 40,0
e	Cemaran fisik**		
	- Filth		0

Sumber: Badan Standardisasi Nasional, 2014

Catatan:

* Untuk bahan baku yang berasal dari jenis *scombroidae*

** Bila diperlukan

Tabel 5. Jenis dan kode kemasan plastik daur ulang

No	Nama	Logo/Simbol
1	PETE atau PET (*polyethylene terephthalate*)	
2	HDPE (*high density polyethylene*)	
3	PVC (*polyvinyl chloride*)	
4	LDPE (*low density polyethylene*)	
5	PP (*polypropylene*)	
6	PS (*polystyrene*)	
7	OTHER (*Polycarbonate*)	

Sumber : Nugraheni, 2017.

Lampiran 10. Formulir Uji Organoleptik (SNI 7266:2014)

Lembar penilaian sensori bakso ikan

Nama Panelis:_____ Tanggal :_____

Cantumkan kode contoh pada kolom yang tersedia sebelum melakukan pengujian

Berikan tanda √ pada nilai yang dipilih sesuai kode contoh yang diuji

Spesifikasi	Nilai	Kode Contoh				
1. Kenampakan		1	2	3	4	5
Permukaan halus, tidak berongga, cerah	9					
Permukaan kurang halus, sedikit berongga, kurang cerah	7					
Permukaan kasar, berongga, kusam	5					
Permukaan sedikit retakan, berongga agak banyak, kusam	3					
Permukaan banyak retakan, banyak rongga, sangat kusam	1					
2. Bau						
Spesifik produk	9					
Spesifik produk kurang	7					
Netral	5					
Agak busuk, tengik	3					
Ausuk dan sangat tengik	1					
3. Tekstur						
Padat, kompak, kenyal	9					
Padat kompak, agak kenyal	7					
Tidak padat, tidak kompak, tidak kenyal	5					
Mudah pecah	3					
Sangat mudah pecah	1					

Lampiran 14. Dokumentasi proses pembuatan bakso

Tetetan merah tuna

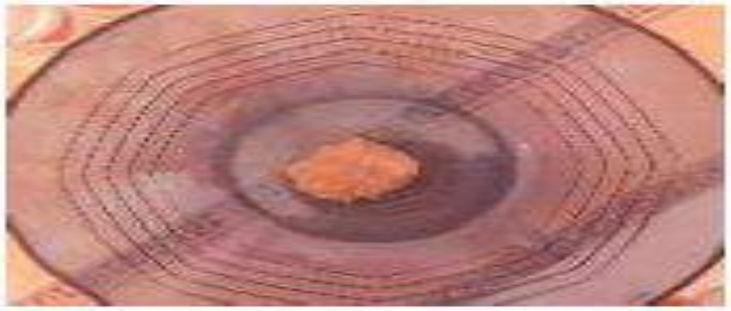
Jamur tiram putih

Pembuatan adonan

Pembulatan

Perebusan

Bakso



Tanpa Kemasan

Pengemasan *styrofoam*

Pengemaan *wrap*

Pengujian kadar Air

Penimbangan sampel

Pengeringan dalam oven

Sampel setelah dikeringkan

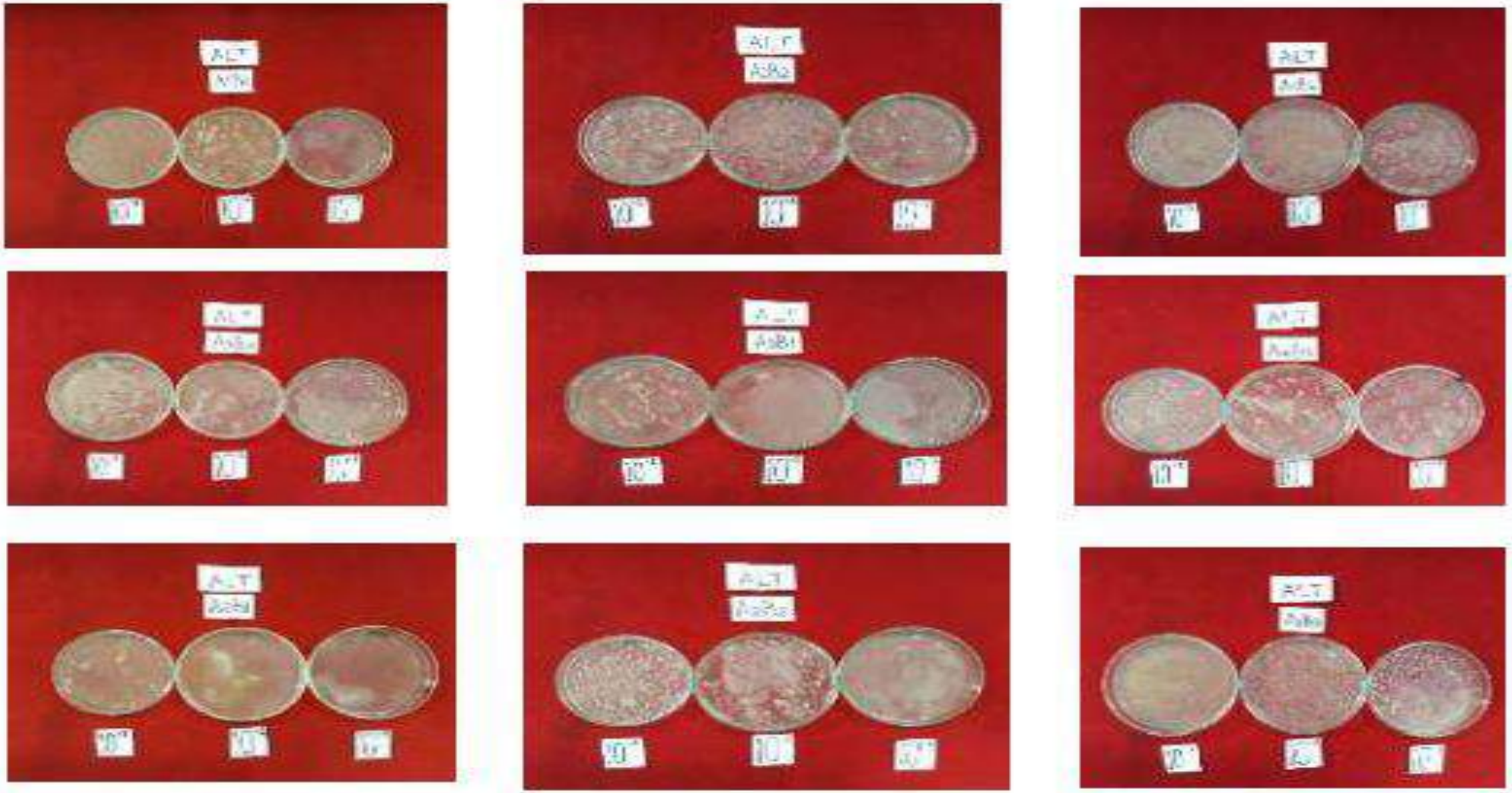
Pengujian Kadar Abu

Pemijaran sampel

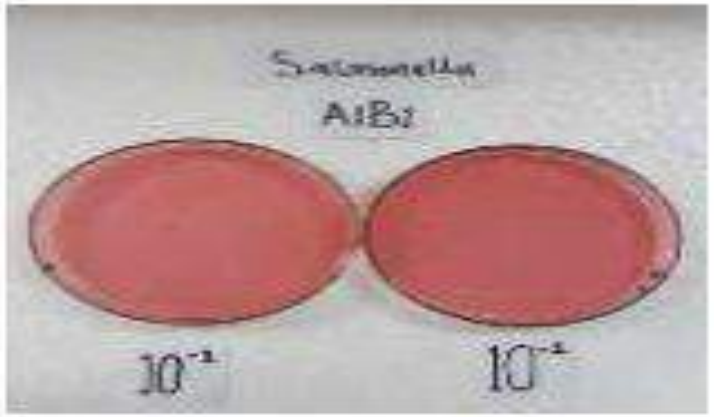
Pembakaran dalam Tanur

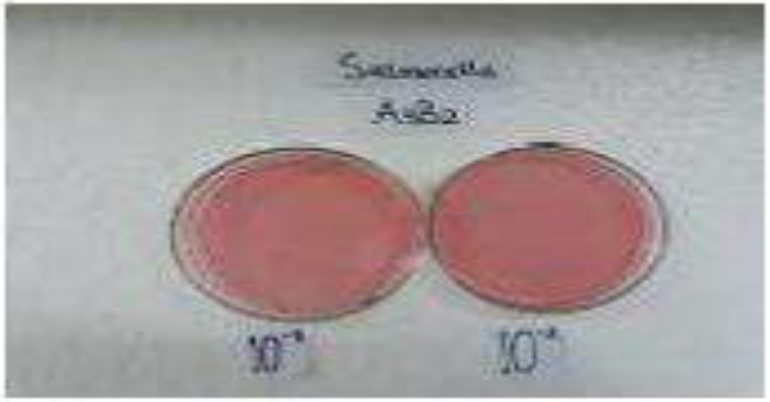
Abu sisa pembakaran

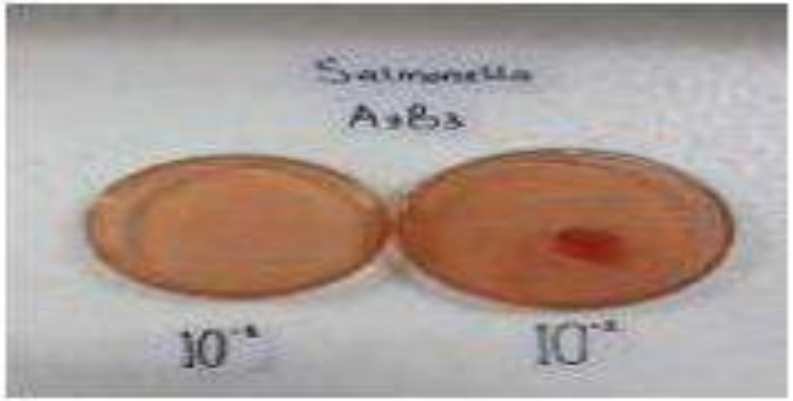
Lampiran 16. Dokumentasi uji ALT



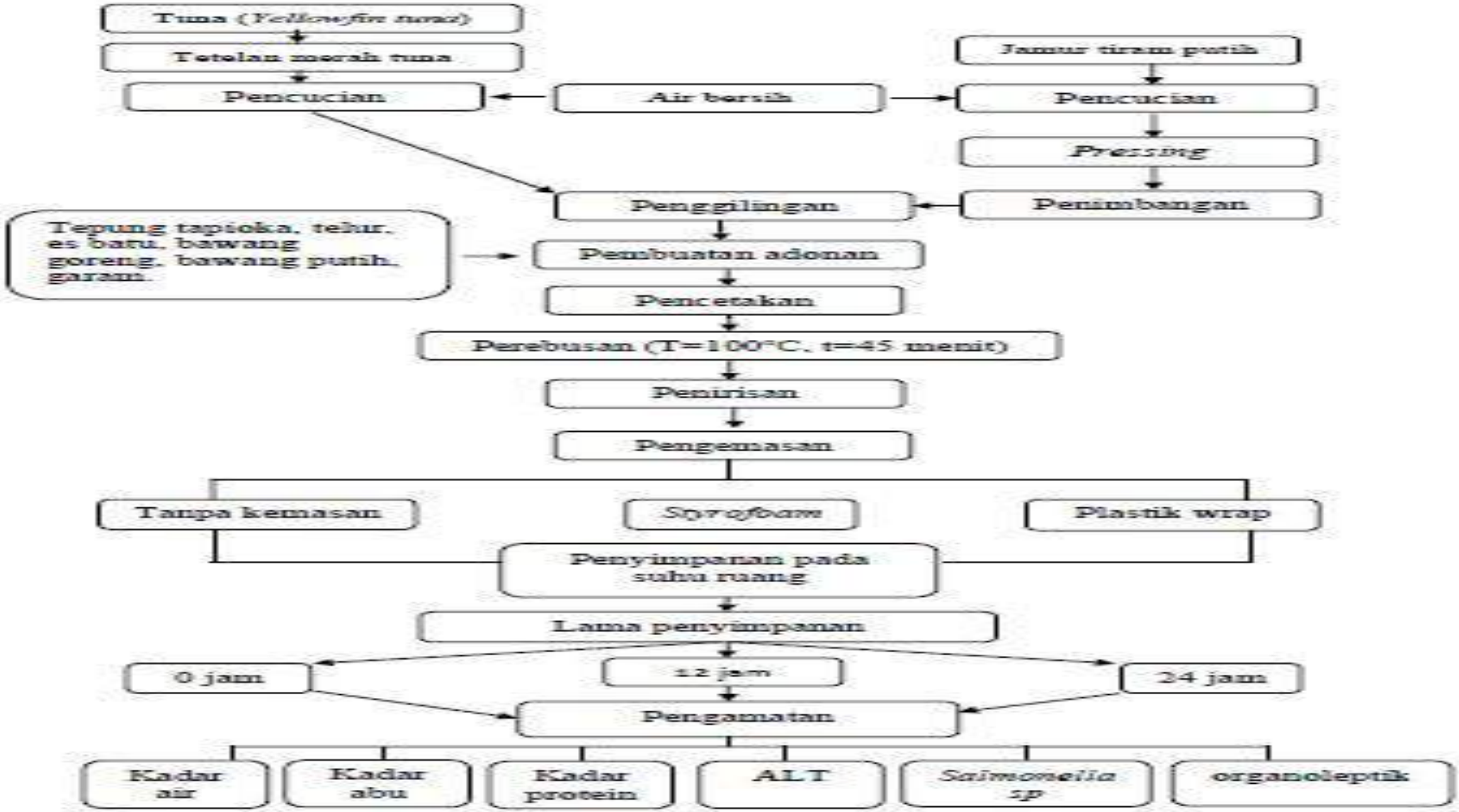
Lampiran 17. Dokumentasi *Salmonella sp.*

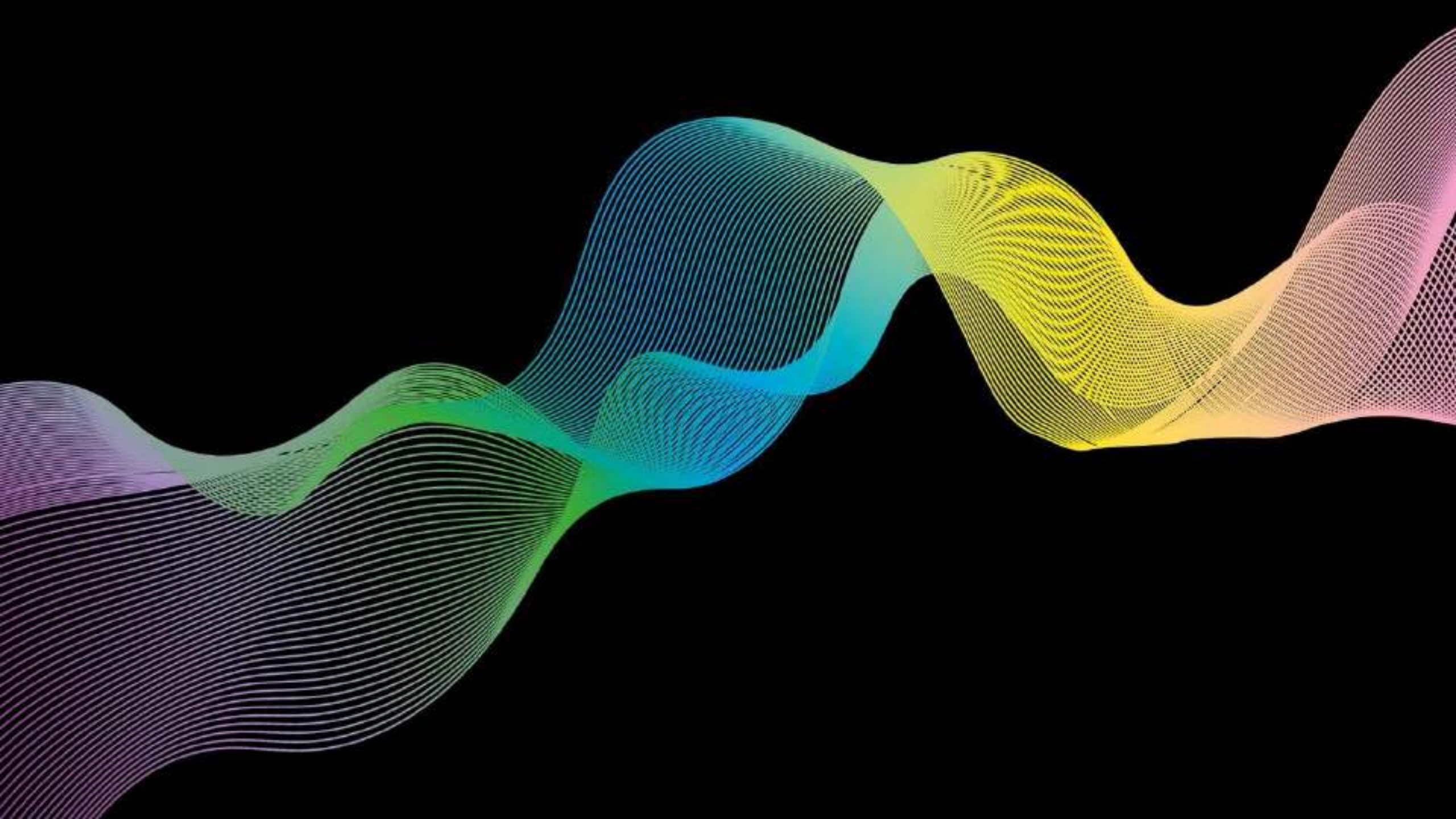






Lampiran 4. Diagram pembuatan bakso tetelan merah tuna jamur tiram putih





RUNDOWN OF THE 2nd ICARD

Monday, November 16th, 2020

Time (GMT +7)	Agenda
07.30 – 08.15	**Registration**
08.15 – 08.25	**Opening Ceremony,** **MC (**Ratna Megasari, S.P., M.Si.**)**
08.25 – 08.35	**Speech from Chairman The 2nd ICARD** (Dr. nat. techn. Weksi Budiaji, S.Si., M.Sc)
08.35 – 08.45	**Welcoming Speech** Prof. Dr. Nurmayulis, Ir., MP *Dean, Faculty of Agriculture, University of Sultan Ageng Tirtayasa*
08.45 – 09.00	**Opening Speech** Prof. Dr. H. Fatah Sulaiman, ST., MT *Rector, University of Sultan Ageng Tirtayasa, Indonesia*
09.00 – 09.10	**Praying: (**Rifqi Ahmad Riyanto, S.Si., M.Sc.) **Photo Session & Break**
09.10 – 09.50	**Sesion 1:** **Invited Speakers** (30 mins presentation, 10 mins Q&A) Dr. Yudi L.A. Salampessy University of Sultan Ageng Tirtayasa *Mining and Biodiversity Comics Publishing to the Elementary School Students around Mine Areas.* **Moderator:** Dr. Adi Susanto, S.Pi., M.Si
09.50 – 10.30	**Sesion 1:** **Invited Speakers** (30 mins presentation, 10 mins Q&A) Dr. Saed Gorgin Gorgan University of Agricultural Sciences and Natural Resources, Iran *Strategy of Shelf-Life Extension to Keep the Quality of Conical Lift net Catch for Sustainability in New Normal Era*. **Moderator:** Dr. Adi Susanto, S.Pi., M.Si MC: Conferment of Certificate of Appreciation

Time (GMT +7)	Agenda
10.30 – 11.10	**Sesion 2:** **Invited Speakers** (30 mins presentation, 10 mins Q&A) Assoc. Prof. Dr. Asmah Awal Universiti Teknologi MARA, Malaysia *Sugar Palm (Arenga pinnata* Wurmb Merr.*): A Review on Plant Tissue Culture Techniques for Effective Breeding.* **Moderator:** Nur Iman Muztahidin, S.P., M.Sc
11.10 – 11.50	**Sesion 2:** **Invited Speakers** (30 mins presentation, 10 mins Q&A) Elena Nikitina, Ph.D Kazan National Research Technological University, Rusia *Potato Starch as a Component Increasing the Antioxidant Potential of Yogurt.* **Moderator:** Nur Iman Muztahidin, S.P., M.Sc MC: Conferment of Certificate of Appreciation
11.50 – 13.00	**Break**
13.00 – 17.30	**Parallel Session**
17.30 – 18.00	**Closing** Awarding ceremony

Zoom meeting ID : 980 8228 3529
Passcode : icard2

or directly via

https://zoom.us/j/98082283529?pwd=di9WekhmS2RBcStFcTY1NGpGS0RlUT09

For the parallel session, the zoom id and passcode will be notified later.

PARALLEL SESSION

The virtual conference will be held separately for all session with 5 parallel sessions. The following schedule for each parallel sessions are explained below.

PARALLEL ROOM A

No	Time (GMT +7)	Title	Author(s)
1	13.00-13.15	Analysis of the Role of Livestock Sub-Sector in Economic Growth in West Sumatra	Amna Suresti, Firwan Tan, and Adrimas
2	13.15-13.30	Demand for Agricultural Product and Sustainable Development Issues: Empirical Studies from Household Survey	Mohtar Rasyid
3	13.30-13.45	The role of the Sawangan Organic Rice Farmers Association in increasing the economic value of organic rice: case study in Sawangan, Magelang	Atik Setiawati, Mahendra Wijaya, and Retno Setyowati
4	13.45-14.00	Risk Analysis of Rice Farming in Alue Merbau Village, East Langsa Sub-District, Langsa District	Faoeza Hafiz Saragih, Hanisah, Fiddini Alham
5	14.00-14.15	The Analysis on Factors Affecting the Risk of Rice Farming Production in West Tanjung Jabung Regency	Yardha, Erwan Wahyudi and Alfadholy Wafi
6	14.15-14.30	Posible Use of Food Security and Vulnerability Atlas (Fsva) to Detect Problem on Poverty and Stunting (the Case of Banten Province)	Yeni Budiawati and Ronnie S. Natawidjaja
7	14.30-14.45	Environmental Carrying Capacity for Food Availability in Pandeglang Regency, Banten Province	Mirajiani
8	14.45-15.00	Revenue and Feasibility Analysis of Celery (*Apium graveolens* l.) in Kelurahan Lingkar Selatan Kecamatan Paal Merah Kota Jambi	Suharyon and Syafri Edi
9	15.00-15.15	Communication Networks of on-Farm Rubber in Riau Province, Indonesia	R. Yulida, Rosnita Rosnita, Y. Andriani, and M. Ikhwan
	15.15-15.30	**Break**	

No	Time (GMT +7)	Title	Author(s)
10	15.30-15.45	Farm Business Analysis of Crops in Tidal Land (Case Study in Rantau Makmur Village, Rantau Rasau District)	Adri and Yardha
11	15.45-16.00	The Effect of Personal and Situational Factors on The Performance of Agriculture Extention Worker on the Behavior of Seeking Information as an Intervening Variabel (Study Case in Lebak Regency Banten Province)	Linda Nurhayati, Nurmayulis, Yudi L.A Salampessy
12	16.00-16.15	Mitigation of Human-Orangutan Conflict in Orangutan Reintroduction Area at Suo-suo Village, Buffer Zone of Bukit Tigapuluh National Park	Maskulino, Alfonsus H. Harianja, Wanda Kuswanda
13	16.15-16.30	Visitor's Perception of Cultural Technology Innovation in Taman Agro Inovasi, BPTP Jambi	Syafri Edi, Rustam
14	16.30-16.45	Gender Adaptation Strategy To The Impact Of Forest And Land Fire In Kelampangan Village Peatland, Sebangau, Central Kalimantan	Sari Marlina; Bambang Supriyono Lautt; Aswin Usup; and Revi Sunaryati

PARALLEL ROOM B

No	Time (GMT +7)	Title	Author(s)
1	13.00-13.15	Yield Ability and Grain Quality of Upland Rice in Sukabumi and Lampung	Hermanasari R, A P Lestari, Yullianida, A Hairmansis, Santoso, A Nasution
2	13.15-13.30	Quantifying the Reliable Discharges as an Incipient Analysis of Agricultural Planning and Developing in Ciujung Watershed	Ngakan Putu Purnaditya and Siti Asyiah
3	13.30-13.45	Improving Rice Productivity through the Implementation of Jajar Legowo Super (Jarwo Super) Technology in Jambi Province	Julistia Bobihoe, Jumakir and Endrizal
4	13.45-14.00	Screening of Rizoplan Rhizobacterial for Suppression of Bacterial Wild (Ralstonia Solanacearum) and Promoting the Growth on Chili *(Capsicum annum)*	J E R Rumbiak and S Hilal
5	14.00-14.15	Distribution Mapping of Rice, Corn, and Soybean Production Based on Geographic Information Systems in Pandeglang Regency	A. T. Sumantri, N. Hermita, R. A. Riyanto, and A Mulyaningsih
6	14.15-14.30	Analysis of Spatial Distribution in Various Types of Use Sub-Optimal Dry Land in Aceh Besar District	Umar. H. A, Sufardi, Syafruddin, Teti Arabia and Munar
7	14.30-14.45	Characterization of Performance 12 Superior Lines of Upland Rice Planted in Two Environmental Conditions	Enung Sri Mulyaningsih, Yuliana Galih Dyan Anggraheni, Eko Binnaryo Mei Adi, Nana Burhana, and Likarsilia Santun
8	14.45-15.00	Efficacy of Red Betel Leaf's *(Piper crocatum)* Chloroform Extract as Repellent against Rice Bugs Leptocorisa acuta Thunberg, 1783 (Hemiptera:Alydidae)	F. Saraswati1, A. S. Herdiannanta1 and R. C. H. Soesilohadi
9	15.00-15.15	Tuba Root (*Derris elliptica* Benth) Flour Extract Concentration Assay to Control the Corn Cob Borer (*Helicoverpa armigera* Hubn.)	R Rustam, D Salbiah, R Rismawanto and R Saputra
	15.15-15.30	**Break**	

No	Time (GMT +7)	Title	Author(s)
10	15.30-15.45	Hybridization and in Vitro Seed Germination of a Commercial Hybrid Oncidium Orchid in Indonesia	S Rianawati. Suryanah. Syafni. Musalamah. Dwiatmini. K.. and B Marwoto
11	15.45-16.00	Improvement of Shallots (Allium Ascalonicum) Cultivation on Paddy Fields to Increase Shallots Yields and Farmers Income During The Covid-19 Pandemic	D Haryani, M C Hadiatry, S Yuniarti, and R Purba
12	16.00-16.15	The performance of the Brown Planthopper *(Nilaparvata lugens)* Population and Predators on Endemic Lowland Rice Areas of Banten Province	Pepi Nur Susilawati, Sri Kurniawati, Yati Astuti, Yusuf Sopyan, Iin Setyowati
13	16.15-16.30	Yield of Soybean and Corn Intercropping Farming in Rainfed Lowland in Central Lampung, Lampung Province	Slameto, Meidaliyantisyah, Agung Lasmono, and Wahyu Wibawa
14	16.30-16.45	Yield Performance of Shade Tolerant Soybean Cultivars under Shaded Environment at Various Planting Densities	A Saryoko, Z Yursak, Y Astuti, S Kurniawati, S Kusumawati, and T Mulyaqin
15	16.45-17.00	A model for Accelerating Rice Planting in Paddy Fields to Provide Food in Banten Province During the Covid-19	Kardiyono, Tian Mulyaqin, Pepi N, Dewi Haryani, Iin Setyowati and Ismatul H
16	17.00-17.15	Potassium Nutrition Supply Affecting Early Growth and Chlorophyll Content of Shallot under Micro Sprinkle Fertigation in Dry Land	Alfu Laila, Nur Iman Muztahidin, Mona Sari, Andi Apriyani Fatmawaty, Nuniek Hermita
17	17.15-17.30	Characterization of Palm Plant Seeds (*Arenga pinnata* merr.) from Several Locations in Banten Province and Their Growth Response to the Provision of Liquid Organic Fertilizers	Kartina AM., Susiyanti and W.A. Rusadi

PARALLEL ROOM C

No	Time (GMT +7)	Title	Author(s)
1	13.00-13.15	Increasing Planting Density of Maize Trough Double Row Cropping System to Improves Seed Yield	A Saryoko, Y Giamerti, Z Yursak, P N Susilawati, S Kusumawati, Kardiyono and N Winanti
2	13.15-13.30	Effect of Basic Fertilizer Doses on Soybean Grow and Production	Twenty Liana, Dedy Irwandi and Andy Bhermana
3	13.30-13.45	Quality of Growth Media and Yields of *Allium ascolanicum* L. on Ultisol Soil Combined with Rabbit Manure	Ikrarwati, N A Syamsi, Y Sastro, T B Rusbana, NR Sudolar, and Y Romadhonah
4	13.45-14.00	Optimization of Annealing Cycle and Temperature SNAP T12 Primer Distinguishing Markers for Male, Female and Hermaphrodite Plants in Papaya (*Carica papaya* L)	Noflindawati, Aswaldi Anwar, Agus Sutanto dan Yusniwati
5	14.00-14.15	Implementation of Eco-friendly Technologies to Control Bacterial Leaf Blight of Rice Disease (*Xanthomonas oryzae* pv. oryzae)	Sri Kurniawati, Yati Astuti, Yusup Sopian Hidayat, Eka Yuli Susanti, Pepi Nur Susilawati
6	14.15-14.30	Application of New Superior Varieties of Irrigated Land Rice within Integrated Crop Management	Rachmiwati Yusuf, Nana Sutrisna, Achmad Saiful Alim, Ida Nur Istina, Indra Fuadi
7	14.30-14.45	The Success Factor In Developing an Energy Independent Village In Klaten Central Java	Dita Wahyu Ningtyas T, Suwarto and Eny Lestari
8	14.45-15.00	Interaction of Genetic and Zn Fertilizer Application on Rice Yield and Grain Zinc Content	Untung Susanto, Cucu Gunarsih, and Wage R Rohaeni
9	15.00-15.15	Correlation Study of Soil Test on Phosphorus In Ultisol Soil For Shallots (*Allium ascalonicum* L.)	I P Lestari, A D Susila, A Sutandi and D Nursyamsi
	15.15-15.30	**Break**	

No	Time (GMT +7)	Title	Author(s)
10	15.30-15.45	Morphological Characterization and Development Potential Beneng Variety (*Xanthosoma undipes* K.Koch) Pandeglang-Banten	Z.Yursak, I Hidayah, A Saryoko, S Kurniawati, O Ripasonah and PN Susilawati
11	15.45-16.00	Increasing Shelf Life of Rhizobacteria Formula with Alginat on Encapsulation During Storage	J E R Rumbiak and S Hilal
12	16.00-16.15	Studies on Cultivation of Several Varieties of Onion (*Allium ascalonicum* L.) in Polybag During Rainy Season in Jakarta	E Sugiartini, F R Eris, E Pancaningsih, O Nurviani, and N Herawati
13	16.15-16.30	Heavy Metal Uptake and Transition Across the Links of Soil-Plant-Animal-Food Chain	R Volkov and D Samigullin
14	16.30-16.45	Diversity Assessment of Mango (Mangifera spp) Plant Collection of Cibinong Germplasm Garden Based on Leaves Morphology and RAPD Markers	Y G D Anggraheni, and E S Mulyaningsih
15	16.45-17.00	The Study of Composting System and Its Use in Supporting Vegetable Cultivation in Kepulauan Seribu-Jakarta	Ana Feronika Cindra Irawati, Yudi Sastro, Ikrarwati, and Susi Sutardi
16	17.00-17.15	Genetic Diversity of SOME Indonesian Local Rice Varieties Based on SSR Marker Related to Aromatic Genes	Susiyanti, Nopiasari, I Rohmawati, P Nursusilawati, Sjaifuddin, S Abdullah

PARALLEL ROOM D

No	Time (GMT +7)	Title	Author(s)
1	13.00-13.15	Development of Seed Mass Production of Snakehead (*Channa striata*) in Indonesia	A Saputra, M B Syamsunarno, and M T D Sunarno
2	13.15-13.30	Penetration of Microplastics (Polyethylene) to Several Organs of Nile Tilapia (*Oreochromis niloticus*)	Desy Aryani , Muta Ali Khalifa, Muh. Herjayanto, Edo Ahmad Solahudin, Exel Muhamad Rizki, Wihdatul Halwatiyah, Hanifah Istiqomah, Siti Hamisah Maharani, Haeru Wahyudin, Ginanjar Pratama
3	13.30-13.45	Business Analysis of Soy Sauce from Chicken Feather Fish (*Coilia dussumieri*) in Bagansiapiapi, Rokan Hilir Regency, Riau Province	Kurnia Sada Harahap, Ratu Sari Mardiah, and Suci Asrina Ikhsan
4	13.45-14.00	Measurement of Fish Gelatin Using Rotational Viscometer: An alternative to conventional pipette method	Agusman, Suryanti, Nurhayati, Murdinah, Tuti Wahyuni
5	14.00-14.15	Economic Resilience of Fishermen Community during Covid-19 Pandemi around Karangantu Archipelago Fishing Port	Asep Hamzah, Hery Sutrawan Nurdin
6	14.15-14.30	Combination Effect of Solid Waste of Gracilaria Extraction and Sargassum Powder on Nitrogen Content of Bio Fertilizer	Jamal Basmal, R. Kusumawati, Nur Rahman, and Zazili Hanafia
7	14.30-14.45	Comparison of Gel Preparation Methods on Gel Strength Measurement of Carrageenan	Fateha, N Ulya, Asmanah, and Agusman
8	14.45-15.00	The Development Design of Venturi Type Protein Skimmer for Mariculture Land Base System	Adi Susanto, Muh. Herjayanto, Alimudin, Weksi Budiaji , Eko Priyantono, Nanda Adi Guna
9	15.00-15.15	Effect of Trichoderma Addition on Sargassum Organic Fertilizer	R. Kusumawati, Nurhayati, H.E. Pangestu, and J. Basmal

No	Time (GMT +7)	Title	Author(s)
	15.15-15.30	**Break**	
10	15.30-15.45	Aquaculture in the World and in RUSSIA: State and Prospects	T E Marinchenko
11	15.45-16.00	Characteristic of Lotion M/A type with Kappa/Iota Carrageenan	Dina Fransiska, Muhamad Darmawan, Ellya Sinurat, Bakti Berlyanto Sedayu, Yoga Windhu Wardhana, Yedi Herdiana and Ghaida Putri Setiana
12	16.00-16.15	The Effect of Addition Glycerol Against Nori Characterization from Gracilaria sp and Ulva Seaweeds	E Sinurat, D Fransiska, and Livia
13	16.15-16.30	Combination of Fish Oil with Rubber Seed to the Growth Performance of Catfish (Clarias sp.)	M B Syamsunarno, I D G Tambunan, A Munandar, Mustahal, A N Putra, M Herjayanto
14	16.30-16.45	Effects of Water on Hydrophobization and Mechanical Properties of Thermoplastic Agar	Agusman, D Fransiska, Nurhayati, H E Irianto, P Priambudi, A H D Abdullah, and R C Nissa, B B Sedayu, A R Hakim, P Wullandari and Wahyu
15	16.45-17.00	The Effect of Adding Bacillus NP5 to Feed on Growth, Survival Rate, and Protection Against Aeromonas hydrophila of Catfish (*Clarias sp.)*	Mustahal, Sevia, Muhamad Herjayanto, Mas Bayu Syamsunarno, Achmad Noerkhaerin Putra

PARALLEL ROOM E

No	Time (GMT +7)	Title	Author(s)
1	13.00-13.15	Whole Genome Sequence Data of *Lactobacillus fermentum* AG8, the Producer of Antibacterial Peptides	A Pavlova, G Ozhegov, M Nait Yahia, N Gogoleva, E Shagimardanova, E Nikitina, A Kayumov
2	13.15-13.30	Design Formula and Product Prototype of Beverage Made from Tamarillo (*Solanum betaceum*) Fruit and Sappan Wood (*Caesalpinia sappan*) Using Kano Method	C Angelica, O O Pangestu, J Kurniawan, B Meindrawan, D J C Hutabarat
3	13.30-13.45	Shrimp Paste Crackers as Potential Product Development for Small and Medium Enterprise (SMEs)	Christiana Retnaningsih, Berta Bekti R , Okti Ruenda, and Meiliana
4	13.45-14.00	The use of Plant Proteins in the Technology of Fermented Dairy-Free Products	D Khrundin, V Ponomarev, E Yunusov, G Egkova
5	14.00-14.15	Analysis of Glutamine Synthetase Activity from *Lactobacillus hilgardii* LMG 7934	D Zhuravleva, L Yadykova, Z Iskhakova, A Kayumov
6	14.15-14.30	Quality of Red Tuna (*Yellowfin Tuna*) Fishball, White Oyster Mushroom (*Pleurotus Ostreatus*) on Different Types of Packaging and Storage Time	I Ketut Budaraga, Vincensius Saibuma, Leffy Hermalena
7	14.30-14.45	Effect of the Formulation of Fermented white Corn Flour and Glutinous Rice Flour on the Quality of Instant Cream Soup Powdered	N A Pratiwi, R Rahmawati, R R Maulani, D Hunaefi, D Saputra , Tj Muhandri
8	14.45-15.00	Performance Test and Economic Analyses of Semi Mechanic Corn Sheller	Taufik Hidayat, Yahumri, Miswarti, Heryan Iswadi, Taupik Rahman, and Wilda Mikasari
9	15.00-15.15	Development of Functional Beverages from Herbs: Aspect of Nutrition, Processing and Safety	V Y Pamela, S Kusumasari and B Meindrawan
	15.15-15.30	**Break**	
10	15.30-15.45	Hazard Analysis and Critical Control Point of Milkfish Floss Production as Indigenous Food from Banten Province	W Nurtiana, Z Najah, D Anggraeni, N A Putri

No	Time (GMT +7)	Title	Author(s)
11	15.45-16.00	Ethnopharmalogical Properties of Essential Oils from Natural Forests in Northern Sumatra	A Aswandi and C R Kholibrina
12	16.00-16.15	The Consumer Preferences for New Sumatran Camphor Essential Oil-Based Products Using a Conjoint Analysis Approach	C R Kholibrina and A Aswandi
13	16.15-16.30	Changes and Differences of Biochemical Characteristics and Sensory of Red Robusta Premium Coffee Seeds Based on Varian Technology (Full Wash, Honey and Natural Process) in Bandung Jaya Village, Kepahiang District Bengkulu Province	Sri Wulandari, Makhmudun Ainuri, Anggoro Cahyo Sukartiko

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Quality of red tuna *(Yellowfin tuna)* fishball, white oyster mushroom *(Pleurotus ostreatus)* on different types of packaging and storage time

Quality of red tuna (*Yellowfin tuna*) fishball, white oyster mushroom (*Pleurotus ostreatus*) on different types of packaging and storage time

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Abstract. This study aims to determine the effect of packaging type and storage time on the quality of red tuna (*Yellowfin tuna*) white oyster mushroom (*Pleurotus ostreatus*) meatball. This research was conducted at the Laboratory of Agricultural Product Technology, Ekasakti University, Padang, Laboratory of Instrumentation and Laboratory of Microbiology, Faculty of Agricultural Technology, Andalas University. The study was conducted for 2 months, from April to May 2019, using a Factorial Completely Randomized Design (CRD) consisting of 2 factors with 3 replications. The first factor is the type of packaging (without packaging, styrofoam packaging, wrap packaging), and the second factor is the storage time (0 hours, 12 hours, 24 hours). Observation data were analyzed using ANOVA with the F test followed by the Duncan Multiple Range Test (DMRT) at the 5% real level. The results showed that the type of packaging with storage time had a very significant effect on moisture content and protein content and had no significant effect on ash content. The type of packaging and storage time for the best white oyster mushroom tuna red tetelan meatball based on water content, ash content, protein content, ALT, Salmonella sp and Organoleptic bacterial contamination is the best use of Wrap packaging with a storage time of 12 hours.
Key words: packaging, storage, oyster mushrooms, meatballs.

1. Introduction

Seafood, especially fish, is a very potential food source as a source of protein, fat and several vitamins. Fish is a perishable food commodity. Decay is caused by enzymes, either from the fish itself or from microbes. The proportion of collagen protein in fish ranges from 3-5% of the total fish protein. The high water content can cause microorganisms to easily grow and reproduce [1].

Fish fat contains a lot of unsaturated fatty acids which are very easily oxidized which can cause a rancid odor [2], so it is necessary to handle, process, and preserve fishery products which aim in addition to preventing damage to fish so that it can extend the shelf life as well as to diversify processed fishery products [3]. Processing can be done by processing whole fish without changing its shape, such as smoked fish, pindang fish, and salted fish. In addition, it can also be processed by changing shapes such as fish meal, fish chips, surimi, fish balls, crackers, shredded and sausage [4].

Fish meatballs are processed fishery products with raw materials for whole fish or fish meat (minced) or surimi, added with starchy fillers or tapioca flour and spices, which are formed in round shapes and boiled in hot water. Good quality fish balls are pure white in color, compact and chewy texture, not brittle or mushy [5].

One of the substitute ingredients for fish balls is white oyster mushroom (*Pleurotus ostreatus*) with the aim of increasing the nutritional value. Oyster mushroom is a type of mushroom that contains high fiber by 11.5%. Oyster mushrooms contain 39.8% lignocellulose fiber, which is insoluble fiber which is very good for digestion, the rest is soluble fiber which is good for cholesterol. In addition, mushrooms also

contain beta glucan which can boost the immune system. Regular consumption of 6-7 grams of mushrooms per day can increase endurance [6].

The addition of oyster mushrooms to fish balls is an effort to diversify food, increase the nutritional value, especially fiber and vegetable protein and to get a chewy texture. Based on research by Hermalena [7], the use of oyster mushrooms and tuna red tetelan in the manufacture of fish balls resulted in a protein content of 5.40% and 18.69% carbohydrates in the ratio of red tuna to oyster mushroom (90:10). Meanwhile, the organoleptic value (color, aroma, taste, and texture) can be accepted by consumers in the ratio of red tuna and oyster mushrooms (70:30) with the level of preference, are color 5.30%, aroma 4.65%, taste 5.5%, and texture 5.14%

Many studies with the aim of extending the shelf life of meatballs have been carried out. The results of [8] study to extend the shelf life of beef meatballs with preservation methods using the antimicrobial substrate *Lactobacillus plantarum* 1A5 at room temperature, showed that the activity of the antimicrobial substrate was able to inhibit *E. coli* and *S. aureus* during storage for 9 hours at room temperature. The microbiological quality of beef meatballs with the addition of antimicrobial substrates is better than those without antimicrobial substrates stored for 9 hours at room temperature.

According to Hidayati [9], the deterioration of the quality of meatballs is the appearance of mucus, a distorted aroma and the emergence of gas. During storage, the meatball will experience syneresis, the release of water from the gel, changes in flavor, taste and decreased nutrients due to fat oxidation. Damage during storage can occur due to the presence of microbes, enzymatic reactions and the influence of temperature. Marketing of meatballs in the community generally takes place with less sanitary storage conditions at room temperature.

One method of preserving meatballs that can be done is preserving meatballs by packaging. Packaging conditions can affect the shelf life of a product during storage. At present there are many packaging materials used for foodstuffs, including paper and cardboard packaging, glass, cans or metal, plastic and composite packaging. Of the several packages commonly used for storage of meatballs are packaging made of plastic materials such as LDPE (Low Density Polyethylene), PP (Polypropylene) plastic, HDPE (High Density Polyethylene) and PS (Polystyrene).

Based on the type of plastic, it is possible to use Styrofoam and plastic wrap. Styrofoam is polystyrene, a type of plastic that is very light, stiff, translucent and cheap but brittle quickly. The advantages of Styrofoam packaging are practical and durable. Plastic Wrap or Wrapping is a type of thin plastic film, with a thickness of 0.010 to 0.020 microns. Its characteristics are transparent (translucent), not easily torn even though it is made of limp material, so it is easy to shape, resistant to acids to avoid dirt or bacteria, impermeable to water, steam or hot enough oil. The objectives of this study were: 1. To determine the effect of the type of packaging on the quality of white oyster mushroom tuna. 2. To determine the effect of storage time on the quality of white oyster mushroom tuna red tetelan meatballs.

2. Materials and methods

2.1. Place and Time

This research has been carried out in the Agricultural Product Technology Laboratory of Ekasakti University, Padang, the Instrumentation Laboratory and the Microbiology Laboratory of the Faculty of Agricultural Technology, Andalas University. The research was conducted for 2 months, namely April to May 2019.

2.2 Material

The main raw material used was yellowfin tuna red tetelan obtained from the by-product of making tuna fish fillets at PT. Dempo Andalas Samudera, Bungus Teluk Kabung Subdistrict, Padang City. Other raw materials used in this study were white oyster mushrooms obtained from the Kongsi soil market in Padang, chicken eggs, Pak Tani Gunung brand tapioca flour, garlic spices, shallots, Dolphin brand salt, ice cubes, and water.

The materials used in chemical analysis are 1) Protein content: selenium 0.4 grams, concentrated H_2SO_4 (PT Smart Lab Indonesia) 10 ml, 10 ml distilled water, 10 ml 40% NaOH, 50 ml H_3BO_3 (Merck), 2

drops indicator , HCl 0.1N. 2) Total Plate Figures (ALT): 70% Alcohol, Nutrient Agar (NA), 0.9% NaCl. 3) Identification of *Salmonella* sp: Mac Conkey Agar (MCA) and Salmonella Shigella Agar (SSA) media, sterile distilled water, 70% alcohol, label paper, aluminum foil, cotton, and plastic bags.

2.3 Tools

The tools used for making meatballs include; sliced knife-Slicing knife, basin, bowl, scissors, portable gas stove with one furnace, Rinnai RI-511C brand, cauldron, steamer pan, bucket, blender, spoon and scale. Chemical analysis tools are: 1) Moisture content: digital scale, oven with Memmert UN 55 53L, vacuum desiccator, dryer jar, clamp, scissors, and aluminum cup. 2) Ash content: Carbolite High Temperature Box Furnace type furnaces, analytical scales, desiccators, tongs, porcelain dishes, Maspion S300 electric stove stoves. 3) Protein content: 500 ml kjeldahl flask, distillation device, 50 ml burette, 5 ml measuring pipette, 50 ml Erlenmeyer, dropper pipette, 250 ml beaker, and fume hood.

The total plate count (ALT) testing tools are autoclave, erlenmeyer, petridish, 10 ml measuring pipette, test tube, test tube rack, water bath, incubator cabinet, colony counter, vortex, tissue , bunsen, and petri dishes. While the tools used to identify Salmonella sp. are ice flasks, knives, scissors, test tubes and racks, petri dishes, erlenmeyers, analytical scales, bunsen heaters, incubators, autoclaves, bent glass rods and magnetic stirrers.

2.4. Experimental Design

The research design used was factorial completely randomized design with 2 factors, namely the type of packaging used consisting of 3 levels and storage time consisting of 3 levels. Each treatment was repeated 3 times. The treatment factors can be seen as follows: 1. Factor A: The type of packaging used consists of 3 levels. A1 = without packaging; A2 = packing with Styrofoam; A3 = packaging with plastic Wrap. 2. Factor B: Duration of storage at room temperature with 3 levels. B1 = 0 hours, B2 = 12 hours, B3 = 24 hours.

2.5. Supply of Raw Materials

The raw materials in this study were fresh yellowfin tuna fillets taken directly from PT. Dempo Andalas Samudera in Bungus Teluk Kabung District, Padang City. The red tuna droplets used have been cleaned first. The binder used is tapioca flour and the cooking spices used in the manufacture of tuna meatballs are fried shallots, garlic, pepper, salt.

2.6. Procedure for making meatballs [7] modified

Seven hundred grams of yellowfin tuna and 300 grams of white oyster mushrooms are washed, added with ice cubes, then finely ground, added with spices, binder, and emulsifier. Then mix well until the dough becomes homogeneous for about 5 minutes and is printed as desired (in this study 20 grams / seed were made). Furthermore, the dough that has been processed is boiled in boiling water for 45 minutes until the meatballs float, cooled at room temperature for 30 minutes.

2.7. Meatball Packaging Process

Freshly cooked meatballs are cooled to room temperature ± 37 ^{o}C then put into packages according to the treatment, all treatments are stored at room temperature.

2.8. Observations

Observations were made on meatballs including moisture content, ash content, protein content, determination of Total Plate Number (ALT), *Salmonella* sp test and organoleptic test, with, namely the initial storage (0 hours) as a control, 12 hours and 24 hours.

2.9. Analysis and Testing

2.9.1. Water content [10]

Determination of water content is a way to measure the amount of water contained in a food ingredient. The drying method with the oven method is based on measuring the weight loss due to evaporation of water from the dried material at a temperature of about 100℃ – 105° C. This method is used for all foodstuffs, unless the product contains volatile components or if the product will decompose on heating at 100 °C-105°C.

2.9.2. Ash content [10]

Ash is an inorganic residue obtained by ashing or heating at high temperatures > 450 °C and / or digesting organic components with strong acids. This inorganic residue consists of various minerals whose composition and amount depend on the type of foodstuff and the analytical method used. Ash in foodstuffs is determined by weighing the remaining minerals as a result of combustion of organic matter at a temperature of about 550 °C.

2.9.3. Protein Content [10]

Determination of protein content to determine the protein content in food. Measurements based on the total nitrogen content present in the sample, protein can be calculated by assuming a certain ratio of protein to nitrogen for the sample being analyzed. The determination of protein is based on the oxidation of carbonaceous materials and the conversion of nitrogen to ammonia. Then ammonia reacts with excess acid to form ammonium sulfate. The solution is made alkaline, and ammonia is evaporated and then absorbed, the amount is determined by titration using 0.02 N HCl.

2.9.4. Testing of Total Plate Numbers [11]

This method of determining the total plate number is used to determine the total number of aerobic and anaerobic microorganisms in meatball products. Before the incubation process, which is carried out the first time is homogenization of the material, homogenization is a way of preparing samples to obtain the best possible distribution of bacteria in the specified sample. The next process after homogenization is sample dilution.

2.9.5. Identification of Salmonella sp. [12]

Salmonella growth on selective media with pre-enrichment, and enrichment followed by biochemical tests and serological tests. Bacteria were isolated by wiping the entire surface of the meatball using a sterile cotton swab then put into a test tube containing *Selenite Cystein Broth* (*SCB*) and incubated at 37°C for 24 hours. Then the bacterial culture was cultured on *Salmonella Shigella* Agar (SSA) selective media. Next, Gram stain was carried out on separate colonies that grew on SSA media. *Salmonella sp* bacteria identification was carried out by inoculating the bacteria on IMViC (Indol, Methyl Red Voges-Proskauer (MR-VP), Simmons Citrate Agar, Sulfite Indol Motility (SIM), Triple Sugar Iron Agar (TSIA) media.

2.9.6. Organoleptic test [13]

Organoleptic testing is carried out on the resulting product. Samples are presented in a uniform form. This test includes tests based on parameters on appearance, smell (aroma) and texture carried out by 15 panelists. This test is carried out to determine the value of product specifications starting from the highest to the lowest product specifications. The panelist test results are then tabulated by entering the panelist assessment numbers into the table. The numbers in the table are the values selected by the panelists against the parameters that have been tested. The parameters to be tested are appearance, smell and texture values.

3. Results and discussion

3.1 Moisture Content

The results of the analysis of diversity showed that variations in the type of packaging, storage time, and interactions had very significant effects on the moisture content of the meatballs produced. The average moisture content of the meatball results of the study is presented in Table 1.

Table 1. Average moisture content (%) of research meatballs

Factor A (Packing Type)	Factor B (Storage Time)		
	B_1 (0 hour)	B_2 (12 hour)	B_3 (24 hour)
A_1 (Non Package)	71,99 a A	54,93 a B	43,50 a C
A_2 (*Styrofoam*)	72,03 b A	63,10 b B	57,38 b C
A_3 (*Wrap*)	73,45 c A	69,99 c B	66,61 c C
KK		0,10	

The numbers followed by the same letter have an insignificantly different effect at the 5% level according to the DMRT follow-up test. Where uppercase is read horizontally and lowercase is read vertically.

Based on Table 1 above, it can be seen that the treatment without packaging with a storage time zero zero hours is very significantly different at 12 hours and 24 hours of storage. The use of Styrofoam packaging was very significantly different for each storage duration of 0 hours, 12 hours and 24 hours. The use of wrap packaging was also significantly different at the storage time of 0 hours, 12 hours and 24 hours. The highest water content was found in the treatment of type of wrap packaging and storage time of 0 hours (A3B1), namely 73.45%. Plastic wrap has mechanical properties that are transparent, strong, flexible, has good resistance to chemical solvents, and low water vapor permeability, thus providing microclimate conditions for the materials it is packed with. The low permeability of wrap packaging can control the hydration process, namely the entry and exit of water and water vapor. While the lowest water content was found in the treatment without packaging and storage time of 24 hours (A1B3), namely 43.50%. The low water content is related to the influence of environmental factors that are directly contaminated with the material, the volatile nature of water results in a decrease in water content. When the temperature of the water increases, the average number of water molecules decreases and hydrogen bonds break and form again rapidly [14].

Storage time has an effect on the water content of white oyster mushroom tuna red tetelan meatballs, the longer the storage of each type of packaging used, the lower the water content. This decrease in water content is due to dehydration, namely the transfer of product moisture to the storage room. The use of plastic wrap with low permeability in meatball packaging can prevent moisture absorption because the pores in the packaging are very small, causing the ability to pass gas particles and water vapor as well. This is in line with the opinion of Gunardi [15] which states that changes in water content during storage can be influenced by the permeability of the packaging used, water absorption properties, and environmental humidity.

The use of styrofoam packaging with a higher moisture permeability than wrap packaging resulted in a decrease in moisture content higher than that of wrap packaging. Styrofoam or polystyrene (PS) is a monomer that is clear rigid but high water vapor and gas permeability with a density level (0.915 - 0.939 g / cm3), while "Wrapping plastic" has a density level (<0.915 g / cm3) is one type of plastic LDPE (Low Density Polyethylene) with water vapor and low water permeability [16].

The decrease in water content in the packaged material is related to the hydration characteristics. The hydration factor can be expressed by water activity (aw), water content (KA), and relative humidity (RH). This water vapor transfer takes place from a product that has a higher water vapor pressure to a product with a lower pressure. According to Syarief and Halid [17], if the humidity in the room is smaller than the food ingredients, some of the water will evaporate. In drying food, there are 2 levels of water removal rate (dehydration). At the beginning of drying, the rate of water loss per unit time is fixed, then a decrease in water removal rate per unit time will occur. This relates to the type of water bound in the material [14].

In food packaging, hydration characteristics are very important, especially with regard to water vapor. Product packaging affects the rate of water evaporation that takes place during storage depending on the type and nature of the packaging itself in controlling the hydration process. When food products are stored

at relative humidity below the monolayer area, there will be less water available to form hydration from trace metals so that the catalytic reaction is active [18].

The use of wrap packaging in food packaging is better at preventing the absorption of steam by packaged products and the release of moisture from excessively packed products during storage. Changes in water content at 12 and 24 hours storage are not a measure of the quality of meatballs. The water content of a good meatball is determined by the composition of the ingredients and the processing process, while the amount of water content that is affected by storage is indicated by external factors. The main function of packaging is to control the interaction between food products and the external environment [19].

3.2. Ash content

The results of the diversity analysis showed that the type of packaging treatment and storage time had no significant effect on the ash content of the resulting meatball. The average ash content of the meatball research results is presented in Table 2.

Table 2. Average ash content (%) of the research results of meatballs

Factor A (Type package)	Factor B (Storage time)		
	B_1 (0 jam)	B_2 (12 jam)	B_3 (24 jam)
A1 (Non package)	1,56	1,54	1,48
A2 (*Styrofoam*)	1,56	1,55	1,51
A3 (*Wrap*)	1,57	1,56	1,54
KK		0,16	

Table 2 shows that the type of packaging treatment, storage time and Interaction of treatment have no significant effect on the ash content of red oyster mushroom tuna. From these data, there is actually a decrease in ash content with insignificant values. Table 2 shows that the ash content of the red tetelan of tuna, white oyster mushroom, decreased in each treatment. The use of the type of packaging and storage time does not significantly affect the increase or decrease of mineral substances in the materials they are packed with. It is assumed that the physical and chemical qualities of food are able to maintain the contents in it, including ash. That is, the different treatment factors for the type of packaging and storage time did not affect the ash content of red oyster mushroom tuna.

Research by Hutapea [20] on the storage of red tilapia fish balls with plastic packaging at room temperature showed no significant changes in ash content. This research is confirmed by Hamdani [21], regarding the packaging of banana heart and catfish meatballs in vacuum and non-vacuum methods at cold temperatures, there was no significant change in ash content.

Ash content is a mixture of inorganic or mineral components found in non-volatile foodstuffs, which remains in the combustion and annealing of organic compounds [22]. In general, ash consists of sodium (Na), calcium (Ca), potassium (K), and silicate (Si) compounds. Ash content is the residual inorganic substance from combustion. Ash content is related to mineral elements contained in the material [14].

The ash content of the red oyster mushroom tuna can be based on the flour used in the dough. The mineral content in flour is not large but it is very important. The mineral material will be found in flour residue which has been completely burned to white ash [23]. According to the National Standard Agency (2014) the limit of ash parameters on fish meatballs is a maximum of 2%, so that the red tetelan tuna, white oyster mushroom meatballs on the type of packaging and storage time differ by below 2%, so that it still meets the Indonesian National Standardization.

3.3. Protein Content

The results of the analysis of diversity showed that variations in the type of packaging, storage time, and their interactions were significantly different to the moisture content of the meatballs produced. The average protein content of the research results is presented in Table 3.

Table 3. Average protein content (%) of research results

Factor A (Type Package)	Factor B (Storage time)		
	B_1 (0 hour)	B_2 (12 Hour)	B_3 (24 Hour)
A_1 (Non Package)	3,67 a A	4,28 a A	3,67 a A
A_2 (Styrofoam)	3,88 a A	4,16 a A	5,47 b B
A_3 (Wrap)	4,79 a A	4,45 a A	4,25 a A
KK			

The numbers followed by the same letter have an insignificantly different effect at the 5% level according to the DMRT follow-up test. Where uppercase is read horizontally and lowercase is read vertically.

Table 3 shows that the highest protein content is found in the Styrofoam packaging type with a storage time of 24 hours (A_2B_3), while the lowest is in the unpackaged treatment with a storage time of 0 hours and 24 hours (A_1B_1, A_1B_3). The effect of the type of packaging and storage time had an inconsistent effect on changes in the protein content of the white oyster mushroom tuna. Table 3 shows that the protein content of unpackaged meatballs has increased at 12 hours of storage, while 24 hours of storage have decreased. This condition is related to the growth and development of bacteria which is influenced by high water content and contamination with the environment. A decrease in water content can lead to an increase in protein levels. Furthermore, at 24 hours of storage there was a decrease in protein levels, presumably the effect of the exudation in the form of mucus out of the meatballs due to microbial activity. The discharge of mucus causes several nutrients such as salts, polypeptides, amino acids, lactic acids, purines, etc. which dissolve in water to be carried away with the water that comes out of the meatballs from microbial activity.

During storage, when using Styrofoam packaging, there is an increase in protein content. The type of Styrofoam packaging with a storage time of 24 hours (A_2B_3) is the highest protein content of all treatments, namely 5.47%. The increase in protein content is influenced by the decreasing water content of the meatballs. This condition cannot be separated from the nature of the Styrofoam packaging material which is able to maintain hot and cold temperatures. The ability of Styrofoam packaging to store heat results in reduced moisture content in the ingredients resulting in drying. According to Adawyah [3] cit Riansyah [24], decreasing water content will result in increased protein content in the material. In the type of wrap packaging, the protein content decreased during storage but it was not significant because the wrap packaging on the red tuna, white oyster mushroom tuna meatballs was better at preventing protein denaturation by bacteria. The decrease in protein content in the wrap packaging is due to the effect of reactive group bonds on the polypeptide chain of the material itself. If the bonds between the reactive groups hold the entire liquid, a gel will form, whereas if the liquid is separated from the coagulated protein, the protein will precipitate [14].

Wrap packaging during storage can reduce contamination by environmental factors so that protein denaturation caused by bacteria can be minimized. This is because the packaging used has low water vapor permeability and moderate gas permeability so that bacterial growth can be inhibited [18]. According to Winarno [25] protein content is closely related to water content and total microbes in food. The activity of microorganisms and enzymatic activity can affect protein levels in meatballs. Bacterial growth will accelerate protein denaturation so that protein levels will decrease. Microorganisms that grow generally will damage proteins turning them into peptides and amino acids [26].

Protein is a great source of amino acids which contain large organic compounds. Based on the atomic arrangement, proteins contain 50-55% carbon atoms (C), 20-23% oxygen atoms (O), 12-19% nitrogen atoms (N), 6-7% hydrogen atoms (H), and 0.2 -0.3% sulfur atom (S) [27]. Protein is an important substance for the body, because in addition to functioning as fuel in the body, it also functions as a building and regulatory substance [23].

Bacteria can break down complex molecules and organic substances such as polysaccharides, fats and proteins into simpler units. This initial breakdown can occur due to the excretion of extracellular enzymes, which are closely related to the process of food spoilage [28].

3.4. Total Plate Count

In this study, an examination of the Total Plate Count was carried out, namely calculating the number of colonies that grew on the media from sample dilution. Dilution aims to reduce the number of microorganism populations. The calculation of the total plate count of microorganisms is selected from petri dishes with a colony of 30-300. This is because the media so that the number of colonies is high (> 300 colonies) is not validly counted so it is likely that the calculation error is very large while the number for small colonies (<30 colonies) is not statistically valid.

The results of the observation / calculation of the Total Plate Number (ALT) using the Plate Count Agar (PCA) method in the calculation results are presented in Table 4.

Table 4. Calculation results of meatball TPC

Factor A (Type Package)	Faktor B (Storage time)		
	B_1 (0 Hour)	B_2 (12 Hour)	B_3 (24 Hour)
A_1 (Non package)	9,2 x 10^3 cfu/g	8,6 x 10^4 cfu/g	3,0 x 10^5 cfu/g
A_2 (Styrofoam)	1,0 x 10^3 cfu/g	2,1 x 10^4 cfu/g	2,8 x10^5 cfu/g
A_3 (Wrap)	4,3 x 10^2 cfu/g	1,2 x 10^4 cfu/g	1,2 x 10^4 cfu/g

Table 4 shows the lowest total number of microbes found in wrap packaging and 0 hour storage time (A_3B_1), while the highest was found in unpackaged meatballs and 24 hours storage time (A_1B_3). The total number of meatball microorganisms that did not meet the SNI requirements for fish balls was found in the A_1B_3 and A_2B_3 treatments. According to SNI 7266: 2014 fish meatballs have a maximum limit of Total Plate Count (TPC) or a total plate number of $1.0x10^5$ colonies / gram (5 log CFU / gram). The higher number of microbes was caused by the type of packaging that was unable to control the conditions of moisture, temperature and air during storage. According to Atma [29], the number of microorganisms in processed food is influenced by water content, water activity, pH, temperature, and length of time. High microbial growth is due to the availability of oxygen, free water and sufficient air to support optimal microbial growth [30].

Meatball as a processed meat product is an ideal culture growth medium for microorganisms because of its high water content, pH that is close to neutral and rich in nutrients. The cause of microbial contamination in foodstuffs can be due to the initial number of microbes in fish affecting the number of microbes in the future so that it will increase the number of microbial contamination in fishery products [31].

Contamination from spoilage organisms is difficult to avoid. The total number of microbes in food products is an indicator of food safety [32]. Microbiological analysis needs to be done as an evaluation of the number of microbes in a food ingredient. The raw materials used contain high nutrients, high moisture content, and packaging characteristics and properties. In accordance with the quality requirements of fish balls, this type of wrap packaging still meets the food safety threshold because it can slow down the growth rate of microorganisms and the enzymatic changes that occur after processing and during 24 hours of storage.

3.5. Identification of Salmonella sp

Salmonella sp. is a type of rod-shaped bacteria with a size of 1-3.5 µm x 0.5-0.8 µm. *Salmonella sp.* is a pathogenic bacteria that can cause food poisoning. This identification is done to determine the presence or absence of *Salmonella sp.* on the red oyster mushroom tuna red meatball after different packaging and storage. SNI 7266: 2014 stipulates that fish meatballs should not contain *Salmonella* (negative *Salmonella).*

From the results of identification that was carried out starting from the pre-enrichment stage, enrichment, selective media to biochemical testing of the red oyster mushroom tuna red meatball samples, the identification results of *Salmonella sp*. Bacteria were obtained. presented in Table 5.

Table 5. Identification results of *Salmonella* sp. on the meatball

Treatment	10^1	10^2	SNI	Information
A_1B_1	Negative	Negative	Negative Per 25 g	Accordance with sni
A_2B_1	Negative	Negative		Accordance with sni
A_3B_1	Negative	Negative		Accordance with sni
A_1B_2	Positive	Positive		Not accordance with sni
A_2B_2	Positive	Positive		Not Accordance with sni
A_3B_2	Negative	Negative		Accordance with sni
A_1B_3	Positive	Positive		Not Accordance with sni
A_2B_3	Positive	Positive		Not Accordance with sni
A_3B_3	Negative	Negative		Accordance with sni
Amount sample	: 9			
Amount positif (+)%	: 44,44%			
Amount negatif (-)%	:55,56%			
Total	:100%			

Based on Table 11, the isolation results on SSA media that were positive for *Salmonella sp* were shown by the formation of clear colonies with black in the middle. The formation of a colorless colony with a black center because *Salmonella* sp. can produce Hydrogen Sulfide (H_2S) which is characterized by the formation of black deposits on the AAS media. In the identification of *Salmonella sp.* In 9 samples of white oyster mushroom tuna red meatballs, samples A_1B_2 (without packaging with 12 hours storage time), A_2B_2 (styrofoam packaging with 12 hours storage time), A1B3 (without packaging) with a shelf life of 24 hours), A_2B_3 (styrofoam packaging with a shelf life of 24 hours) were positive for salmonella sp After the percentage, the results (44.44%) were obtained from the total of all samples. However, meatball with wrap packaging and storage time of 24 hours (A3B3) was not indicated that *Salmonella sp* was present, meaning that the use of wrap packaging with a storage time of up to 24 hours was still able to protect the meatball products from Salmonella sp bacteria.

Based on research by Susanti [33] the occurrence of bacterial contamination with *Salmonella sp*. in smoked fish is influenced by the hygiene practices of producers and sellers. Poor hygiene practices, for example unwashed hands, using dirty utensils, uncut nails and leaving food open are a means of spreading bacteria. In addition, dirty environmental conditions allow the spread of microbes and germ particles to be carried into smoked fish.

According to the theory of Arlita [34], which causes the sample to be contaminated by bacteria is caused by a knife used to cut raw materials such as raw meat that is contaminated by pathogenic bacteria if the equipment is used again without washing it first to cut cooked food that will be contaminated by the tool, by means of displacement of pathogens that can pose a risk to those who consume these foods. *Salmonella sp* in food in large enough quantities will not cause a change in appearance, smell or taste [35]. *Salmonella sp* can grow in a temperature range of 5−47 °C with the optimum growth temperature is 37 °C and the maximum temperature is 45.6 °C [36].

Food containing *Salmonella sp* in small amounts will not change the shape, taste and smell of the meal. However, if the food contains large amounts of bacteria, it will change the shape, taste, and distinctive smell of bacteria. The presence of *Salmonella sp.* According to SNI 7266: 2014 concerning fish meatballs, it must be negative for *Salmonella sp* microbes per 25 grams. In the research, tuna red tetelan meatball with wrapper was still protected from the growth of *Salmonella sp* bacteria for 24 hours.

3.6. Organoleptic Test

Organoleptic tests are carried out through sensory assessments, namely by observing appearance, observing odors, and observing texture. This test is carried out by means of the sample made in accordance with the treatment formulation. Furthermore, the test was carried out on 15 panelists. Panelists will provide a value based on the meatball specifications provided.

3.6.1. Appearance

Appearance is the first characteristic that consumers can judge for the first time. This appearance assessment aims to determine the panelists' acceptance which is assessed from the surface appearance of the meatball. The average results of the assessment of the appearance of the meatballs are presented in Table 6.

Table 6. Average parameter values for the appearance of meatballs

Treatment	average
A_1B_1 (Without packaging with a long shelf of 0 hours)	8,60
A_2B_1 (Packaging *Styrofoam* a long shelf of 0 hours)	8,60
A_3B_1 (Packaging *wrap* a long self 0 hours)	8,60
A_1B_2 (Non packaging a long self 12 hours)	6,33
A_2B_2 (Packaging *Styrofoam* a long self 12 hour)	7,00
A_3B_2 (Packaging *wrap* a long self 12 hour)	7,53
A_1B_3 (Non Packaging a long self 24 hour)	4,47
A_2B_3 (Packaging *Styrofoam* a long self 24 hour)	5,53
A_3B_3 (Packaging *wrap* a long self 24 hour)	6,87

Test parameter description:
9: smooth surface, not hollow, bright., 7: surface less smooth, slightly hollow, less bright., 5: surface rough, hollow, dull., 3: surface slightly cracked, hollow a lot, dull, 1: surface lots of cracks, lots of cavities, very dull

Table 6 shows the average value of panelists' acceptance of the appearance of meatballs in different treatments which tends to decrease. The appearance of the red oyster mushroom tuna red meatballs has an average value ranging from 4.47 to 8.60. The treatments for meatballs without 0 hour storage packaging (A_1B_1), Styrofoam packaging for 0 hours storage (A_2B_1), and 0 hours storage wrap packaging (A_2B_1) both had the highest value reaching 8.60. Based on the panelists' values 7-9, the three treatments have specifications of smooth, non-hollow, bright surface. The high value of the appearance test is due to the test carried out before the product experiences storage and the type of packaging used.

While the lowest appearance value was found in the A_1B_3 treatment (without packaging for 24 hours storage time) with a value of 4.47 with a slightly cracked surface specification, a lot of hollow, dullness. In accordance with SNI 7266: 2014 concerning fish meatballs, the minimum sensory value of 7 (score 1-9) with the surface specifications is less smooth, slightly hollow, less bright. From this research, those that do not meet the requirements according to SNI for the appearance value are without 12-hour storage packaging (A_1B_2), without 24-hour storage packaging (A_1B_3) and 24-hour storage packaged Styrofoam meatballs (A_2B_3).

Table 6 shows the longer the retention of the panelists' acceptance of the appearance of the meatballs, the decreasing. The use of styrofoam packaging and wrap for 12 hours of storage still meets the minimum threshold for the appearance value of meatballs based on SNI 7266: 2014, which is a minimum of 7, meaning that it still has a surface specification that is less smooth, slightly hollow, less bright. Meanwhile, the 24-hour storage without Styrofoam packaging and packaging no longer meets the sensory quality requirements of meatballs.

Products or foodstuffs that experience storage result in quality degradation, both physically and chemically [37]. Meatballs are known to have decreased water content during storage resulting in the appearance of dull meatballs. According to Chamidah [38], explaining that the decrease in appearance value during storage is suspected because the water content of the product during storage has also decreased. In addition, during storage, there will be microorganism activity which results in the appearance of slimy

meatballs. This is in accordance with the opinion of Hidayati [9], said that the meatballs will look soft and slimy due to the activity of microorganisms. It can be seen that the red and white oyster mushroom tuna meatballs during storage for up to 24 hours have deteriorated quality.

3.6.2 Odor (aroma)

Aroma is a parameter that affects the quality of a processed product. The smell or smell of food can determine the delicacy of these food ingredients. In general, the smells received by the nose and brain is a combination of four main smells, namely fragrant, sour, rancid, and charred [25]. The average value of the red oyster mushroom tuna red meatball aroma is presented in Table 7.

Table 7. Average value of meatball odor parameters

Treatment	average
A_1B_1 (Without packaging with a long shelf of 0 hours)	8,33
A_2B_1 (Packaging *Styrofoam* a long shelf of 0 hours)	8,60
A_3B_1 (Packaging *wrap* a long self 0 hours)	8,73
A_1B_2 (Non packaging a long self 12 hours)	6,87
A_2B_2 (Packaging *Styrofoam* a long self 12 hour)	6,47
A_3B_2 (Packaging *wrap* a long self 12 hour)	7,93
A_1B_3 (Non Packaging a long self 24 hour)	4,87
A_2B_3 (Packaging *Styrofoam* a long self 24 hour)	4,47
A_3B_3 (Packaging *wrap* a long self 24 hour)	6,07

Test parameter description:
9 = specific product 7 = less specific product 5 = neutral 3 = slightly rotten, rancid 1 = rotten and very rancid

The results of the panelists' average assessment of the aroma parameters of red tetelan tuna, white oyster mushroom tuna on different treatments ranged from 4.47 to 8.33. The highest aroma value of the tested fish balls was achieved by the A_3B_1 treatment (0 hour storage wrap packaging), namely 8.73. The high value of this aroma is because it has not been influenced by the type of packaging and storage time so that the aroma is still maintained with product specifications. While the lowest value was achieved by the A_2B_3 treatment (Styrofoam packaging for 24 hours), namely 4.47.

The decrease in the average value of the odor specification for stored meatballs at 0 to 12 hours, the odor sensory value was still acceptable to the panelists, but after the 24th hour the value had been rejected because the aroma had changed. The production of aroma compounds is largely determined by the composition of the bacteria involved in these compounds [25]. Basically, the stored meatball does not experience a change in aroma to become rancid, but rather an increase in the aroma of fish in the meatball. The increase in the fishy aroma of meatballs can occur due to an overhaul of fish protein by enzyme activity and microorganisms. According to Rahmadana [39], a change in a sharp fishy odor is a sign of protein decomposition in fish.

The decrease in the average value of the odor specification of fish meatballs from the 0th hour to the 12^{th} hour of the odor sensory value of the unpackaged meatballs and wrap packaging was still acceptable to the panelists, but after the 24th hour the value was rejected for fish balls. Where the characteristic appears unpleasant odor is close to neutral until a sour smell arises. From the sensory value, it can be seen that the treatment of meatballs without Styrofoam packaging and packaging decreases the specification value faster than the packaging during storage. According to Saleh [40], during storage, the sensory value of aroma / smell tends to decrease, this is in line with the increase in the value of ammonia, TVB, TPC, fat oxidation. The increasing number of microorganisms causes the formation of compounds that produce unpleasant odors and tastes.

3.6.3. Texture

Texture is one of the factors that determine the acceptance of a product. Texture assessment aims to determine the panelist's acceptance of the level of elasticity or resilience of a product which can be assessed

using the sense of touch, namely through touch stimuli. The results of the scoring test regarding the texture of the red and white oyster mushroom tuna meatballs are presented in Table 8.

Table 8. Average value of meatball texture

Treatment	average
A_1B_1 (Without packaging with a long shelf of 0 hours)	8,47
A_2B_1 (Packaging *Styrofoam* a long shelf of 0 hours)	8,60
A_3B_1 (Packaging *wrap* a long self 0 hours)	8,60
A_1B_2 (Non packaging a long self 12 hours)	7,00
A_2B_2 (Packaging *Styrofoam* a long self 12 hour)	7,00
A_3B_2 (Packaging *wrap* a long self 12 hour)	7,13
A_1B_3 (Non Packaging a long self 24 hour)	6,07
A_2B_3 (Packaging *Styrofoam* a long self 24 hour)	6,07
A_3B_3 (Packaging *wrap* a long self 24 hour)	6,60

Description of test parameters: 9 = solid, compact, chewy 7 = compact, rather springy 5 = not solid, not compact, not chewy 3 = easy to break 1 = very easy to break

In Table 8, it can be seen that the average value of the panelists' acceptance rate of the texture of the white oyster mushroom tuna red tetelan meatball ranges from 6.7 to 8.60. The highest average value was found in the A_2B_1 treatment (Styrofoam packaging for 0 hours storage) and A_3B_1 (24 hours storage wrap packaging), which had the same value of 8.60 with the specifications of solid, compact, and thick. While the lowest was in the A_1B_3 treatment (without 24-hour storage packaging) and A_2B_3 (24-hour storage Styrofoam packaging) which had the same value of 6.07 with the specifications of solid, compact, rather chewy.

Based on the data above, it is known that the meatball product with storage for 12 hours has a value of 7, meaning that it still meets the product specifications for solid, compact, somewhat chewy. In accordance with SNI 7266: 2014 regarding fish meatballs with a minimum sensory value of 7 (score 1-9) with a compact, rather chewy solid specification. Storage at 0 to 24 hours texture parameters in all treatments decreased. However, the texture of the oyster mushroom tuna red tetelan meatball on the A_3B_3 treatment (24-hour storage wrap packaging) was still acceptable to the panelists with a value of 6.60, meaning that it still met the specifications for solid, compact, somewhat chewy.

One of the parameters that people like about meatballs is their chewy texture. There are several factors that can affect the texture of the meatballs such as the composition of the meatballs, the manufacturing process and heating time [41]. During storage, changes in the texture of food can occur due to changes in water content, temperature and microbiological activity which can lead to a decrease in food quality [42].

4. Conclusion

Based on research on "The Effect of Packaging Type and Storage Time on Quality of Red Tuna, White Oyster Mushroom Meatballs" can be drawn the following conclusions: 1. Type of red oyster mushroom tuna red meatball packaging based on water content, ash content, protein content, TPC, Salmonella sp and Organoleptic bacterial contamination is the best use of Wrap packaging. 2. The duration of storage of red oyster mushroom tuna red meatballs based on water content, ash content, protein content, TPC, Salmonella sp and Organoleptic bacterial contamination is the best storage for 12 hours. 3. Combination of treatment on the quality of white oyster mushroom tuna red meatballs is the use of wrap packaging with a storage time of 12 hours.

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