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PREFACE

First of all, we are very happy for the success of first international conference on Food and Bio-industry. We would like to thank to all the committees and parties involved so the conference could succeed well. The theme of the conference is "Indonesia Towards Leading Agro-Industry in Local Wisdom based Food and Bio-energy Sovereignty" .The conference was held in Puri Setiabudhi Residence, Bandung west Java, Indonesia on 29-30 July 2019. The invited speakers from Indonesia and also from abroad contributed and shared their valuable opinions made the conference interesting and valuable to all participants. It was around 250 participants attended the conference mainly from Indonesia and some from abroad like Malaysia, Singapore, Philippine, Vietnam, Thailand and Sri Lanka. The participants background varied from lecturer, researcher, government, businessman and student

The conference is aimed to explore and share the recent development in food science technology and agro-industrial technology field and its contribution to reach the Sustainable Development Goals (SDGs). The international conference was the collaboration between Indonesian Food Technologist Association (PATPI) and Indonesian Agro-Industry Association (AGRIN). We are very grateful for the contribution from all host universities and institution like Universitas Padjadjaran (UNPAD), Universitas Pasundan (UNPAS), Institut Teknologi Bandung (ITB), Universitas Al-Ghifari, Universitas Garut, SAFE Network and JP Global Transtech.

The conference took the concept of outdoor conference with the previous day had been filled with the visit to some places related to conference theme. The next day was filled with the plenary session and parallel session. There were more than 100 articles presented orally and poster. The topic were spread in two big sub-themes, food-science technology and agro-industrial technology. The selected articles were chosen to publish in the proceeding which Scopus indexed.

Finally we hope this conference could be beneficial to all of us and see you again to the next conference with the same theme.

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Acknowledgement

This event – International Conference on Food and Bioindustry (ICFB-2019) is held by the Indonesian Association of Food Technologists (IAFT/PATPI) hosted by IAFT Bandung Branch, Indonesia Agroindustry Association (AGRIN) and supported by the Faculty of Agroindustrial Technology Universitas Padjadjaran, Universitas Pasundan, Universitas Al Ghifari and others.

Seminar, conference or scientific forum is a tradition held by professional organizations like IAFT and AGRIN. IAFT has been running national and international seminar every year intermittently during the past, however in this year we conduct an international instead of national conference since we have a good opportunity to have a collaboration with AGRIN that it might be expected to be able to extend the scope of the conference and to get greater output and outcome from this valuable event. This is also as an effort to make our professional association go global.

Organizing committee of ICFB has set the scope of this conference comprising three parts, i.e. Food, Bioenergy, Special theme of Sustainable Development Goal's (SDG's) and Halal Industry. About the first part, Postharvest Technology, Food Diversification, Functional Foods, Food Safety are four aspects that are very relevant and matching with the mission of IAFT. Plenary and technical sessions the Conference also provides other agendas such as PATPI annual meeting, IAFT/PATPI Award, Food Exhibition and Food Business Forum.

High appreciation is granted to PATPI Branch Bandung, the Chairman and members of organizing committee for their commitment to realise this enormous event.

Chairman

Robi Andoyo, STP, M.Sc., Ph.D

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The quality of corn milk-based cheese analogue made with virgin coconut oil as a fat substitute and with various emulsifiers

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Abstract. Cheese analogues can be produced by modifying ingredients to produce low-fat cheese. Low-fat cheese generally has a less preferable texture and taste, so it is used as a fat substitute. Virgin coconut oil (VCO) is commonly used as a fat substitute because it can reduce total cholesterol, triglycerides, phospholipids and low-density lipoprotein (LDL) cholesterol, and increase high-density lipoprotein (HDL) cholesterol in the blood. In this study, we aimed to: 1) determine the effect of VCO concentration on the quality of corn milk-based cheddar cheese analogue; and 2) study the effect of emulsifier type on the quality of the cheese analogue. This research used experimental methods with a randomized group design. Two factors were studied: the concentration of VCO (i.e. 15%, 20%, 25%) and type of emulsifier (Span 80, Tween 80 (1%), Span 80:Tween 80 (1:1)). The observed variables included yield, total solids, total titrated acidity, moisture content, fat content, protein content, and sensory properties. The results showed that an increase in VCO concentration of 15–25% in the cheese analogue-making process increased fat and moisture content, but reduced sensory value. The emulsifiers did not influence the physicochemical variables and sensory properties of the produced cheese analogue significantly. The best cheese analogue was produced using 25% VCO and Tween 80. The characteristics of this product were: 59.93% bb yield, 54.62% moisture content, 30.2 degrees Brix total solids, pH 5.62, 19.96% fat content, 11.51% soluble protein with colour sensory value of 3.84 (yellowish white), scent value of 4.07 (slightly typical of cheese), taste value of 5.48 (slightly salty), texture value of 2.55 (not hard) and favourite value of 4.38 (slightly favourable).

Keywords: cheese analogue, virgin coconut oil, Span 80, Tween 80

1. Introduction

The consumption of cheese in the world increases every year. In 2017, the increase in cheese consumption in Indonesia reached 0.252 ounces per year. To anticipate the increasing demand for cheese, cheese products are being developed using raw materials other than cow milk, and are known as cheese analogues. Cheese analogues, also termed imitation cheese, are a cheese-like product in which fat, milk protein or both are partly or wholly replaced by non-milk components, mainly from vegetable ingredients such as rice bran oil, sunflower seeds, or other plants [1-3]. During cheese analogue

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production, the fat that usually comes from milk is replaced by oil or vegetable fat. This reduces the level of saturated fatty acids and the risk of cardiovascular diseases [4-5].

Corn milk is an innovative product that has been used to replace cow milk and to reduce fat levels in cheese. Corn milk-based cheese analogues have been produced by [6-7] with low yield levels. Filler material such as whey protein can be used to increase the yield level. Virgin coconut oil (VCO), which contains unsaturated fatty acids, is used as a fat substitute. According to [8], the addition of oil has a significant influence on customer acceptance and cheese texture and structure.

The use of vegetable oil with skim milk requires emulsifiers with a hydrophilic–lipophilic balance (HLB) value of 9–14 to produce a stable emulsion [9]. In the present, the emulsifiers Tween 80 and Span 80 were used to maintain the product's stability. The addition of VCO and emulsifier significantly influences the cheese analogue quality. Therefore, VCO concentration and emulsifier type are related to the physicochemical quality of the resultant cheese analogue.

This research aimed to 1) determine the effect of VCO concentration on the quality of a corn milk-based cheddar cheese analogue; 2) study the effect of emulsifier type on cheese analogue quality, and 3) determine the best product and its characteristics.

2. Experimental details

2.1. Ingredients

The ingredients used in this study were sweet corn from the wage market Purwokerto, whey protein concentrate (PT Naturelle Inti Global), VCO (CV Mutia, Yogyakarta), Span 80 (CV Prima chemical), Tween 80 (CV Prima chemical), and ingredients for analysis. The materials included the equipment for cheese analogue production and analysis tools.

2.2. Cheese analogue production

The cheese analogue production consisted of two parts: corn milk production and cheese analogue production. The corn milk was produced based on the method described by Aini *et al* [10]. The cheese analogue was produced using the modified method [6].

2.3. Experimental design

We used experimental methods with a random group design. The factors examined included: (1) VCO concentration (15%, 20%, 25%) and emulsifier type (Span 80, Tween 80, combined Span 80:Tween 80 (1:1)). Three replications were conducted for this experiment, so there were 27 test units.

2.4. Analysis of samples

The variables tested included pH [11], total solids [11], total titrated acid, moisture content [12], fat content [12], soluble protein and sensory properties (colour, flavour, taste, texture, preference). The result of physicochemical variables was analyzed using analysis of variance (ANOVA). If the analysis showed a significant influence, it was followed by the DMRT (Duncan multiple-range test) with a 95% confidence interval.

3. Results and discussion

3.1. Characteristics of the product

3.1.1. Yield. The concentration of VCO and emulsifier type did not influence the yield significantly. The average levels of cheese analogue from 15%, 20% and 25% VCO were 58.49%, 59.51% and 58.26%, respectively (figure 1). We suspect that the results were derived because the same proportion

of whey protein, i.e. 20%, was used in all samples. This corresponds with the study by [13], where the same proportions of whey protein concentrate resulted in similar yield concentrations.

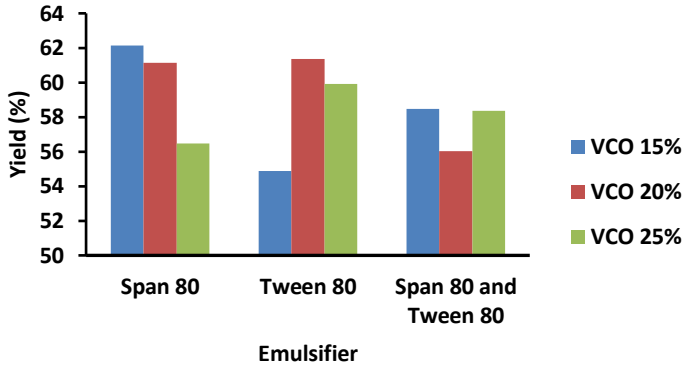

Figure 1. Yield of the corn milk-based cheddar cheese analogue according to emulsifier and VCO concentration combinations.

The yield rate of cheese analogue produced with Span 80, Tween 80 and the combined Span 80 plus Tween 80 was 59.91%, 58.72%, and 57.63%, respectively. The yield rate of cheese analogue produced with Span 80 tended to be higher compared to the other two treatments. This shows that Span 80 is the best emulsifier for maintaining fat and protein stability in the cheese analogue. According to [14], Span 80 is better for stabilizing emulsions compared to Tween 80. Meanwhile, the combination of Span 80 and Tween 80 did not have a significant effect on stabilizing the emulsion.
Protein and fat content are the influencing factors of yield. According to Abd El-Salam [13], there is a linear correlation between yield and the concentrations of protein and fat. Higher protein and fat concentrations increase yield. This corresponds with Stankey *et al* [15], who found that adding 0.5% microparticulate whey protein to low-fat cheddar cheese increased the yield and sensory values.
The yield value of the cheese analogue was 54.87%–62.12%; higher than the findings by Aini *et al.* [6], who reported a yield of 14.262%–17.072%. In the present research, we used whey protein concentrate, and gum arabic as filler, resulting in a higher yield.

3.1.2. pH. The variance analysis showed that VCO concentration and emulsifier type and interaction did not influence the pH value significantly. This was apparently due to the indirect addition of acid during production via the use of the same proportion of papain for all treatments. The pH of the cheese analogue was 5.48–5.82 (figure 2).

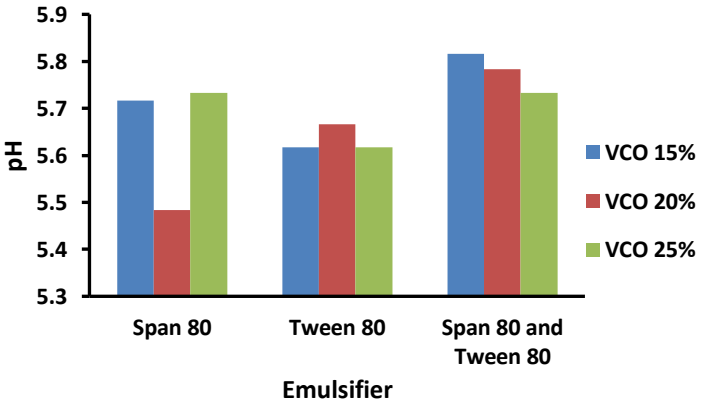

Figure 2. pH of the corn milk-based cheddar cheese analogue according to emulsifier and VCO concentration combinations.

According to Felfoul *et al* [16], the pH of cheese is not influenced by decreased fat or the addition of fat substitutes. The pH of full-fat cheese is 5.06; that of reduced-fat cheese is 5.07; that of cheese made with olive oil is 4.98. Abd El-Salam stated that the pH of cheese is not affected by the addition of canola oil, whey protein concentrate or emulsifier [13]. The pH value produced by several treatment combinations was 6.5–6.7. This value is higher than that of our cheese analogue, as the pH of corn milk is generally lower than that of cow milk (6.7). The pH of our cheese analogue corresponds with that of [6] and [7], who stated that the pH of the cheddar cheese analogue from corn milk extract ranged from 5.3–6.4.

3.1.3. Total solids. VCO concentration and emulsifier type and interaction did not affect the total solid significantly. The total dissolved solids of the cheese analogue containing 15%, 20% and 25% VCO were 29 degrees Brix (°Bx), 29.6°Bx and 29°Bx, respectively (figure 3). The soluble solids of the cheese analogue made using Span 80 and Tween 80 were 29°Bx and 29.5°Bx, respectively; the cheese analogue made using the combination of Span 80 and Tween 80 had soluble solids of 29°Bx.

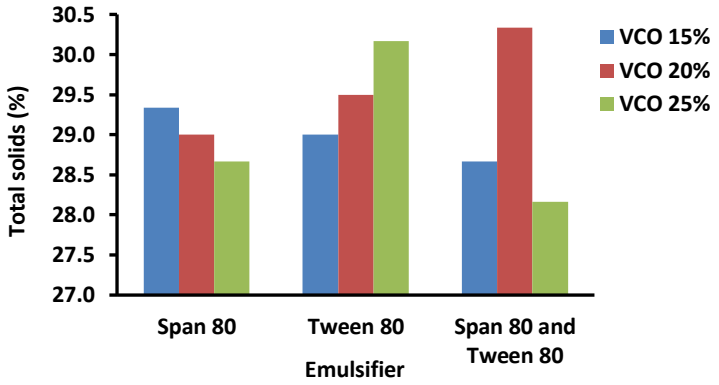

Figure 3. Soluble solids of corn milk-based cheese analogue according to emulsifier and VCO concentration combinations.

Here, the range of total solids of 28.2°Bx–30.3°Bx is higher compared to the corn milk-based cheddar cheese analogue produced by Aini [6], which was 19°Bx. This difference appears to stem from the use of additional ingredients during cheese analogue production, namely whey protein concentrate and gum arabic. According to Stankey *et al* [15], the amount of solids added during production affects the total value of dissolved solids.

The high value of soluble solids might be caused by the fatty acid content in the VCO. According to Villarino [17], lauric acid is the dominant fatty acid in VCO, ranging from 46%–48%, followed by myristic acid and stearic acid. Organic acid in the form of fatty acids (lauric acid, myristic acid, stearic acid) is a type of acid that can increase the total value of dissolved solids. However, the difference in VCO concentration did not have a significant effect on the total value of dissolved solids.

3.1.4. Titrated acidity. Variance analysis showed that VCO concentration and emulsifier type and interaction did not affect the total titrated acid significantly. The average value of total titrated acid in the cheese analogue produced from 15%, 20% and 25% VCO were 1.67%, 1.79% and 1.64%, respectively (figure 4). Regarding emulsifier type, the average total titrated acid in cheese analogue made with Span 80 and Tween 80 was 1.83% and 1.71%, respectively; that of cheese analogue made with the combination of Span 80 and Tween 80 was 1.56%.

Total titrated acid is the amount of lactic acid formed during fermentation as the result of the breakdown of lactose by lactic acid bacteria [18]. In the present cheese analogue, the whey protein concentrate was the source of lactose. According to Stankey *et al* [15], whey protein concentrate contains 1%–80% lactose, which is hydrolyzed during fermentation and produces lactic acid. We assume that using the same concentration of whey protein concentrate for all treatments is one of the factors that caused the

non-significant total titrated acid value. Here, the cheese analogue contained lactic acid levels according to the National Standard (1992): 0.5%–2.0%.

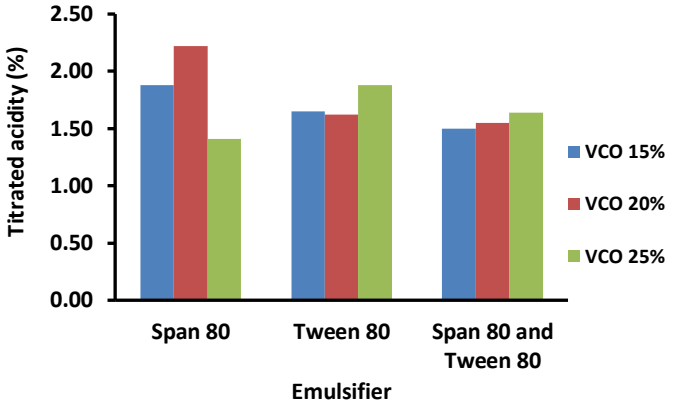

Figure 4. Titrated acidity of corn milk-based cheddar cheese analogue according to emulsifier and VCO concentration combinations.

3.1.5. Fat content. The variance analysis showed that the VCO concentration, but not the emulsifier type and interaction, affected the fat content in the cheese analogue significantly. The addition of higher VCO concentrations increased fat content. The cheese analogue with the highest fat content (19.24% dry basis [db]) was produced by the addition of 25% VCO (figure 5), while that with the lowest fat content (13.95% db) was produced by the addition of 15% VCO. The low lipid content in the cheese analogue means that it can be categorized as low-fat cheese. According to Stankey *et al* [15], cheese can be categorized into four groups according to its fat content. Low-fat cheese contains 10–25% fat.

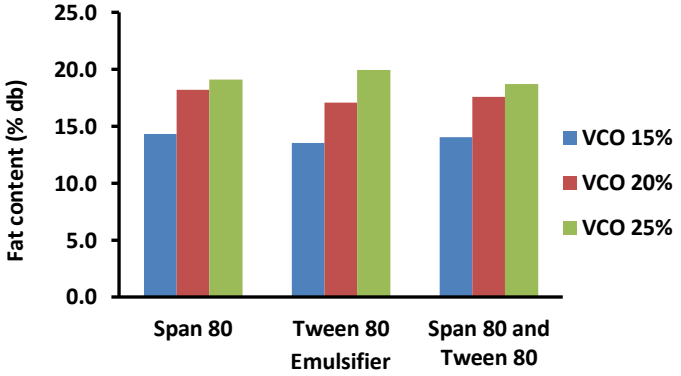

Figure 5. Fat content of corn milk-based cheddar cheese analogue according to emulsifier and VCO concentration combinations.

Compared to cow-milk cheese, the present cheese analogue had much lower fat content. According to Ramel and Marangoni [19], the fat content of cow milk-based cheese containing canola oil, whey protein concentrate and emulsifier is influenced by the fat content of the cow milk, the emulsifier mixture and interaction and the whey protein concentrate. The fat content of cheese containing canola oil, whey protein concentrate and emulsifier is 11.9%–13.4%. According to Abd El-Salam [13], the fat content of cheese containing olive oil (41.36%) is lower than that of full-fat cheese (44.55%), but is higher than that of reduced-fat cheese (37.68%). The difference in the fat content of all three samples was also influenced by the addition of water during cheese production. In addition, the loss of fat content can be influenced by the HLB value of the emulsifier mixture.

The type of emulsifier had no effect on the fat content of the cheese analogue. The fat content of the cheese analogues containing Span 80, Tween 80 and the combination of Span 80 and Tween 80 was

17.19% bk, 16.84% bk and 16.76% bk, respectively. The HLB value of Span 80 (sorbitan monooleate), Tween 80 (polyethylene sorbitan monooleate) and the combination of Span 80 and Tween 80 (0.5:0.5) is 4.3, 15.0 and 9.65, respectively [20]. According to Abd El-Salam [13], the emulsifier mixture suitable for cheese production is 0.5:0.2:0.3 polyethylene sorbitan monostearate:sorbitan monostearate:monostearate glycerol, with a HLB value of 9.3, to increase the size of fat droplets. This is in contrast with Lobato-Calleros *et al* [21] due to the incorrect HLB value for mixing the emulsifiers.

3.1.6. Moisture content. The VCO concentration had a significant effect on the moisture content of the cheese analogue, while the emulsifier type and interaction did not. The cheese analogue produced with 15% VCO had the highest water content of 60.78%, followed by 56.78% for 20% VCO and 55.93% for 25% VCO (figure 6).

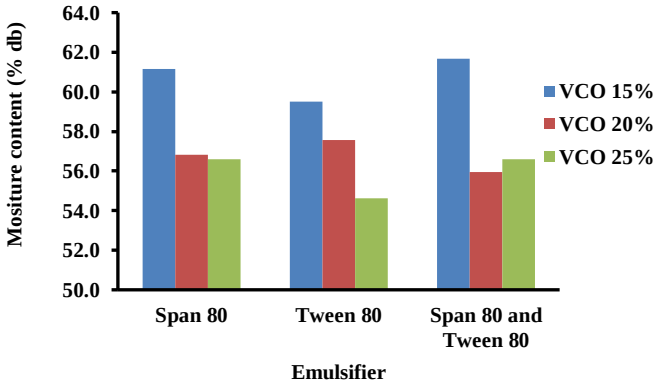

Figure 6. Moisture content of corn milk-based cheddar cheese analogue according to emulsifier and VCO concentration combinations.

The reduction of fat content or the use of fat substitutes impact the moisture content of cheese analogues. The lubricity properties of water are decreased during viscosity and it will fill the space between the globula and the casein molecule [16]. According to Lobato-Calleros *et al* [21], cheese water content is dependent on the mixture of emulsifier, whey protein concentrate and milk fat content. Higher milk fat and canola oil emulsion will produce a higher amount of fat, preventing the formation of protein bonds. Therefore, the use of whey protein concentrate is appropriate for improving the water-binding capacity and for increasing water retention in low-fat cheese. The moisture content of cheese containing canola oil, whey protein concentrate and emulsifier is 61.7%–66.3%. This result is not much different from that of the present cheese analogue, i.e. 57.43%–61.35%.

3.1.7. Soluble protein. VCO concentration, and emulsifier type and interaction did not influence the dissolved protein levels of the cheese analogue significantly. The soluble protein content of the cheese analogue containing 15%, 20% and 25% VCO was 9.57% db, 8.75% db and 9.35% db, respectively (figure 7). The dissolved protein levels of the cheese analogue containing Span 80, Tween 80 and the combination of Span 80 and Tween 80 were 8.70% db, 9.65% db and 9.32% db, respectively. The non-significant value of the dissolved protein content is assumed to have been caused by the use of protein additives in the form of the 20% whey protein concentrate in all three samples. According to Dhanraj *et al* [9], protein content is influenced by the emulsifier mixture and whey protein concentrate. The

emulsifier mixture will maintain the canola oil emulsion, inhibit syneresis and decrease protein reduction.

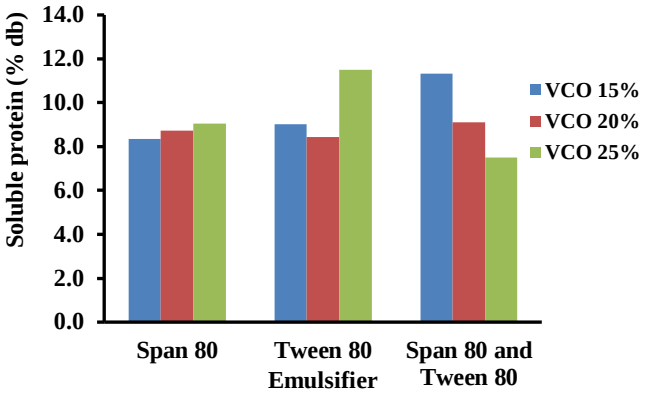

Figure 7. Soluble protein of corn milk-based cheddar cheese analogue according to emulsifier and VCO concentration combinations.

The protein content of the cheese analogue was 7.34%–9.97%, which is lower than that of the cheese analogue containing canola oil, whey protein concentrate and emulsifiers, which ranged 14.9%–18.2% [21], and was also lower than that of the cheese analogue produced by Abd El-Salam [13], which contained 12%–13.61% protein.

3.1.8. Sensory characteristics. The combination of VCO concentration and emulsifier type affected the colour of the cheese analogue significantly. The cheese analogue with the highest colour was obtained from treatment A2B2 (20% VCO and Tween 80), with a value of 4.11 (whitish-yellow); the lowest colour was obtained from A2B3 and A3B3 treatment with a value of 3.82 (white yellowish) (figure 8). The main factor affecting the yellow colour of the cheese analogue was sweet corn, which was the main material and contains anthocyanin pigment compounds (anthocyanidin, aglycone, glucoside) and carotenoids [22].

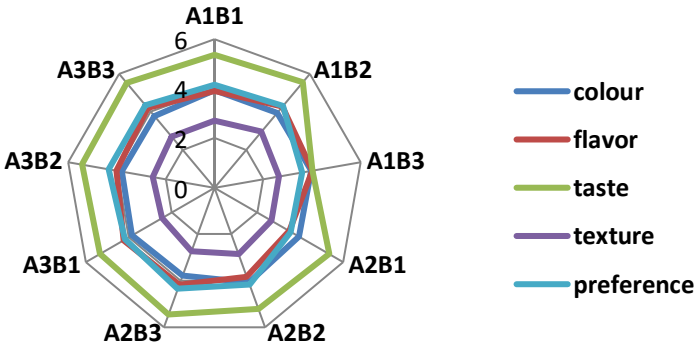

Figure 8. Sensory characteristics of corn milk-based cheddar cheese analogue according to emulsifier and VCO concentration combinations.

The colour of the cheese analogue was also influenced by the combination of VCO concentration and emulsifier. Tween 80 is a yellow oil and Span 80 is a thick yellow liquid [23], while VCO is almost transparent [17]. Mixing VCO and the emulsifier mixture into an emulsion produces a white, turbid emulsion [24]. Mixing these ingredients with corn milk will produce a yellow colour due to the presence of anthocyanin and carotenoid pigments [25].

The combination of VCO concentration and emulsifier type also affected the aroma of the cheese analogue significantly. Product A1B2 (15% VCO and Tween 80) had the highest aroma of 4.37 (little

typical of cheese), while product A2B1 (20% VCO and Span 80) produced the lowest aroma with a value of 3.55 (rather typical of cheese). The aroma of cheese is sour, sweet, boiled potato, butter-like and caramel, which is produced by acetic acid, butyric acid, methionyl, diacetyl, and homofuraneol [26]. According to Abd El-Salam [13], cheese analogues containing coconut oil can have a distinctive aroma because it contains high ethanol, dietan butan and acetic acid levels. VCO has an acidic, nutty and rancid aroma, where the sour aroma is produced by acetic acid during fermentation [17].

Besides VCO, the aroma of the cheese analogue was influenced by the aroma of the whey protein concentrate. Whey protein concentrate contains volatile compounds consisting of butanoic acid, 2-acetyl-1-pyrroline, 2-methyl-3-ranthiol, 2,5-dimethyl-4-hydroxy-3-furanone, 2-nonenal, 2,6-nonadienal, and 2,4-decadienal, which each produces a specific aroma, such as cheesy, popcorn, brothy, maple, fatty, cucumber, and fatty/oxidized [13].

The combination of VCO concentration and emulsifier type had a significant effect on the taste of the cheese analogue. Product A1B2 (15% VCO and Tween 80) had the highest taste value of 5.59 (slightly salty), while product A1B3 (VCO 15% and Span 80 plus Tween 80) produced a taste value of 4.02 (neutral). VCO produces sweet and nutty tastes [17], while Tween 80 is bitter [27]. The main influencing factor of the taste of the cheese analogue was the combination of VCO concentration with emulsifier, because the VCO emulsion and emulsifier mixture can be used as a flavour carrier system. According to [28], who formulated microemulsions using aqua demineralization, a mixture of non-ionic surfactants (Tween 80 and Span 80) and VCO can be used as a system to produce strawberry, orange, or mint flavours. Therefore, the salt taste in cheese analogues can be produced by the taste of other additives, namely the salt bound by the VCO emulsion with the emulsifier mixture. The difference in the VCO concentration and the emulsifier type influences the character of the system, which affects the amount of bound salt and ultimately the taste. Another additive that can affect the taste of cheddar cheese analogue is whey protein concentrate. Whey protein concentrate has mild dairy flavours such as milky, and sweet aromatic and non-dairy flavours such as cardboard [29].

The combination of VCO concentration and emulsifier type had a significant effect on the texture of the cheese analogue. Product A1B2 (15% VCO and Tween 80) had the highest texture value of 3.00 (slightly hard), while product A3B1 (25% VCO and Span 80) had the lowest value taste of 2.45 (not hard). The texture of the cheese analogue was influenced by VCO concentration and protein content. According to [30], water can break down protein tissue and yield a smoother, softer texture to the cheese analogue. In addition, higher water content leads to a smoother texture. In the present study, higher VCO concentrations yielded softer textures.

The combination of VCO concentration and emulsifier type affected preference for the cheese analogue significantly. Product A3B3 (25% VCO and Span 80 plus Tween 80) had the highest preference score of 4.40 (rather preferable), while product A2B1 (20% VCO and Span 80) had the lowest score of 3.59 (slightly preferable). Panelists' levels of preference for the cheese analogue were influenced by factors such as colour, aroma, taste and texture. In general, all treatment combinations of the cheese analogue were received by the panelists.

3.2. Characteristics of the best product

Based on the total index of effectiveness, we concluded that the best treatment combination is A3B2: a cheese analogue containing 25% VCO and Tween 80. The A3B2 treatment had a yield value of 59.93% bb, fat content of 19.96%, dissolved protein level of 11.51% bk, colour sensory value of 3.84 (yellowish white), aroma value of 4.07 (slightly typical of cheese), taste value of 5.48 (slightly salty), texture value of 2.55 (not hard) and preference value of 4.38 (rather preferable).

The yield, fat content and dissolved protein content of the cheese analogue were lower than that of the cheese containing olive oil emulsion produced by [31]. That cheese analogue had a yield value of 139.58 g/L, fat content in the range of 41.36% and dissolved protein content in the range of 39.25%. Using cow milk as the basic ingredient yielded fat content of 15.65 g/L and dissolved protein content of 33.92 g/L. This is higher than the fat and protein content of corn milk.

The cheese analogue had higher yield and fat content, but lower protein content than that of Lobato-Calleros [21]. According to Lobato-Calleros *et al* [21], cheese made from cow milk and containing canola oil and whey protein concentrate at a ratio of 0.17:0.66:0.17 had a yield value of 14.8%, 13.4% fat content and 16.2% protein content.
Compared to the topical cheese analogue made from corn extract produced by Aini [6], the yield value of the topical cheese analogue was lower than that of the present cheese analogue (17.512%), as well as lower fat content (6.976%). However, it contained higher dissolved protein levels than the present cheese analogue (19.837%). Despite this, both cheese analogues had similar sensory properties: yellowish-white colour, distinctive cheese aroma, and texture that was neither hard nor soft.
In the present study, the fat content and dissolved protein levels of the cheese analogue did not differ significantly from the optimal results of Tallaga cheese containing 50% sunflower oil and 25% whey protein concentrate in the study by Abd El-Salam [13]. The fat content of the cheese analogue and Tallaga cheese was 19.96% bk and 20% bk, respectively, and the protein content was 11.51% and 12%, respectively.

4. Conclusion

Increasing the VCO concentration from 15% to 25% in the cheese analogue production increases the fat and water content while at the same time reducing the sensory properties. The addition of various emulsifier types does not significantly influence the physicochemical variables and sensory properties of the cheese analogue. The best cheese analogue was produced with treatment A3B2:25% VCO and Tween 80. This treatment produced a yield value of 59.93% bb, fat content of 19.96% db and dissolved protein content of 11.51% db with the following sensory properties: colour value of 3.84 (yellowish white), aroma value of 4.07 (slightly typical of cheese), taste value of 5.48 (slightly salty), texture value of 2.55 (not hard) and the favourite value is 4.38 (rather preferable).

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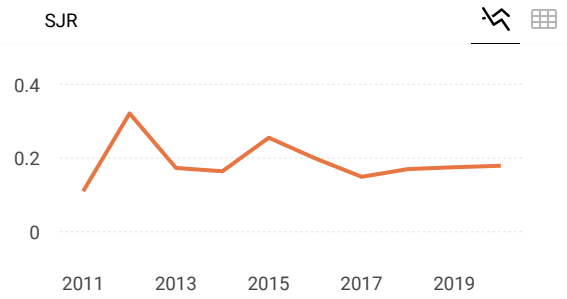

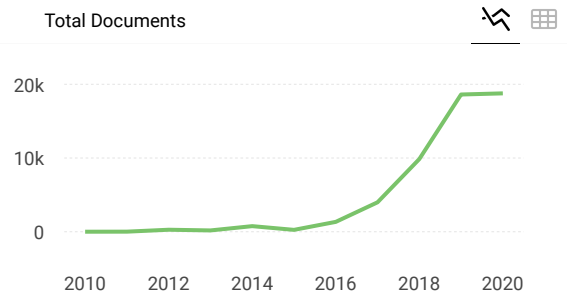

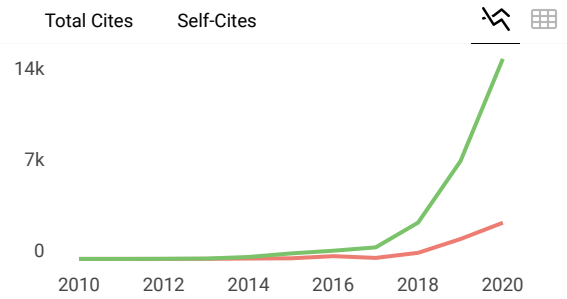

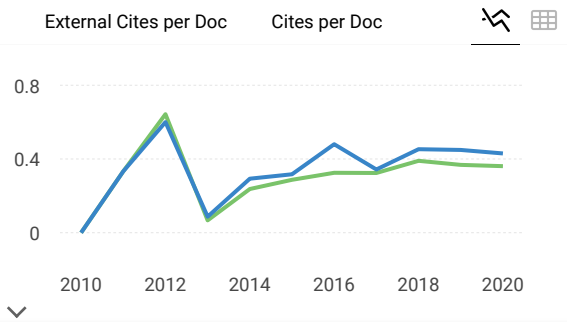

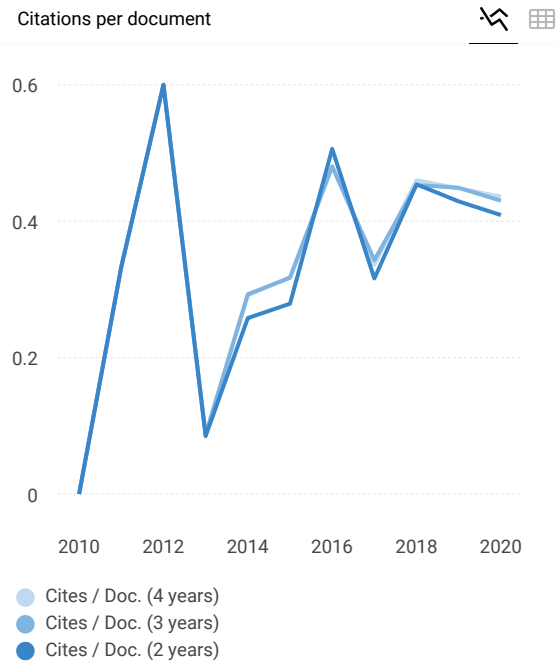

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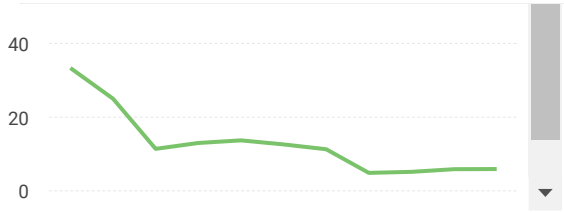

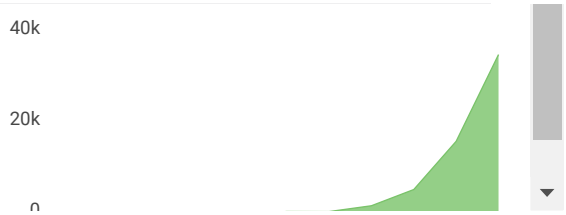

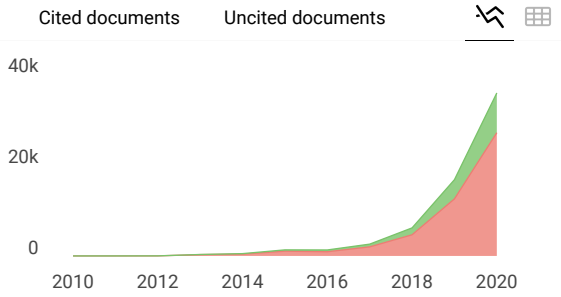

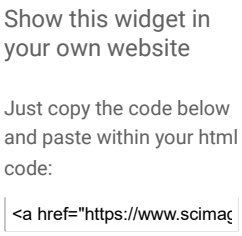

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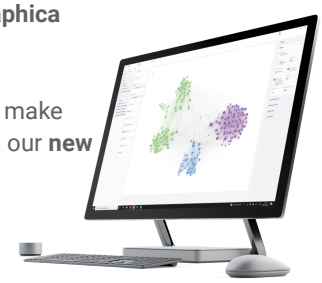

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Dear Mrs. Nur Aini

Following up on the publication of Scopus indexed International Proceeding (IOP), at this time y
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Monday, July 29th 2019	
	Agenda
- 07.00	Arrangement before departure
07.00 - 07.30	Registration
07.30 - 08.15	Trip to BPTP
08.15 - 09.45	Visit BPTP
09.45 - 10.15	Trip to Balitsa and Laboratory of Kimia Agro
10.15 - 11.30	Visit Balitsa and Laboratory of Kimia Agro
	Balitsa (All of participant)
	Laboratory of Kimia Agro (Summer School Participant)
11.30 - 12.30	Ishoma
12.30 - 13.00	Trip to Floating market
13.00 - 14.00	Visit Floating Market
14.00 - 15.00	Trip to the Mayor House (Pendopo Walikota)
15.00 - 15.30	Break
15.30 - 16.00	Opening
	Traditional Ceremony
	Recitation of The Holy Quran
	Singing Indonesian National Anthem and Mars of PATPI
16.00 -16.10	Committee report
16.10 - 17.10	**Opening Speech**
	Chairman of AGRIN (Prof. Dr. Ir. Anas M. Fauzi, M.Eng)
	Chairman of SafeNetwork (Prof. Novizar Nazir)
	Chairman of BKP (Dr. Ir. Agung Hendriadi, M.Eng)
17.10 - 17.45	**Keynote Speech** : Chairman of PATPI (Prof. Umar Santoso)
	Challenges in food security in the future : The role of food science and technology
17.45 - 18.30	Praying
18.30 - 19.00	**Keynote speech** : Dr. Zuzy Anna
	Sustainable Development Goals National and Regional Readiness of Indonesia
19.00 - 19.10	**Opening Speech** : Mayor of Bandung
19.10 - 20.30	Gala Dinner + Announcements
	Art Performance
	Kecapi FTIP UNPAD
	Lises UNPAS
20.30-21-00	Closing
Tuesday, July 30th 2019	
07.30 - 08.00	Registration
08.15 - 08.45	Openning speech : Rector of Universitas Padjadjaran
08.45- 09.00	Art Performance (Keong dkills)
09.00 - 10.30	Plenary Session I
	Moderator :
	Keynote speech 1 : Dr. rer. nat. Sonja Kleinertz
	Marine Fish Parasites: ecological roles, fish health, human impacts and handling related to fisheries and food safety
	Keynote speech 2 : Prof. Dr. Taufiq Yap Yun Hin
	Production of Renewable Bioenergy from Oil Palm Biomass

	Agenda
	Keynote Sppech 3 : PT. CAN
	Spice Up - Geodata for Sustainable Pepper Raming : Case Pepper Field at Bangka Belitung, Lampung, West Kalimantan, and East Kalimantan
	Discussion
10.30 - 12.30	Pararel Session 1
12.30 -13.15	Lunch break
13.15 - 14.30	Plenary Session II + PATPI Annual Meeting
	Moderator :
	Keynote speech 1 : Prof. Yazid Bindar, Ph.D
	Carbohydrate Food Now and Future : Problem and Solution
	Keynote speech 2 : Ir. Alik Sutaryat
	Pemberdayaan Petani Melalui Budidaya Tanaman Sehat Ramah Lingkungan Berkelanjutan Berbasis Kearifan Lokal "Organic System of Rice Intensification"
	Keynote speech 3 : Prof. Nobutaka Ito
	How Agriculture Can Achive The Goal for Food and Energy Sovereignty
	Discussion
14.30 - 16.30	Pararel Session 2 + Food Forum Business
16.30 - 17.00	PATPI Award, The Winner of Agroindustrial Student Competition and closing

Time	Title	Author	Class
10.30 - 10.45	(EFFECT OF HEATING TEMPERATURE AND TIME ON THE FORMATION OF 11S GLOBULIN NANOFIBRIL FROM BOGOR NUT (Vigna subterranea (L.) Verdcourt) FOR FOOD INGREDIENTS)	Dewi Sarastani	1p
10.45 - 11.00	THE EFFECT OF SUWEG TUBER STARCH AND CHITOSAN TO MECHANICAL CHARACTERISTIC OF EDIBLE FILM	Dewi Sulistyowati	1p
11.00 - 11.15	EFFECTS OF DIFFERENT SOAKING TIME USING CALCIUM CHLORIDE EXTRACTED FROM EGGSHELL ON PHYSICOCHEMICAL AND ORGANOLEPTIC PROPERTIES OF SWEET POTATO CHIPS	Ignasius Radix AP Jati	1p
11.15 - 11.30	CHARACTERISTISC OF VIRGIN COCONUT OIL EMULSION WITH HONEY AND CITRIC ACID	Lastri Wiyani	1p
11.30 - 11.45	APPLICATION OF CASSAVA STARCH, GEMBILI STARCH AND CANNA STARCH FOR EDIBLE COATING	Seveline	1p
11.45 - 12.00	Physicochemical, Organoleptick Dry Noodles Ratio of Sorghum (Sorghum bicolor L.) Flour and Mung Bean (Vigna radiata)	Sri Budi Wahjuningsih	1p
12.00 - 12.15		Widya Puspantari	1p
12.15 - 12.30		Willy Pranata Widjaja	1p

Time	Title	Author	Class
10.30 - 10.45	Stabilizer of Emulsion Preparation from Passion Fruit Skin Pectin (Passiflora edulis)	Illah Sailah	2p
10.45 - 11.00	A comparison of discrimination triangle and tetrad test: case study in sweetener product	Dede Robiatul Adawiyah	2p
11.00 - 11.15	HYPOGLYCEMIC PROPERTIES OF COMPOSITE FLOUR THAT WAS MADE OF GROWOL AND COWPEAS (Vigna unguiculata) SPROUT FLOUR	Bayu Kanetro	2p
11.15 - 11.30	The Comparison Sweetness Levels of Stevia Tea (Stevia rebaudiana Bertoni) and Other Sweeteners	Ana Nadiya Afinatul Fishi	2p
11.30 - 11.45	THE CHANGES OF MOISTURE CONTENT, TOTAL PHENOLIC CONTENT, AND PASTING PROFILE CAUSED BY PARBOILING PROCESS OF BLACK RICE	Reza Widyasaputra	2p
11.45 - 12.00	Chemical properties of milk kefir whey-based beverages using honey as sweetener	Firman Jaya	2p
12.00 - 12.15	PHYSICOCHEMICAL PROPERTIES OF WHITE OYSTER MUSHROOM POWDER FLAVORING (Pleurotus ostreatus) POST-DRYING (TEMPERATURE AND TIME	Nur Lailatul Rahmah	2p
12.15 - 12.30	The Effect of Cooking on The Microscopic Structure of Banana Starch and Instan Banana Breakfast Cereal Porosity	I Mulyawanti	2p

Time	Title	Author	Class
10.30 - 10.45	Effect of Coconut milk and palm sugar to glutinous rice flour pasting properties on the traditional food of Dodol Ulame	Setiavani, G	3p
10.45 - 11.00	Production and Stability Test of Natural Dye Powder from Carrots (Daucus carota)	N A Permatasari	3p
11.00 - 11.15	The change of chemical and antioxidant properties of coconut sap added with histidin during heating treatment	Pepita Haryanti	3p
11.15 - 11.30	Quality of cheese analogous to the addition of VCO as a fat substitute and variations of emulsifiers	Nur Aini	3p
11.30 - 11.45	EFFECT OF Amylase HYDROLYSIS IN NAGARA BEAN GRITS FROM SPONTAN FERMENTATION ON GELATINIZATION PROFILE AND IN VITRO STARCH DIGESTIBILITY	Susi, STP, M.Si	3p
11.45 - 12.00	Sensory and Chemical Properties of Cookies Formulated with South Kalimantan's Local Commodities	Desy Seventina Simanjuntak	3p
12.00 - 12.15	THE APPLICATION OF ADSORBENTS ACTIVATED CARBON FROM COCONUT SHELL AND ZEOLITE ON DECAFFEINATION COFFEE PROCESSING USING SWISS WATER METHOD	Dr. Satrijo Saloko	3p
12.15 - 12.30	Influence of pandan leaf extract and fortificants addition and cooling duration to cooking quality, preference level, and glycemic index of brown parboiled rice fortified with chromium and magnesium	Dr. Ir. Wisnu Adi Yulianto, M.P.	3p

Time	Title	Author	Class
10.30 - 10.45	CARRAGEENAN AS STABILIZER IN HERBAL CHOCOLATE FORMULATIONS	Anis Yohana Chaerunisaa	4p
10.45 - 11.00	Study The Rate of Drying and Level of Osmosis Dehydration on Physical Properties of Dried Cengkir Mango	Yosini Deliana	4p
11.00 - 11.15	The Proportion of Cassava (Manihot esculenta Crantz) with Sorghum Flour (Sorghum bicolor L. Moench) and Glycerol Monostearate (GSM) Concentrates toward The Characteristic of Fortified Analog Rice	Wisnu Cahyadi	4p
11.15 - 11.30	Application of Whey Powder from Goat's Milk in Processed Food	Yelliantty	4p
11.30 - 11.45	Development and Characterization of edible coating formulations based on mixture of carbohydrates, lipids and proteins	Yudi Garnida	4p
11.45 - 12.00	EFFECT USING SWEET POTATO AND TARO COMPOSITE FLOUR AS PARTLY SUBSTITUTION OF WHEAT FLOUR IN CAKE	Healthy Aldriany Prasetyo	4p
12.00 - 12.15	PENGARUH SUHU PEMANASAN TERHADAP KOMPOSISI KIMIA DAN SIFAT FUNGSIONAL TEPUNG KENARI DEFATTED	G. S. Suhartati Djarkasi	4p
12.15 - 12.30	THE MAKING OF GREEN SPINACH VEGETABLE LEATHER AS AN FE SOURCE TO INCREASE THE NUTRITIONAL INTAKE	Angelly Wulan Pricilia K.	4p

Time	Title	Author	Class
10.30 - 10.45	Palm Oil Yield Potency on Different Level of Ripening and Storage Time Based on Fruits Percentage and Fresh Fruit Bunches	Adi Roeswanto	5p
10.45 - 11.00	The Effects of Ozone Treatment on Microbiological and Physicochemical Properties of Soymilk Beverage	Agustina Ayu Perwitasari	5p
11.00 - 11.15	DETERMINATION OF ULTRAFILTRATION RESISTANCE USING SERIES RESISTANCE MODEL IN INULIN PURIFICATION FROM RED FRUIT PEDICEL EXTRACTION (Pandanus conoideus L)	Murtiningrum	5p
11.15 - 11.30	UTILIZATION OF PURPLE SWEET POTATO FLOUR, STARCH, AND FIBRE IN BISCUITS MAKING	Prof.Dr.Ir. Elisa Julianti, MSi	5p
11.30 - 11.45	Phisicochemical Properties of ozone-oxidizes cassava starch under different slurry concentration	satmalawati, Em	5p
11.45 - 12.00	Powder Production of Sea Cucumber (Holothuria scabra): Effect of Processing Method of The Various Parts of Sea Cucumber Body on The Antioxidant Properties and Chemical Characteristics	Ansharullah	5p
12.00 - 12.15	The Influence of Cooked Rice Addition On Joruk (Fermented Fish Product)	Dyah Koesoemawardani	5p
12.15 - 12.30	Effect of the fermentation periods of the Yellow Bamboo shoots (B. vulgaris Striata) var. with L. plantarum starter on physical and chemical properties of bamboo shoots flours as a source of dietary fiber	Rohadi	5p

Time	Title	Author	Class
10.30 - 10.45	PHYSICO-CHEMICAL AND ANTIMICROBIAL PROPERTIES OF CASEIN-CHITOSAN EDIBLE FILMS AS FOOD QUALITY AND FOOD SAFETY	MW Apriliyani	6p
10.45 - 11.00	GENETIC RELATEDNESS of LOCAL Cronobacter sakazakii BASED ON INVASION GENE ompA	Ririn Fahrun Nisa	6p
11.00 - 11.15	ANALYSIS OF HEAVY METAL CONTAMINANTS (Pb and Sn) IN CANNNED DRINKS	Wildan Wibawa Perdana	6p
11.15 - 11.30	Effect of Whey Kefir's Goat Milk on Adhesion of Candida albicans to Resin Acrylic Surfaces	L. E. Radiati	6p
11.30 - 11.45	Effect of Ozonation and Pasteurization on Total Microorganisms, pH and Density Whole Milk and Skim Milk During Cold Storage	Gita Genecya	6p
11.45 - 12.00	Novel Dioscorea Hispida sp. (Ubi Gadong) starch-based hydrogels and their beneficial use as disinfectants	Imran Azman	6p
12.00 - 12.15		Sri Suhartini	6p
12.15 - 12.30	The Effect of Sulfuric Acid Catalyst Concentration of Esterification Process on The Quality of Crude Palm Oil Off Grade As Biodiesel Raw Material	Mahdi Singgih Hidayat	6p

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10.30 - 10.45	THE SHALLOT AGRO-INDUSTRIAL CLUSTER BASED ON REGIONAL CHARACTERISTIC WITH SOFT SYSTEM METHOLODOGY APPROACH: A CONCEPTUAL DESIGN	Ermia Sofiyessi	7p
10.45 - 11.00	COMMUNITY POTENTIAL MAPPING FOR ACTIVATING AND DEVELOPING OF ENTREPRENEUR SOSIAL BASED ON LOCAL COMMODITY IN BERAU REGENCY, EAST KALIMANTAN	Marlis Nawawi	7p
11.00 - 11.15	EFFECT OF DROUGHT STRESS ON MORPHOLOGICAL TRAITS OF PADJADJARAN MAIZE HYBRIDS	Meisha Athaya Thifalny	7p
11.15 - 11.30	REGION PLAN FOR ACTIVITIES IN CIRATA RESERVOIR BASED ON THE SUITABILITY OF AQUACULTURE FISHERIES AND WATER TOURISM	Dwi Rustam Kendarto	7p
11.30 - 11.45	THE ROLE OF INNOVATION CAPABILITY AND TECHNOLOGY ADOPTION TOWARD PRODUCT INNOVATION PERFORMANCE IN MICRO SMALL ENTERPRISES FOODINDUSTRY	Agnes Irwanti	7p
11.45 - 12.00	Critical Issue Mapping of Indonesian Natural Rubber Industry Based on Innovation System Perspective	Dadang Kurnia	7p
12.00 - 12.15	POTENTIAL OF BEEF, BIO ENERGY, AND SUSTAINABLE DEVELOPMENT OF PALM OIL INTEGRATION ACTIVITIES	Firman RL Silalahi	7p
12.15 - 12.30	CRYSTALLOGRAPHY IN AGRICULTURE	Bohari M Yamin	7p

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14.30 - 14.45	Effect of light and storage on the quality of potato tuber (Solanum tuberosum L.) cultivar 'medians' grown at different altitudes	Ira Endah Rohima	1s
14.45 - 15.00	(EFFECTt OF STORAGE TEMPERATURE AND TYPE OF PACKAGING ON PHYSICAL AND CHEMICAL QUALITY OF CARROT)	Ali Asgar	1s
15.00 - 15.15	THE USING OF FILLER MATERIAL PACKAGING TO REDUCE POST-HARVEST LOSS OF PAPAYA DURING TRANSPORTATION	Wendianing Putri Luketsi	1s
15.15 - 15.30	CHANGES OF CHEMICAL CONTENTS DURING WHITERING PROCES OF WHITE TEA	M. Iqbal Prawira-Atmaja	1s
15.30 - 15.45	ASSESSMENT OF GIBBERELLIN AND WAXING ON SOME TYPE OF PACKAGING TO PRESERVE QUALITY OF CHILI DURING TRANSPORTATION	Didit Rahadian, S.TP., M.Sc	1s
15.45 - 16.00	Characteristics of Persimmon Velva Fruit (Diospyros foot L f) Garut Local Commodities Using Carboxy Methyl Cellulose (CMC) as Stabilizer During Cold Storage	AtiAtul Quddus	1s
16.00 - 16.15	Physical, Microbial and Pesticide Contaminations on Fresh Vegetable and Fruit Marketed in Samarinda-Indonesia	Anton Rahmadi	1s
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14.30 - 14.45	ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY OF FRESH AND STEAMED YOUNG COCONUT LEAVES (Cocos nucifera L.)	Umar Santoso	2s
14.45 - 15.00	Antioxidant Activity, Physical Characteristic and Sensory Properties of Melon Marshmallow with Red Beet Extract Additions.	Frysye Gumansalangi	2s
15.00 - 15.15	Formulation Nanoemulsion of Moringa leaves (Moringa oleifera Lam) Extract as an Antioxidant	Nina Jusnita	2s
15.15 - 15.30	FORTIFICATION OF SKIM MILK WITH WHEY PROTEIN XANTHONE AND ITS EFFECT ON ANTI HYPERGLYCEMIC ACTIVITIES IN ANIMAL MODEL	R.D. Andriani	2s
15.30 - 15.45	Study of antioxidant of purple skin broken rice, browned purple rice and purple rice stem cultivated organically in Kanagarian Kasang, Batang Anai District, District Padang Pariaman	I Ketut Budaraga	2s
15.45 - 16.00	Characteristics of Liquid Skim Milk which Fortified with Whey-Mangosteen Pericarp (Garcinia mangostana L.) Extract Solution	Jaya Mahar Maligan	2s
16.00 - 16.15	COLOR DEVELOPMENT AND ANTIOXIDANT ACTIVITY IN HONEY CARAMEL	Monika Rahardjo	2s
16.15 - 16.30	FUNCTIONAL PROPERTIES OF TEMPE PROTEIN ISOLATES DERIVED FROM GERMINATED AND NON-GERMINATED SOYBEANS	Made Astawan	2s

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14.30 - 14.45	MOLECULAR DOCKING STUDIES AND PHYSICO CHEMICAL PROPERTIES ON THE INTERACTION OF XANTHONE WITH WHEY PROTEIN (β-LACTOGLOBULIN AND α-LACTALBUMIN)	PP Rahayu	3s
14.45 - 15.00	THE INFLUENCE OF BLACK RICE BRAN AQOUEUS EXTRACT ON BLOOD AND SPLEEN PROFILES	Nurlaili, E.P	3s
15.00 - 15.15	Chemical Characteristics and Glycemic Index of Processed Products from Corn Starch Modified with Green Tea Polyphenols	N Nurjanah	3s
15.15 - 15.30	OPTIMIZATION OF GASEOUS OZONE APPLICATION IN REDUCING TOTAL AMOUNT OF MICROORGANISM IN MUNTOK WHITE PEPPER	Hayu Lesya Putri	3s
15.30 - 15.45	Phenolic Contents and The Antioxidant Capacities Evaluation of Indonesia Wild Honey from Seven Different Regions	Y. Riswahyuli	3s
15.45 - 16.00	Physical and Antimicrobial Properties of Hydroxypropyl Starch Bio-plastics Incorporated with Nyamplung (Calophyllum inophyllum) Cake Extract	Rini Umiyati	3s
16.00 - 16.15	Viability of encapsulated Lactobacilus casei using glucomannan iles-iles and skim milk to low pH and bile salts	Ngatirah	3s
16.15 - 16.30	ANTIOXIDANT ACTIVITY OF ESSENTIAL OIL OF PULAI LEAVES (ALSTONIA SCHOLARIS L. R. Br.)	Silvi Leila Rahmi	3s

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14.30 - 14.45	Formula optimization of functional beverage made from carica seeds	Santi Dwi Astuti	4s
14.45 - 15.00	Effect of Feeding Coconut Sugar-Mix Coffee Rich in Antioxidants on Blood Pressure, Serum SOD and MDA of Sprague Dawley Rats	Hidayah Dwiyanti	4s
15.00 - 15.15	MUNG BEAN (Vigna radiata) MILK YOGURT RICH IN PHENOLIC ANTIOXIDANT AND DISSOLVED PROTEIN AS AN ALTERNATIVE OBESITY DRINK	Hery Winarsi	4s
15.15 - 15.30	Functional, Thermal, and Molecular Properties of Ozonated Starches	Kejora Handarini	4s
15.30 - 15.45	POTENCY OF PARIJOTO (Medinilla speciosa) SYRUP AS FUNCTIONAL FOOD: STUDY OF PHYSICALS, CHEMICALS, FUNCTIONAL, AND SENSORY PROPERTIES	Naila Zulfa	4s
15.45 - 16.00	OPTIMIZATION OF EXTRACTION PROCESS OF COFFEE PULP AS A SOURCE OF ANTIOXIDANT	Samuel P. Kusumocahyo	4s
16.00 - 16.15	Pigments Extraction from *Monascus* -fermented durian seed	Srianta, I.,	4s
16.15 - 16.30	Quantitative Determination of Quercitrin and Myricitrin in Three Different Parts of *Euphorbia hirta* As Bioflavonoid Source for Functional Food	Agung Nugroho	4s

Time	Title	Author	Class
14.30 - 14.45	INNOVATIVE POST-HARVESTED PROCESSING ACTIVATION PROGRAM FOR POTENTIAL LOCAL AGRO-BASED FOOD COMMODITY USING DESIGN THINKING APPROACH [CASE STUDY: KELADI TUBER/TARO (Caladium bicolor Vent.) COMMODITY IN MANOKWARI, WEST PAPUA]	Dwi Purnomo	5s
14.45 - 15.00	INNOVATION ON FOOD PRODUCT DEVELOPMENT FOR LOCAL COMMODITY WITH DESIGN THINKING APPROACH [CASE STUDY: TENGKAWANG FRUIT (Shorea stenoptera Burck.) COMMODITY IN BENGKAYANG, WEST KALIMANTAN]	Anas Bunyamin	5s
15.00 - 15.15	DEVELOPMENT OF SORGUM BIOINDUSTRY IN DEMAK TO SUPPORT FOOD SECURITY	Kun Tanti Dewandari	5s
15.15 - 15.30	SWOT Analysis and Strategy Formulation for Cocoa Small and Medium Enterprises in Nglanggeran Area, Gunung Kidul Regency-Indonesia	Aulia Adzkia Fauzi	5s
15.30 - 15.45	Linking Agro-Industrial Engineering Body of Knowledge with Industry 4.0: A Case study of Agroindustrial Engineering Study Program at IPB University	Taufik Djatna	5s
15.45 - 16.00	An Analysis and Design of Recovery System for Service Failure in Online Culinary Business	R P Juarsa	5s
16.00 - 16.15	Modeling Digital Business for Classification and Quality Post Harvest in the Potato Agroindustry	Ririn Regiana Dwi Satya	5s
16.15 - 16.30	The Impact of Starch-Hydrocolloid Interaction on Starch Digestibility, Pasting and Physicochemical Properties: A review	Herlina Marta	5s

Time	Title	Author	Class
14.30 - 14.45	EXTRACTION BABY JAVA CITRUS (Citrus sinensis (L) Osbeck) PEEL USING MICROWAVE ASSISTED- EXTRACTION	Erryana Martati	6s
14.45 - 15.00	Negative Pressure Cavitation Extraction of Total Phenolics Compound from Millettia sericea roots	Fitry Filianty	6s
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37. The quality of corn milk-based cheese analogue made with virgin coconut oil as a fat substitute and with various emulsifiers

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