EMBRIO
ENHANCHING MARINE BIODIVERSITY RESEARCH IN INDONESIA
Understanding, Protecting/Rehabilitating & Sustainable Use of Indonesia's Marine Biodiversity
FFMS-IPB
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Mobile phone: +6282122848754, Email: embrio.ipb@gmail.com

Attachments : Reviewed abstract, template & example
Subject : Letter of Acceptance

19 June 2019

Dear Ranu Rezqia Ramadheka,

Thank you for submitting your abstract to our joint symposium, The 4th EMBRIO International Symposium 2019 (4th EIS) and The 7th East Asia Fisheries Technologists Association Symposium (7th EAFTA), which will be held on 5-6 August 2019 in Bogor, Indonesia.

Herewith, on behalf of the Organizing Committee, **we are pleased to announce that your abstract has been ACCEPTED as detailed follows:**

Title : The effect of seaweed (*Glacilaria sp*) powder addition to the characteristics of fish sausage (*Nemipterus sp*)
Type : Poster presentation

However, the abstract need to be revised according to the review result attached. We hope to receive the revision before 30 June 2019. Please be informed that the deadline of full paper submission is on 2 August 2019. Thank you for your kind attention.

If you have any requires, please contact us (EMBRIO Secretariat +6282122848754) or email: embrio.ipb@gmail.com, and for more information about EMBRIO, please visit http://eis-embrioipb.org.

Yours sincerely,
Director of EMBRIO,

EMBRIO

Dr. Mala Nurilmala, S.Pi., M.Si.
NIP 197309092005012001

Head of Committee,

Dr. Asadatun Abdullah, S.Pi., M.Si., MSM
NIP 198304052005012001

	EMBRIO Enhancing Marine Biodiversity Research in IndOnesia *Understanding, Protecting/Rehabilitating & Sustainable Use of Indonesia's Marine Biodiversity* Kampus IPB Dramaga, Jl. Agatis Bogor 16680Jawa Barat Telp. (0251) 8622909, Fax. (0251) 8622907 http://embrio.ipb.ac.id/	RECEIPT#	
		Date of Release	1 September 2019
		Page	1 of 1

RECEIPT

Telah terima dari / Received from	**Yuliati Hotmauli Sipatuhar**
Jumlah / Amount	Rp 2.000.000,- / 2,000,000 IDR
Terbilang / Written	Two million rupiahs / Dua juta rupiah
Untuk pembayaran / For Payment of	Publication fee for EMBRIO International Symposium 2019 (EIS 4th and EAFTA 7th)
Cara pembayaran / payment method	☐ Bank transfer to Rector IPB cq FPIK account (Account number: 0003889960) ☑ Cash

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Dr. Asadatun Abdullah, S.Pi, MSM, MSi

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EMBRIO Enhancing Marine Biodiversity Research in Indonesia

EIS 4th EMBRIO INTERNATIONAL SYMPOSIUM

CERTIFICATE

is awarded to

Yuliati Hotmauli Sipatuhar

as a Poster Presenter

in the 4th EMBRIO International Symposium (EIS)

& the 7th International Symposium of East Asia Fisheries and Technologists Association (EAFTA)

"Innovative Solution and Technology for Marine Biodiversity and Sustainable Fisheries"

at IPB International Convention Center & Favehotel, Bogor - Indonesia

August, 5- 6th 2019

Dean of Faculty of Fisheries and Marine Sciences, IPB	Director of EMBRIO & EAFTA Representative	Head of Committee EMBRIO International Symposium
Dr. Luky Adrianto	Dr. Mala Nurilmala	Dr. Asadatun Abdullah

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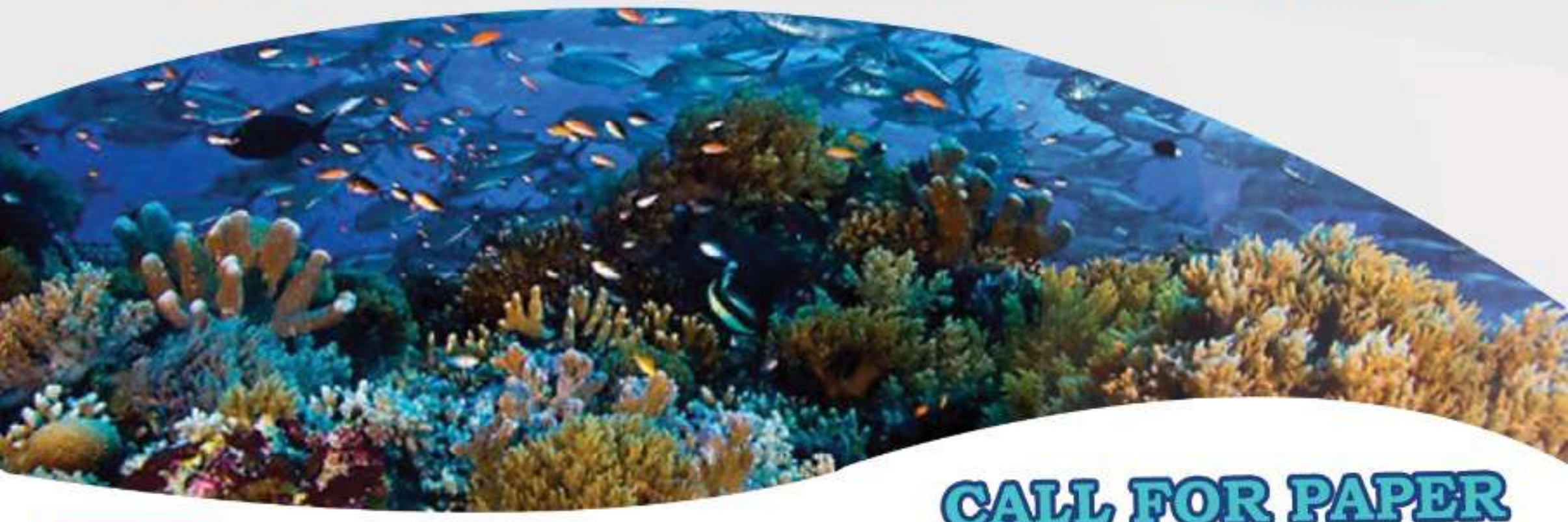
Joint symposium
The 4th EMBRIO International Symposium 2019
and
The 7th International Symposium of East Asia Fisheries and Technologist Association (EAFTA)

● August , 5th - 6th 2019 ● IICC (IPB International Convention Center) Bogor, Indonesia



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"Innovative Solution and Technology for Marine Biodiversity and Sustainable Fisheries"

Selected manuscripts will be published in Reputable International Journals and Accredited National Journals. Others manuscript will be reviewed and published in E3S Web of Conference Proceeding (e-ISSN: 2267-1242), Indexed by SCOPUS

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National Sun Yat-Sen University, Taiwan
Department of Marine Biotechnology & Resources

Prof. Dietriech G. Bengen
Bogor Agricultural University, Indonesia
Department of Marine Science and Technology

Prof. Yoshihiro Ochiai
Tohoku University, Japan
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Student (early bird)	Rp 400.000,-	$130
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Publication Fee	Rp 2.000.000,-	$400
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Timeline

18 May : Early bird abstract submission deadline
27 May : Announcement of accepted early bird abstract
17 June : Early bird payment deadline
26 June : Abstract submission deadline
3 July : Announcement of accepted abstract deadline
18 July : Payment deadline
2 August : Full paper submission deadline
5-6 August : Symposium

Registration: Bit.ly/4thEIS

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EIS-EAFTA Symposium Schedule 2019

Day 1, Monday, 5 August 2019, IPB International Convention Center

Time (GMT+7)	AGENDA
08.00-08.30	**Registration**
08.30-08.50	**Opening Ceremony**
	- Indonesian National Anthem
	- Angklung Performance (Gentra Kaheman)
08.50-09.00	**Welcome Speech**: Dr. Luky Adrianto (Dean of Faculty of Fisheries and Marine Science, IPB University)
09.00-09.15	**Opening Speech**: Dr. Arif Satria (Rector of IPB University)
09.15-09.35	**MoU Signing**: IPB – STP, IPB - BBESKP, IPB – India, IPB – Vietnam
09.35-09.40	**Report Speech**: Dr. Mala Nurilmala (Director of EMBRIO)
09.40-10.00	**Keynote Speech**: Prof. Ocky Karna Radjasa (Ministry of Research, Technology and Higher Education, Indonesia)
10.00-10.20	Photo Session & Coffee Break
10.20-11.35	**Speech & Discussion:** • Prof. Shang-Yin Vanson Liu (20 mins) • Prof. Masashi Hosokawa (20 mins) • dr. LE (Lisa) Becking (20 mins)
11.35-13.00	Poster Presentation
12.05-13.00	Lunch Break
13.00-13.15	EAFTA Opening Speech
13.15-17.15 (4 sessions, coffee break between sessions)	**Oral Presentation**
	Ballroom 1 : EAFTA/Utilization of Marine Biodiversity
	Meeting Room B : EAFTA/Utilization of Marine Biodiversity
	Meeting Room C : Understanding of Marine Biodiversity
	Meeting Room D : Conservation of Marine Biodiversity
17.15-17.20	Closing day 1

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Day 2, Tuesday, 6 August 2019, Favehotel

Time (GMT+7)	**AGENDA**
08.00-08.30	**Registration**
08.30-10.00	**Opening** **Speech & Discussion**: • Prof. Michael Krutzen (20 mins) • Prof. Dietriech G. Bengen (20 mins) • Mr. Hendra Sugandhi (20 mins) • Dr. Noor Khan (20 mins)
10.00-10.15	Coffee Break
10.15-12.15 (2 sessions)	**Oral Presentation**
	Room Salak Negara : EAFTA/ Utilization of Marine Biodiversity
	Room Argabinta : Understanding & Conservation of Marine Biodiversity
12.15-12.30	Closing day 2, announcement of student competition
12.30-13.30	Lunch
13.30-17.00	Excursion (KML Ichimasa Foods, Sentul)

Poster Presentation: IPB International Convention Center

5 August 2019

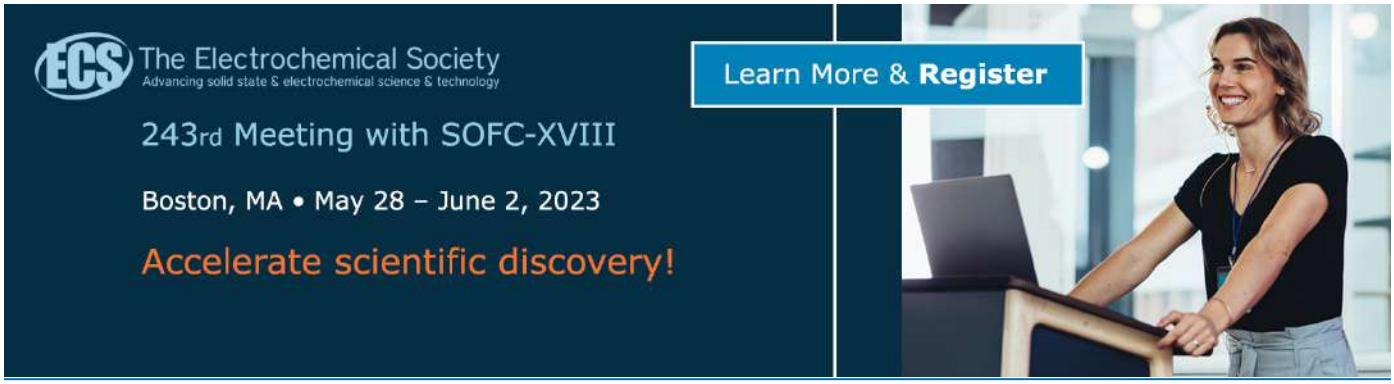
No	Code	Presenter	Title
1	P-UT-S1-01	Jamal basmal	Identification and characterization of solid waste from Gracilaria extraction
2	P-UT-S1-02	Ran Jielin	A trial study to develop high quality frozen pickled mackerel by suppressing myofibrillar protein denaturation
3	P-UT-S1-03	Nurhayati	The effect of extraction time on the proximate content of Gracilaria sp. post sap liquid extraction
4	P-UT-S1-04	Faiza A. Dali	Evaluating the Protein and Fat Content of Skipjack Fish (Katsuwonus pelamis, L) in the Smoking Process of Arabushi Wooden Fish
5	P-UT-S1-05	Ranu Rezqia Ramadheka	The effect of seaweed (Glacilaria sp) powder addition to the characteristics of fish sausage (Nemipterus sp)
6	P-UT-S1-06	Latif Sahubawa	Steak-restructuring Processing from Yellow Fin Tuna Flake Meat Using Binders (Microbial Transglutaminase) in Low Salt Conditions
7	P-UT-S1-07	Susiana Melanie	Combination of cell disruption methods and pH variation as pre-treatment for lipid extraction of Nannochloropsis sp.
8	P-UT-S1-08	Wini Trilaksani	Nano collagen of grouper swim bladder in compliance with the quality standard of cosmetics materials
9	P-UT-S1-09	Ace Baehaki	Effects of purun tikus (Eleocharis dulcis) extract on fish fillet of catfish (Pangasius sp.)
10	P-UT-S1-10	Jiayin Huang	The effects of different freezing methods on the freshness properties of crayfish
11	P-UT-S1-11	Yao Jieyu	The effects of PVP-EA solid dispersion on lipid and protein oxidation of hailtail in hydroxyl radical oxidation simulation system
12	P-UT-S1-12	Ni Shen	Changes of enzyme activities, protein and tissue structure of hailtail under different freezing processing
13	P-UT-S1-13	Gintung Patantis	Purification of chitosanase from Stenotrophomonas maltophilia KPU 2123 and Micromonospora sp. T5a1 for chitooligisacharides production
14	P-UT-S1-14	Ayu Septi Wulandari	Pattern Fortification of Patin Fish Calcium For Increasing Tropical Fish Surimi Gelation
15	P-UT-S1-15	Ace Baehaki	Antioxidant Activities of Peptides from Skin Fish of Snakehead (Channa striata) Hydrolysis with Protease from Swamp Water Isolate
16	P-UT-S1-16	Sumarto	Determination of Chitosan Nanoparticles of Sea Cucumber (Holothuria scabra J) Using Ionic Gelation Methods
17	P-UT-S1-17	Diini Fithriani	Potential utilization of Botriococcus braunii and Nannochloropsis microalgae as a biodiesel feedstock in Indonesia
18	P-UT-S1-18	Agusman	Characteristics of composited Eucheuma cottonii seaweed flour and conjak, and it effect on starch gelatinization
19	P-UT-S1-19	Yuspihana Fitrial	Study on Antibacterial Potency and Mechanism of Action of Cuttlefish Ink Melanin on Aeromonas sp.
20	P-UT-S1-20	Kustiariyah Tarman	Characterization of refined carrageenan from Kappaphycus alvarezii extracted using marine fungi with heat pretreatment
21	P-UT-S1-21	Mutiara Dian Pertiwi	Quality of Indian Mackerel (Rastrelliger sp.) Pindang With Different Additions of Liquid Smoke and Cooking Methods
22	P-UT-S1-22	Nindita Praba Daniswara	Fatty Acid Profile and Cholesterol of Smoked Vaname Shrimp (Litopenaeus vannamei) with Addition of Different Concentrations of Clove Brances Liquid Smoke
23	P-UT-S1-23	Iriani Setyaningsih	Characterization of peel off mask containing Spirulina biomass and extracts
24	P-UT-S1-24	Ruddy Suwandi	Characteristics of Chemical Compounds of Horseshoe Crab Tachypleus gigas in Different Body Proportions
25	P-UN-S1-01	Ria Faizah	Growth Pattern And Condition Factor of Giant Catfish (Arius Thalassinus) in The Cilacap Waters –Central Java
26	P-UN-S1-02	Andi Perdana Gumilang	Supply Chain Analysis in the Distribution of Leading Commodity-Based Catches in PPN Kejawanan / Analisis Rantai Pasok Dalam Distribusi Hasil Tangkapan Berbasis Komoditas Unggulan di PPN Kejawanan
27	P-UN-S1-03	Erika Saraswati	Analysis of stomach content of nemipterus japonicus from The Blimbingsari Waters, Banyuwangi District, Jawa Timur
28	P-UN-S1-04	Rajesh Marotirao Dhere	Biodiversity of Zooplanktons and Its Management For Fish Culture Zooplanktons , Reservoir, Management
29	P-UN-S1-05	Yuliati Hotmauli Sipatuhar	THE INFLUENCE OF LEADERSHIP FISHERMAN WOMAN, CLEAN PRODUCTION ENVIRONMENT IN THE FISH PROCESSING INDUSTRY ON THE WORK EFFECTIVENESS OF PRESERVING THE COASTAL ENVIRONMENT IN TANGERANG DISTRICT
30	P-CO-S1-01	Achmad Mustofa Huda	The Diversity of Echinoderms in Sarangan Beach, Gunung Kidul, Yogyakarta

Poster Presentation: Favehotel

6 August 2019

No	Code	Presenter	Title
1	P-UT-S2-01	Tati Nurhayati	Pepsin activity from gastric of catfish and milkfish from indonesian waters
2	P-UT-S2-02	Asadatun Abdullah	Antioxidant capacity and natural uv protector compounds from active fractions of Indonesian brown seaweeds biopigments. as cosmeceuticals ingredients.
3	P-UN-S2-01	Nila Septi Meikasari	PCR-RFLP as a detection method of allelic diversity seahorse (Hippocampus comes) from Bintan Waters, Riau Island
4	P-CO-S2-01	Yuni Puji Hastuti	Environmental optimization of recirculation aquaculture system: Addition of shelters to increase production of mud crab Scylla Serrata
5	P-UT-S2-03	Nurjanah	Fish quality and nutrional assessment of yellowfin tuna (*thunnus albacares*) and skipjack tuna (*katsuwonus pelamis*) during low temperature storage
6	P-UT-S2-04	Nurjanah	Bioactive potential and nutritional assessment of low sodium healthy salts from combination materials of different seaweeds
7	P-CO-S2-02	Lenny S. Syafei	Diet composition and trophic niche overlap among engraulid fishes in coastal waters of Pabean, Indramayu, Indonesia

The effect of *Gracilaria* powder on the characteristics of nemipterid fish sausage



The effect of *Gracilaria* powder on the characteristics of nemipterid fish sausage

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Abstract. This research was aimed to observe the effects of using food additives from *Gracilaria* powder to the structural properties and chemical characteristics of nemipterid fish sausages. Seaweed powder was originated from raw *Gracilaria* obtained from cultivated seaweed in Karawang waters. Five different concentrations of *Gracilaria* powder (0.0%, 2.5%, 5.0%, 7.5%, 10.0%) were used. The quality of the sausage was decided based on the sensory and the chemical quality. The results showed that the addition of *Gracilaria* powder had a significant effect on the texture and chemical quality but not to the taste, odor, appearance or fat content. The addition of *Gracilaria* powder at 2.5% was considered as the best treatment resulting in nemipterid fish sausage with an appearance value of 8.4, taste 7.7, odor 2.5, texture 8.7, and chemical value of moisture content 61.3%, ash content 1.52%, protein content 13.16%, fat content 0.62%.

Keywords: chemical characteristics, food additives, *Gracilaria* powder, nemipterid fish, sausage structural properties

1. Introduction

Based on the statistical data from the Ministry of Maritime Affairs and Fisheries, total domestic seaweed production reached 1.12 million tonnes in 2016 and increased to 15.6 tonnes in 2017 where 21% of the total production or 236.9 thousand tonnes were exported to various countries, 97% of those were exported in the form of raw materials and the rest in the form of processed products (KKP 2018).

One type of seaweed that has economic value and has been cultivated is red seaweed (Rhodophyceae) which contains agar compounds (Chapman 1980). The type of seaweed producing agarofit that has been widely developed is *Gracilaria* sp. in Indonesia, *Gracilaria* sp. is generally cultivated in ponds. *Gracilaria* sp. is the most common seaweed for consumption and cultivation so that its availability does not depend on the season and is easy to obtain. Jelly is the main product produced from red seaweed, such as *Gracilaria* sp. jelly is a hydrocolloid polysaccharide compound having ability to stabilize the emulsion by reducing surface tension through the formation of a protective layer covering the dispersed globule. Therefore insoluble compounds (fat) are more dispersed and more stable in the emulsion (Ma'ruf *et al* 2013). The stability of fat emulsion can improve tenderness, suppleness and reduce hardness in processed meat products.

Sausages are pulverized meat mixed with seasoning and spices then put in and formed in a wrapper or casing (Winarno 2011). Fish has a soft texture so the sausages that are produced are rather soft. The quality characteristics of fish sausages that must be fulfilled are having a chewy texture, good nature of juiciness, and good iris power, and having a taste that is acceptable to consume. An additional ingredient is needed to improve the quality characteristics of fish sausages. Yakhin *et al* (2013), states *Gracilaria* powder can improve the quality of catfish fish sausage gel because of the hydrocolloid content. *Gracilaria* powder increases gel strength (1,831.32 g/cm^2), water holding capacity (88.19%) of catfish sausage without giving changes to the sensory quality (aroma, flavor, foreign odor, color) of fish sausage. This research aimed to determine the effect of *Gracilaria* powder on the characteristics of nemipterid fish sausages.

2. Materials and methods

The experiment was conducted with a complete randomized design (CRD) experiment using 5 different *Gracilaria* powder concentrations, namely 0%, 2.5%, 5%, 7.5%, and 10% with four replications. The process of making fish sausages referred to SNI 7755-2013 about fish sausages with slight modification (BSN 2013). The hedonic test parameters used the Kruskal-Wallis test analysis. The significant results then will be proceed with the comparison mutiple test. Hedonic test is a test method used to measure the level of preference for a product by using an assessment sheet. The hedonic scale used ranges from 1-9. Sausages assessed by 30 untrained panelists.

Texture test carried out using the texture analyzer (TA) tool. The analysis was carried out descriptively. Chemical test parameters were content of water (SNI 2354.2:2015), ash (SNI 2354.1:2010), fat (SNI 01-2354.3-2006), and protein (SNI 01-2354.4-2006). Analysis using ANOVA then followed by BNJ or Tukey test for significant results.

3. Results and discussion

The test was carried out on all five different additions of *Gracilaria* powder on nemipterid fish sausage. The test was aimed to determine the effect of *Gracilaria* powder addition by conducting sensory, chemical, and texture test.

3.1 Sensory test (appearance, odor, taste, texture)
The result of sensory test for nemipterid fish sausages with the addition of *Gracilaria* powder can be seen in table 1.

Table 1. Hedonic results of nemipterid fish sausage.

Concentration	Parameter			
	Appearance	Odor	Taste	Texture
0%	8.12±0.64^a	7.42±0.59^a	7.55±0.63^a	7.33±0.46^a
2.5%	8.40±0.62^a	7.55±0.65^a	7.69±0.69^a	8.72±0.43^c
5.0%	8.37±0.68^a	7.38±0.55^a	7.62±0.74^a	8.50±0.63^c
7.5%	8.27±0.57^a	7.40±0.58^a	7.55±0.55^a	8.33±0.56^{bc}
10.0%	7.96±0.73^a	7.42±0.64^a	7.42±0.63^a	8.02±0.66^b

Note: The same letters indicates no significant different

The highest appearance (value 8.4) of nemipterid fish sausage was obtained from sausage with addition of 2.5% *Gracilaria* powder, while the lowest value was 10% (value 7.95). The hydrocolloid properties of *Gracilaria* powder able to absorb water, therefore the appearance of sausage will looks dry and hard.

The results of Kruskal-Wallis test showed that there was no significant difference (P>0.05) in the hedonic test of the appearance of nemipterid fish sausages. The evaluation of the appearance of sausages in general includes all the criteria tested by organoleptics which include rounded shapes, cleanliness, tidiness, evenness of color, and brilliance.

The highest odor value (7.55) of nemipterid fish sausage was obtained by addition of 2.5% *Gracilaria* powder, while the lowest value (7.38) was obtained by addition of 5%. There was no significant difference in the hedonic odor test for fish sausages (P>0.05). The aroma of food products mostly comes from raw materials used and spices added. The odor of nemipterid fish sausage treated was caused by an additional component of seasoning. According to Hui *et al* (2001) the use of spices in food products aims to give aroma to the product. Herbal components such as red onion contain aniline substances that contribute to the taste and aroma of sausages.

The hedonic test results showed that the texture of nemipterid fish sausage was the most preferred by panelists with the highest value nemipterid fish sausage with the addition of *Gracilaria* powder 2.5% with a value of 8.71 while the texture with the lowest value was sausages without the addition of *Gracilaria* powder. The results showed that there were significant differences in the treatment of the nemipterid fish sausages textures (P<0.05). The test results were followed by the Tukey test and showed that the effect of the addition of flour treatment was significantly different from the texture of nemipterid fish sausage. The increasing concentration of *Gracilaria* powder will reduce the hedonic value of texture, because too much addition of *Gracilaria* powder can tie too many molecules water resulting texture become more softer (Yuliani 2015).

The flavor test results showed that the highest flavor of nemipterid fish sausage by panelists was fish sausage with the addition of *Gracilaria* powder 2.5% with a value of 7.69, and the lowest value for 5% addition was 7.61 for 7.5% addition of 7.55 and without an increase of 7.55 while for the least preferred flavor value is with an additional 10% with a value of 7.41. There was no significant difference in the hedonic test of nemipterid fish sausage flavor (P>0.05). According to Maghfiroh (2000), the taste of food is influenced by the components contained in foods such as protein, fat, and carbohydrates that make up it.

3.2 Texture profile analyzer test

Texture is one of the most important in the quality of meat products (Indiarto *et al* 2012). The results of texture test of fish sausages was carried out by the texture analyzer (TA) tool.

Table 2. Texture of nemipterid fish sausage.

Parameters	Concentrations (%)				
	0	2.5	5.0	7.5	10.0
Hardness (g)	13,930	11,962	13,366	15,061	12,422
Facturability (g)	10,412	15,091	10,700	10,015	8,377
Adhesiveness (g.sec)	-0.51	-0.82	-0.45	-1.33	-1.35
Springiness	0.93	0.92	0.92	0.92	0.90
Cohesiveness	0.50	0.54	0.56	0.56	0.55
Gumminess	7,020	6,471	7,422	8,305	6,785
Chewiness	6,550	5,941	6,810	7,638	6,170
Resilience	0.62	0.28	0.28	0.28	0.28

The texture analysis result showed the highest level of hardness, factorability, adhesiveness, springines, gumminess, chewiness, and resilience were 7.5%, 2.5%, 5.0%, 0.0%, 7.5%, 7.5%, and 0.0% respectively, with the value were 15,061, 15,091, -0.45, 0.93, 8,305, 7,638, and 0.62, respectively. In

addition, the highest value for cohesiveness was found in 5.0% and 7.5% with the value 0.56. The difference value is significantly influenced by the amount of addition of *Gracilaria* powder.

3.3. Chemical test (moisture, ash, fat, protein content)

Chemical tests were carried out to obtain the nutritional content of nemipterid fish sausages. The results of the chemical nemipterid fish sausages test with the addition of *Gracilaria* powder can be seen in table 3.

Table 3. Proximate of nemipterid fish sausages.

Concentrations (%)	Parameters			
	Moisture Content	Ash Content	Fat Content	Protein Content
0	61.75±0.14^{c}	1.27±0.11^{a}	0.63±0.01^{a}	13.04±0.01^{a}
2.5	61.39±0.29^{bc}	1.52±0.02^{b}	0.62±0.03^{a}	13.17±0.07^{b}
5.0	60.94±0.40^{ab}	1.67±0.13^{bc}	0.64±0.05^{a}	13.21±0.05^{bc}
7.5	61.04±0.30^{ab}	1.74±0.06^{c}	0.66±0.02^{a}	13.26±0.01^{c}
10.0	60.66±0.03^{a}	1.79±0.05^{c}	0.66±0.02^{a}	13.28±0.02^{b}

Note: The same notation indicates no significant different

Moisture test results for nemipterid fish sausage content ranged from 60.66%-61.75%. This results met the standard criteria set by SNI 7755: 2015 concerning fish sausages which states that the value of moisture content in nemipterid fish sausages is maximum 68%. ANOVA analysis results showed that F count>F table stated that there was a real influence on the treatment of adding *Gracilaria sp*. This is due to the hydrophilic nature of *Gracilaria* powder, the ability to absorb water molecules from the environment. The water molecules in the dough intensively increase due to the hydrophilic nature of *Gracilaria* powder which continuously absorbs water molecules in the surrounding environment (Wulandhari 2007). Excess water in the dough causes the resulting texture to tend to be softer. According to Chapman (1980), the addition of seaweed in processing sausages will cause the three-dimensional network built to absorb water, besides seaweed is a polysaccharide compound that easily binds water with the presence of reversible sulfate groups in the molecular chain.

The results of ash content met the standard criteria set by SNI 7755: 2015 concerning fish sausages which state that the value of ash content in nemipterid fish sausages maximum 2.5%. The higher the concentration of powder added, the higher the ash content. This shows the content of mineral in *Gracilaria* powder was quite large so it affects the ash content of nemipterid fish sausages.

The results of ANOVA analysis showed that F count> F table shows that there were significant different effects given by the addition of *Gracilaria* powder to ash content in fish sausages. Ash content is a food that shows the amount of minerals that are bound in a material (Winarno 2011)

The highest test results for the fat content of nemipterid fish sausages (table 3) were on adding 10% powder with a yield of 0.66% followed by an addition of 7.5%, while the lowest was in sausages with the addition of 2.5%. This met the standard criteria set by SNI 7755: 2015 concerning fish sausage which states that the value of fat content in fish sausages is maximum 7.0%. The results of ANOVA analysis showed that F count < F table shows that there is no significant different effect given by the addition of *Gracilaria* powder to fat content. Stable fat emulsions in nemipterid fish sausages result in fat removal in fish meat during boiling can be prevented.

The results of protein test levels of nemipterid fish sausages ranged from 13.04%-13.27%. The results met the standard criteria set by SNI 7755: 2015 concerning fish sausages which state that the value of protein content in nemipterid fish sausages is at least 9.0%. The results of ANOVA analysis state that F count > F table shows that there were significant different effects given by adding *Gracilaria* powder to

protein content in nemipterid fish sausages. According to Yakin *et al* (2013), the addition of various concentrations of seaweed flour had an effect on fish meatball protein. Seaweed flour will bind free water and resist proteins that can dissolve in water during the boiling process (Husni *et al* 2008). This causes a fish meatball protein will increase with increase the concentrate seaweed flour.

4. Conclusion

Nemipterid fish sausages with the addition of *Gracilaria* powder which is most preferred by the panelists are the addition of 2.5% in terms of appereance, aroma, odor, taste. In hedonic test results shows that only on texture parameters which state there is a real effect and in chemical test shows that only the fat content component is not significant. Then the texture test results are mostly influenced by the amount of *Gracilaria* powder addition.

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