UNIVERSITAS SUMATERA UTARA
FACULTY OF AGRICULTURE
INTERNATIONAL CONFERENCE ON AGRICULTURE, ENVIRONMENT, AND FOOD SECURITY 2023
Jalan. Prof. A. Sofyan No. 3 Kampus USU Medan - 20155
Email: aefs@usu.ac.id; Fax: 061 - 8211924

LETTER OF ACCEPTANCE
INTERNATIONAL CONFERENCE ON AGRICULTURE, ENVIRONMENT, AND FOOD SECURITY (AEFS 2023)

Dear Author,

On behalf of the committee, we are pleased to inform you that after the first step of the peer-reviewed, your manuscript entitled **"Protein potential in nagara beans (Vigna unguiculata ssp Cylindrica) from South Kalimantan",** has been accepted for presentation at the 7th International Conference on Agriculture, Environment, and Food Security, which will be held hybrid in Medan and via Zoom Web Conference on September, 26 - 27th 2023.

Your paper is scheduled to be published in the forthcoming issue of IOP Conference Series: Earth and Environment Science indexed by Scopus, but before that, you have to fulfil the following requirements:

1. Submit your latest version paper to the morressier website on https://tinyurl.com/icaefs no longer than October 08th 2023. **Remember**, **you may have another revision even after the presentation until your paper is ready to publish.**
2. All articles must follow IOP Publishing's author and ethical guidelines https://publishingsupport.iopscience.iop.org/author-guidelines-for-conference-proceedings/.
3. For papers with multiple authors, ensure at least one of the registered authors attend the conference for oral presentation.
4. Complete your payment and fill this google form no later than September, 22th 2023: https://bit.ly/AEFS2023PAYMENT. This year, the payment for IC-AEFS 2023 is done through a virtual account that can be accessed through your registered account on the AEFS website. You can download the payment guideline here: https://bit.ly/PaymentGuidelineForAuthor.
5. For the online presenter, please share your uploaded presentation video no later than September, 20th 2023 via this google form https://bit.ly/AEFS2023VideoPresentation. (More details about the video presentation and ppt template will be announced later).
6. IOP Publishing's Article Processing Charge (APC) is chargeable for accepted and declined articles
7. Papers written with artificial intelligence support (ChatGPT, Bard, etc.) will not be accepted.

Once you completed those procedures and we received all the required electronic materials, we will process your paper. As stated before, it will be scheduled for the next available slot in the IOP Conference series. More details will be announced closer to the event. If there is anything we can do to assist you in your preparations for this meeting, please do not hesitate to contact us.

We look forward to meeting you at the conference.

Sincerely,

Prof. Dr. Ir. Elisa Julianti M.Si.
Chair of Organizing Committee

UNIVERSITAS LAMBUNG MANGKURAT

Rini Hustiany <rini.hustiany@ulm.ac.id>

Your Paper for AEFS-2023

1 message

Morressier Team <discover@morressier.com> Tue, Jan 9, 2024 at 12:27 PM
To: rini.hustiany@ulm.ac.id

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[ICAEFS2023] Announcement: Full Paper Acceptance

1 message

aefs@usu.ac.id <aefs@usu.ac.id> Mon, Sep 18, 2023 at 10:21 PM
To: rini.hustiany@ulm.ac.id

Dear Author,

Thank you for submitting your manuscript to the 7th IC-AEFS 2023. On behalf of the committee, we are pleased to inform you that after the first step of the peer-reviewed that your manuscript has been accepted for presentation at the 7th International Conference on Agriculture, Environment, and Food Security, which will be held hybrid in AryaDuta Hotel, Medan and via Zoom Web Conference on September, 26 - 27th 2023.

We would like to send the Letter of Acceptance (LoA) to you, please find it at the attachment of this email. Moreover, you will need to fulfil the requirements attached in the LOA. The scientific program, including the date and time of the presentation, will be emailed to you shortly. After being reviewed and meeting the criteria, the full paper will be published in the IOP Conference Series: Earth and Environmental Science. Please refer to the IOP Science's guidelines for conference proceedings here:
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Please check it carefully.
Join our WhatsApp group at https://bit.ly/wag-aefs2023 for more information and easier communication.
Thank you for your participation and we look forward to seeing you at this event.

Best regards,
The 7th IC-AEFS Organizing Committee

International Conference on Agriculture, Environment, and Food Security
(AEFS) 7th International Conference on Agriculture, Environment, and Food Security (AEFS) 2023
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THE 7TH IC-AEFS 2023 PROCEEDINGS
CONTENT REVIEW FORM

Moressier Paper ID : 57
Paper title : **Protein potential in nagara beans (Vigna unguiculata ssp Cylindrica) from South Kalimantan**

Reviewer's Suggestion (Choose one)*:
a. Accepted with a Minor Revision b. Accepted with a Major Revision c. Rejected
*Please write this suggestion as the reviewer's comment in Morressier.

No.	Review Criteria	Comment/Suggestion	Response from Author
I. Technical Criteria			
1	**Scientific merit**: notably scientific rigor, accuracy, and correctness.		
2	**Clarity of expression**.		
3	**Communication of ideas**.		
4	**Readability and discussion of concepts**. Proofread to increase the readability level and correct grammatical errors.		
5	**Sufficient discussion of the context of the work**.		
6	**Suitable referencing**. Please adhere to the IOP referencing style. The minimum number of references is 10, and 80% should be international journals.		
II. Quality Criteria			
7	**Originality**: Is the work relevant and novel?	yes	
8	**Motivation**: Does the problem considered have a sound motivation? All papers should clearly demonstrate the scientific interest of the results.	yes	
9	**Length**: Is the content of the work of sufficient scientific interest to justify its length? Max 8-9 pages.	yes	
III. Presentation Criteria			

10	**Title**: Is it adequate and appropriate for the content of the article?	yes	
11	**Abstract**: Does it contain the essential information of the article? Is it complete? Is it suitable for inclusion by itself in an abstracting service?	yes	
12	**Diagrams, figures, tables, and captions**: Are they essential and clear? Make sure that all tables and figures have a good readability level.	yes	
13	**Text and mathematics**: Are they brief but still clear? If you recommend shortening, please suggest what should be omitted.	yes	
14	**Conclusion**: Does the paper contain a carefully written conclusion, summarizing what has been learned and why it is interesting and useful?	- Conclucion- please mention novelty of your research and add more detailed suggestion for further studies	Done. It has been added to the conclusion section
IV. Content Criteria			
15	**Is the article topic within the IOP EES scope?** IOP EES Scope: https://iopscience.iop.org/journal/1755-1315/page/scope	yes	
16	**Is the article topic within the conference scope?** Plant Science (Agronomy, Plant Breeding, Biotechnology, Integrated Pest Management, and Soil Science); Agricultural Economics; Animal Science; Food Science and Technology; Agricultural Engineering; Marine	yes	

	and Fisheries Science; Environmental Science.		
17	**The Manuscript's Title**: From the Manuscript's Title, can you see that the content of the manuscript will be related to the environment, sustainability, agricultural activities, and/or agricultural commodities? It should be related.	yes	
18	**The Manuscript's Topic/Track Group**: Is the Manuscript's Topic/Track Group suitable, or is it more suitable in another Topic/Track Group?	Suitable in this topic	
19	**The Manuscript's Abstract**: Does the Manuscript's Abstract discuss matters related to the environment, sustainability, agricultural activities, and/or agricultural commodities? At least 1 sentence.	yes	
20	**The Manuscript's Introduction**: Does the Manuscript's Introduction discuss matters related to the environment, sustainability, agricultural activities, and/or agricultural commodities? At least 1 paragraph.	Please write in the manuscript about the relationship of this paper with the Sustainable Development Goals https://sdgs.un.org/goals , and how this paper might contribute to the fulfillment of the Sustainable Development Goals	Done. SDGs have been added
21	**The Manuscript's Results and Discussion**: Does the Manuscript's Results and Discussion discuss matters related to the environment, sustainability, agricultural activities, and/or agricultural commodities? At least 1 paragraph. As	yes	

	this is an international publication, local aspects need to be discussed from a global perspective.		
22	**The Manuscript's Conclusions**: Does the Manuscript's Conclusions discuss matters related to the environment, sustainability, agricultural activities, and/or agricultural commodities? At least 1 sentence.	yes	
23	**The Manuscript's Content**: Is the Manuscript's Content the results of research that the main content includes sections: Introduction, Methods, Results and Discussion, Conclusions, References, and Acknowledgements (optional)?	yes	

THE 7TH IC-AEFS 2023 PROCEEDINGS
FORMAT REVIEW FORM

Moressier Paper ID : 57
Paper title : Protein potential in nagara beans (Vigna unguiculata ssp Cylindrica) from South Kalimantan

Reviewer's Suggestion (Choose one)*:
a. Accepted with a Minor Revision b. Accepted with a Major Revision c. Rejected
*Please write this suggestion as the reviewer's comment in Morressier.

No.	Review Criteria	Comment/Suggestion	Response from Author
I. Technical Criteria			
1	**Suitable referencing**. Please adhere to the IOP referencing style. The minimum number of references is 10, and 80% should be international journals.	Your manuscript's references do not adhere to the IOP referencing style. Please adhere to the IOP referencing style precisely (the format example attached in the Revision Guidelines).	Done
II. Quality Criteria			
2	**Repetition**: Have significant parts of the manuscript already been published? Turnitin Max 25-30% if the bibliography is included; Max 15-20% if the bibliography is not included.	The repetition in your manuscript is quite high. The Turnitin similarity check result is 25% if the bibliography is included; and 19% if the bibliography is not included (The Turnitin result is attached). Please paraphrase to try reducing the similarity to less than 25% if the bibliography is included; and less than 15% if the bibliography is not included	Done
3	**Length**: Is the content of the work of sufficient scientific interest to justify its length? Max 8-9 pages.	Good	
III. Presentation Criteria			
4	**Diagrams, figures, tables, and captions**: Are they essential and clear? Make sure that all tables and figures have a good readability level, quite clear after zooming in 300%.	Figures 1 is not clear enough. Please make sure that all of them have a good readability level and quite clear after zooming in 300%	Done It's been enlarged
IV. Content Criteria			
5	**Is the article topic within the IOP EES scope?** IOP EES Scope: https://iopscience.iop.org/journal/1755-1315/page/scope	Yes	

6	**Is the article topic within the conference scope?** Plant Science (Agronomy, Plant Breeding, Biotechnology, Integrated Pest Management, and Soil Science); Agricultural Economics; Animal Science; Food Science and Technology; Agricultural Engineering; Marine and Fisheries Science; Environmental Science.	Yes	
7	**The Manuscript's Title**: From the Manuscript's Title, can you see that the content of the manuscript will be related to the environment, sustainability, agricultural activities, and/or agricultural commodities? It should be related.	No. It should be related. Please add at least 1 word related to the environment, sustainability, agricultural activities in your manuscript's title.	Done
8	**The Manuscript's Topic/Track Group**: Is the Manuscript's Topic/Track Group suitable, or is it more suitable in another Topic/Track Group?	Yes	
9	**The Manuscript's Abstract**: Does the Manuscript's Abstract discuss matters related to the environment, sustainability, agricultural activities, and/or agricultural commodities? At least 1 sentence. Abstract max 200 words without keywords.	No. Please add at least 1 sentence related to the environment, sustainability, agricultural activities in your manuscript's abstract	Done
10	**The Manuscript's Introduction**: Does the Manuscript's Introduction discuss matters related to the	Yes	

	environment, sustainability, agricultural activities, and/or agricultural commodities? At least 1 paragraph.		
11	**The Manuscript's Results and Discussion**: Does the Manuscript's Results and Discussion discuss matters related to the environment, sustainability, agricultural activities, and/or agricultural commodities? At least 1 paragraph. As this is an international publication, local aspects need to be discussed from a global perspective.	No. Please add at least 1 paragraph related to the environment, sustainability, agricultural activities in your manuscript's	Done
12	**The Manuscript's Conclusions**: Does the Manuscript's Conclusions discuss matters related to the environment, sustainability, agricultural activities, and/or agricultural commodities? At least 1 sentence.	No. Please add at least 1 sentence related to the environment, sustainability, agricultural activities in your manuscript's conclusions.	Done
13	**The Manuscript's Content**: Is the Manuscript's Content the results of research (not literature or critical review) that the main content includes sections: Introduction, Methods, Results and Discussion, Conclusions, References, and Acknowledgements (optional)?	Yes	
14	**The Manuscript's Format**: Does the Manuscript's Format adhere to the IOP format precisely? IOP Publishing's author and ethical guidelines: https://publishingsupport.iopscience.iop.org	Yes	

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PAPER NAME

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AUTHOR

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CHARACTER COUNT

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PAGE COUNT

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Protein potential in nagara beans (*Vigna unguiculata* ssp Cylindrica) from South Kalimantan

R Hustiany[1]

[1]Agroindustrial Technology Department, Lambung Mangkurat University, Banjarbaru, Indonesia
Email: rini.hustiany@ulm.ac.id

Abstract. Nagara beans are a local superior beans from South Kalimantan which grow in the swampy area of lebak and belongs to the cowpea group. The purpose of this study was to analyze the potential of nagara bean protein in various forms of nagara bean and their processes. The protein content of whole nagara beans is 14.22% and when roasted is 18.42%. If the nagara beans are peeled off and dried into flour, the protein content becomes 24.16%. Nagara bean flour that has been floured and the fat removed, then the protein content is 22.54%, the concentrate of nagara bean flour is 17.58% and the protein isolate is 61.31%. The protein content of nagara bean tempeh which has been fermented is 9.58%. The protein content of defatted tempeh flour was 26.09%, the concentrate of nagara bean tempeh flour was 21.28% and the protein isolate of nagara bean tempeh flour was 61.31%. The protein content of nagara bean sprout flour on a small scale is 31.06% and when scaled up, the protein content of sprout flour becomes 19.83%. The composition of the many amino acids found in nagara beans are glutamic acid, aspartic acid, lysine, phenylalanine, threonine, and leucine. Nagara bean protein is mostly globulin and albumin. Nagara beans have the potential to produce protein.

1. Introduction

Nagara bean is a typical legume commodity from South Kalimantan. Nagara bean is only cultivated in North Daha and South Daha Subdistricts, Hulu Sungai Selatan District. The planting of these bean is usually done during the dry season, when the swampland has receded but the soil is still moist enough to plant.

The planting season in the villages of North Daha and South Daha is only carried out during the dry season, whereas during the rainy season the soil is flooded and cannot be planted. This condition causes the nagara bean to not grow rapidly, because planting is limited and their utilization is also lacking. Nagara bean is usually used by traditional communities as an additional part of a substitute for vegetables in curry dishes. Apart from that, nagara bean can also be used in the produce of kuku peanuts or fried peanuts which come from nagara beans which have had their skin removed. Nagara bean is also processed into magali cakes, which are cakes made from nagara beans which have been removed from the skin, mashed, and mixed with brown sugar.

Nagara bean belong to the cowpea class. There are four cultivars of cowpea germplasm, namely paddy, plank, yellow and arabic. Paddy cultivars have longer pods, small seeds and yellowish white with dark brown hilum. Plank cultivars have large pods, large yellowish-white or greenish seeds with a large dark brown triangular hilum. Yellow cultivars have large pods, when young the pods are green and yellowish white when ripe, the seeds are yellowish white with a dark brown hilum. Arabic cultivars have large pods, with relatively large seed sizes, the seeds are slightly yellowish white with a black hilum [1].

The yellow cowpea cultivar that grows in the North Daha and South Daha areas became the national superior cowpea under the name of nagara bean or cowpea nagara cultivar in 1994 [2]. Nagara bean (Vigna unguiculata ssp Cylindrica) is a type of cowpea (Vigna unguiculata) that has adapted to the swampland environment in the North Daha and South Daha areas, South Kalimantan. Therefore, the nagara bean is different from cowpea in general and also different from cowpea (Vigna unguiculata L.

Walp) which grows in California, United States of America or other places in sub-Saharan Africa and other Asia. According to [3] many cowpeas are produced from these areas.

Nagara bean is also different from similar cowpeas, namely white beans which are commonly found in Java. Nagara bean has physical characteristics of small size, white bones and wrinkled surface. The white beans that are abundant in the Java region are larger in size, white in color and the surface of the skin is smooth or not wrinkled.

Nagara bean, which belong to the cowpea group, is nut for which the protein, carbohydrates, and micronutrients such as vitamins and minerals can be utilized [3]. One that has the potential to be developed from nagara beans and cowpeas in general is protein which is contained in various forms. Based on [4], world production of cowpea in 2021 will be 8.9 million tons. Most of the cowpea producers are in Africa (95.3%) and Asia, only 2.9%. The purpose of this study was to analyze the potential of nagara bean protein in various forms of nagara bean and their processes.

2. Materials and methods

The materials used in this study were the nagara bean (Vigna unguiculata ssp Cylindrica) a plank cultivar originating from North Daha or South Daha subdistricts, Hulu Sungai Selatan district, South Kalimantan province and several chemicals for analysis originating from Merck.

2.1. Skinless nagara bean flour

As stated by [5] that the nagara beans are sorted first and then washed thoroughly before soaking in an alkaline solution for 3 hours to reduce the activity of trypsin inhibitors and tannins, and eliminate hemaglutinin activity. The soaked beans are then drained and the skin removed. The beans were immediately dried in the oven at 50°C until dry. The dried nagara beans are then ground with a grinder. Nagara bean flour sifted through a 60 mesh sieve.

2.2. Roasted nagara bean flour

As stated by [5], nagara beans are sorted and washed with water for cleaning. After that, the nagara beans are roasted for 50 minutes while stirring. The roasted nagara beans were then ground using a grinder and sifted through a 60 mesh sieve.

2.3. Nagara bean tempeh

As stated by [5] that the processing of nagara bean tempeh is done by soaking the nagara beans for 1 night. Nagara beans are washed with running water. Nagara beans are ground to separate the shell from the nut and the flesh of the nut as well as to break the nuts into two parts. The ground nagara beans are then washed to separate the skin. Nagara beans are boiled for 1 hour. After that, the nagara beans are drained. After draining, the nagara beans are added with commercial tempeh yeast, 1 g of yeast for 100 g of beans. Furthermore, the nagara beans are put in plastic to be fermented for 1 night and become nagara bean tempeh.

2.4. Nagara bean tempeh flour

Nagara bean tempeh that has been produced is then cut into pieces and dried using an oven dryer at 50°C until dry with a moisture content of 10-12%. The dried nagara bean tempeh is then mashed and sieved through a 60 mesh sieve. Nagara bean tempeh that has been dried and mashed is called nagara bean tempeh.

2.5. Defatted flour

Nagara bean flour and nagara bean tempeh flour were removed the fat by percolation method using hexane solvent. The mixture of nagara bean flour and hexane was then shaken at 180 rpm for 1 hour at room temperature. The mixture is filtered using filter paper. The filter results were then dried in an oven at 50°C until dry with a moisture content between 10 – 12%.

2.6. Protein concentrate

Nagara bean defatted flour and nagara bean tempeh defatted flour were then made into protein concentrate by dissolving 60 g of nagara bean defatted flour and nagara bean tempeh defatted in 300 ml of 80% ethanol. This mixture was stirred at room temperature for 30 minutes. Then the mixture is filtered. The filter results were then added with 300 ml of distilled water and adjusted to a pH of 4.5 using 2N HCl solution. This mixture was then centrifuged at 2000 rpm for 15 minutes. The centrifugal results are then separated between the precipitate and the supernatant. The supernatant was discarded and the precipitate was added with 300 ml of distilled water and neutralized to a pH of 6.5 – 7 with 2N NaOH solution. This mixture was then centrifuged again at 2000 rpm for 15 minutes. The precipitate was collected and the supernatant was discarded. This precipitate is then dried in the oven until dry at 50°C until dry with a moisture content between 10 – 12%. The dried precipitate is called nagara bean protein concentrate or nagara bean tempeh protein concentrate.

2.7. Protein isolate

Protein isolate can be prepared by adding 200 g of nagara bean defatted flour or nagara bean tempeh defatted flour by adding 1 liter of distilled water (1: 5) and adjusting the pH to 8.5 – 8.7 using 2 N NaOH solution. Then extracted at 60°C for 30 minutes using a water bath shaker. After extraction, this mixture was then centrifuged at 2000 rpm for 15 minutes. The supernatant was collected which is called supernatant 1. The precipitate was then added with 400 ml of distilled water and centrifuged again at 2000 rpm for 15 minutes. The supernatant is collected which is called supernatant 2. The precipitate is discarded. Supernatants 1 and 2 were mixed and then the pH was adjusted to 4.5 with 2N HCl solution. The solution was centrifuged at 2000 rpm for 15 minutes. The supernatant was discarded and the precipitate was added with 200 ml of distilled water and neutralized to pH 7 with 2N NaOH solution. This mixture was then centrifuged again at 2000 rpm for 15 minutes. The supernatant was discarded and the precipitate was dried in an oven at 50oC until dry with a moisture content between 10 – 12%. The dried precipitate is called nagara bean protein isolate or nagara bean tempeh protein isolate.

2.8. Small scale nagara bean sprout flour

The nagara beans are first sorted from defects and foreign objects. The nagara beans used are still mostly empty and light and split, and there is still a lot of dirt in the form of leftover pods, twigs and stones. These dirt materials will interfere during the germination process. Nagara beans are then washed with water and soaked in water with a ratio between nagara beans and water is 1: 3. 500 grams of nagara beans are used. Soaking was carried out for 12 hours. After soaking, the soaking water is removed and drained. Furthermore, the nagara beans are wrapped in banana leaves, so that the nagara beans are still moist during the germination process. The germination process was carried out for 48 hours. After germination is complete, the nagara bean sprouts are cleaned of the skin and dried at 50°C. After drying, the sprouts were crushed to 80 mesh.

2.9. Scale up nagara bean sprouts flour

The nagara beans are first sorted from the defects and dirt of the nagara beans. Then the nagara beans are washed and soaked with the ratio between the nagara beans and water is 1: 3. Soaking time and germination on scale up are 12 hours and 48 hours. In this scale up, the amount of nagara beans used is 3 kg or 6 times more than the small scale. Nagara beans that have been soaked and drained are then put in a plastic basket with small holes and covered with black plastic. During the germination process, the nagara beans are sprinkled periodically with a little water. After 48 hours of germination, the skin of the nagara bean sprouts was removed and dried at 60 – 70°C. The dried sprouts were then crushed to 80 mesh.

2.10. Protein Content Analysis

Protein content was analyzed using the micro Kjeldahl method [6].

2.11. Amino Acid Composition Analysis with HPLC-Ortophthaldehyde Derivatization Method

The sample containing 3 mg of protein was put into an ampoule and added with 1 ml of 6 N HCl. The sample mixture was frozen using dry ice-acetone. The air in the sample that has been frozen is completely removed. If there are still air bubbles, then 1 or 2 drops of n-octyl alcohol are added to the sample as an anti-bubbling. The ampoule was vacuumed again for 20 minutes, then the center of the tube was closed by heating it over a fire. The closed ampoules were placed in the oven at 110ºC for 24 hours. Samples that have been hydrolyzed are cooled at room temperature. Then the contents were transferred to a 50 mL evaporator flask and the ampoule was rinsed with 2 mL of 0.01 N HCl. The rinse liquid was also put into the evaporator flask. Rinsing is done 2 to 3 times. The samples were then frozen using a freeze dryer in a vacuum. To convert cysteine into cystine, 10-20 mL of water is added to the sample and the sample is dried again using a freeze dryer. This is repeated 2 to 3 times. The dried sample was added with 5 mL of 0.01 N HCl and ready to be analyzed. Samples were filtered using millipore paper. Potassium borate buffer pH 10.4 was added to the sample in a ratio of 1: 1. Into a clean empty vial, 10 µl of sample was added and 25 µl of OPA reagent (orthophthaldehyde) was added. This sample mixture was left for 1 minute so that the derivatization was complete. Samples were injected into the HPLC column as much as 5 µl. HPLC used with ultra techsper columns and fluorescence detectors. The mobile phases used were buffer A (a mixture of Na-acetate, Na-EDTA, methanol and tetrahydrofuran (THF)) and buffer B (a mixture of 95% methanol and distilled water) with a flow rate of 1 ml/minute using the gradient method.

Calculation:

The concentration of amino acids (expressed in µmol of amino acids) in the sample is:

$$\text{Amino acid concentration} = \frac{\text{Sample peak area}}{\text{Standard peak area}} x \text{ concentration standard}$$

After that, the percent of amino acids in the sample is determined as follows:

$$Percent\ of\ amino\ acids = \frac{\text{µmol amino acid x molecular weight of the amino acid x 100}}{\text{µg sample}}$$

2.12. Protein Types Analysis with the SDS-PAGE Method

The type of protein analyzed was defatted flour and protein concentrate from nagara bean and nagara bean tempeh. The protein contained in the flour was precipitated using the [7] method with a concentration of 90% v/v. By means of 10 ml of sample added 90 ml of acetone. Protein electrophoresis based on the [8] method using the SDS-PAGE (Sodium dodecyl sulfate – polyacrylamide gel electrophoresis) method with a vertical slab gel. Slab gel was made with a concentration of 4% collecting gel and 12.5% separating gel. The marker used was from Fermentas: Unstained Protein Molecular Weight Marker with 7 protein bands which can be seen in Table 1.

Table 1. Marker Composition from Fermentas : Unstained Protein Molecular Weight Marker

Molecular Weight (kDa)	Protein	Source
116.0	beta-galactosidase	E.coli
66.2	bovine serum albumin	bovine plasma
45.0	ovalbumin	chicken egg white
35.0	Lactate dehydrogenase	porcine muscle
25.0	REase Bsp981	E.coli
18.4	beta-lactoglobulin	bovine milk
14.4	Lysozyme	chicken egg white

3. Results and discussion

3.1. Protein Content

The protein content of nagara beans in various forms and their processes is varied. The protein content of whole nagara beans is 14.22% (Table 2). The protein content is more or less the same as roasted nagara beans, namely 18.42% (Table 2). The increased protein content in roasted nagara beans is caused by a decrease in water content due to roasting. Roasting functions to inactivate the lipoxygenase enzyme which forms the beany flavor or unpleasant flavor in nagara beans.

Increasing the protein content of the nagara bean can be done by removing the epidermis of the nagara bean. The protein content of the nagara bean became 24.16% (Table 2) by removing the epidermis from the nagara bean. Nagara bean epidermis is a carbohydrate.

Nagara beans can also be processed into tempeh through a fermentation process, so it can hydrolyze protein into amino acids. The protein content of nagara bean tempeh is 9.58% with a total solids of 32.75% (Table 2), because the nagara bean tempeh is still wet.

Nagara bean and nagara bean tempeh can increase the amount of protein by making defatted flour, protein concentrate and protein isolate [9]. Defatted flour is nagara bean flour or nagara bean tempeh flour which has had the fat part removed. This removed fat functions to be able to increase the amount of protein in the nagara beans. Only nagara bean defatted tempeh flour could increase its protein content, while nagara bean defatted flour decreased its protein content.

Table 2. Protein content of various forms of nagara beans and processed nagara beans*

Nagara Bean Forms	Protein Content (%)	Dry Matter (%)	Nagara Bean Forms	Protein Content (%)	Dry Matter (%)
Whole nagara bean	14.22±0.43	86.35	Nagara bean concentrate	17.58±1.63	87.91
Roasted nagara bean	18.42±0.05	94.27	Nagara bean tempeh concentrate	21.28±0.33	86.91
Nagara bean flour without skin	24.16±0.23	91.10	Nagara bean isolate	61,31±0.51	87.00
Nagara bean tempeh	9.58±0.47	32.75	Nagara bean tempeh isolate	38.40±2.57	87.00
Nagara bean defatted flour	22.54±0.34	90.67	Small-scale nagara bean sprout flour	31.06±0.89	89.49
Nagara bean tempeh defatted flour	26.09±1.25	88.30	Scale up nagara bean sprout flour	19.83±0.24	90.12

*2 replication

The increase in the amount of protein in nagara bean tempeh defatted flour can be caused by an increase in ammonia nitrogen and amino nitrogen [10] during the fermentation process, thereby increasing the nitrogen and amino acid content. As for the decrease in protein content in defatted flour, it is suspected that the non-polar amino acids that make up the protein are dissolved with hexane.

In nagara bean and nagara bean tempeh protein concentrate, there was a decrease in protein content compared to their defatted flour. This is because during the extraction process to produce protein concentrate, so proteins and amino acids become dissolved. Even so, the protein produced in protein concentrate is purer than defatted flour. According to [11] defatted soybean tempeh flour reduced its total ash, moisture content, fat content, total carbohydrates and crude fiber. In defatted soybean flour, only the protein increases.

In protein isolates, the solvent used for the produce of protein isolates only uses aqueous solvents, resulting in an increase in protein content. The protein content of nagara bean protein isolate can reach 61.31% (Table 2). In contrast to the protein content of nagara bean tempeh protein isolate, which was only 31.06% (Table 2). This is because the protein isolate of nagara bean tempeh contains many polar amino acids, so it is easily dissolved in water during extraction. Even though the amount of amino acid protein isolate of nagara bean tempeh can reach 78.95% (Table 3). The protein content in nagara bean tempeh protein isolate is lower than that of soybean tempeh protein isolate by 50.5% [11]. This is

because the nagara beans are very hydrophilic, while the soybeans are more hydrophobic. As a result, when the nagara beans are extracted with aqueous solvents, many of the proteins and amino acids are dissolved.

Nagara beans can also be processed into sprouts. On a small scale, the protein content of nagara bean sprouts increased to 31.06% (Table 2). This is caused by the formation of growth hormone and increased activity of enzymes during the growth process [12]. However, when the production scale for nagara bean sprouts was increased, the protein content decreased to 19.83% (Table 2). This is caused by an increase in the number of sprouts made and the thickness of the pile of sprouts increases, so the activity of enzymes becomes inhibited [13]. As a result, the amount of protein in the nagara bean sprouts decreased.

3.2. Amino acid composition

The amino acid composition of nagara beans was determined using the HPLC-derivatization orthophthaldehyde method. Total amino acids were highest in protein isolate compared to protein concentrate and defatted flour (Table 3). Protein isolates contain amino acids ranging from 77.58 – 78.95 %, protein concentrates ranging from 24.27 – 27.71 % and defatted flour ranging from 24.28 – 26.17 %. The amino acid content found in defatted flour, protein concentrate, and protein isolate tends to be higher than the protein content (Table 3).

Table 3. Amino acid composition in defatted flour, protein concentrate and protein isolate in nagara bean and nagara bean tempeh

Amino Acid Type	Amino Acid Concentration (% w/w)					
	Nagara Bean Isolate	Nagara Bean Tempeh Isolate	Nagara Bean Concentrate	Nagara Bean Tempeh Concentrate	Nagara Bean Defatted Flour	Nagara Bean Tempeh Defatted Flour
Alanine	2.53	2.85	0.94	1.23	1.00	1.23
Isoleucine	3.32	3.48	1.14	1.51	1.13	1.36
Leucine	5.31	6.14	1.95	2.60	1.93	2.19
Methionine	1.61	1.89	0.74	1.02	0.73	0.78
Phenylalanine	6.40	6.32	1.50	1.92	1.51	1.71
Tryptophan	0.82	0.85	0.47	0.36	0.39	0.57
Valine	3.73	3.91	1.32	1.71	1.31	1.56
Total	23.72	25.44	8.06	10.35	8.00	9.40
Glycine	2.35	2.42	0.77	1.04	1.00	0.93
Serine	4.10	3.92	1.45	0.21	0.34	0.59
Threonine	5.23	3.34	0.97	1.30	1.09	1.22
Tyrosine	2.67	2.83	0.81	1.11	0.85	0.98
Total	14.35	12.51	4.00	3.66	3.28	3.72
Aspartic Acid	9.23	9.65	2.75	3.37	2.82	3.11
Glutamic Acid	15.70	13.87	4.67	5.12	4.75	4.70
Total	24.93	23.52	7.42	8.49	7.57	7.81
Arginine	2.44	6.15	2.03	2.33	2.30	2.23
Histidine	4.69	3.86	1.23	1.44	1.35	1.45
Lysine	7.45	7.47	1.53	1.44	1.78	1.56
Total	14.58	17.48	4.79	5.21	5.43	5.24
Amino acid total	77.58	78.95	24.27	27.71	24.28	26.17

The amino acids found in defatted flour, protein concentrate, and protein isolate from nagara bean and nagara bean tempeh are mostly polar amino acids, namely amino acids with a negative charge, namely glutamic and aspartic acids. This is the same as what was stated by [14] which states that cowpea in Ethiopia contain also many glutamic acid and aspartic acid

In addition, there are several essential amino acids, such as lysine, phenylalanine, threonine, and leucine, which are also found in abundance in nagara beans (Table 3). Essential amino acids are also found in cowpea (Vigna unguiculata L.walp) in Sudan in the form of defatted flour and protein isolate in greater amounts. However, cowpea in Sudan did not find aspartic acid [15]. In addition, cowpea found in Nigeria is almost the same as the amino acid composition of nagara beans. Most of the amino acids found are glutamic acid and aspartic acid [16]. The amino acid composition of the nagara bean is almost the same as that of the cowpea (Vigna unguiculata L. Walp) found in California. The content of polar amino acids is also more than non-polar amino acids in cowpea [17].

If the nagara beans are made into sprouts, then the number of amino acids is reduced [13]. This is due to the washing process on the nagara bean sprouts, the amino acids which are soluble in water become dissolved together with the water. The types of amino acids found in nagara beans are almost the same as those found in soybeans, that is, there are more polar amino acids than non-polar amino acids as stated by [18].

3.3. Protein Typ

Types of protein based on their molecular weight using the SDS-PAGE method can be seen in Figure 1. Only the nagara bean protein concentrate was identified and the protein was well separated based on its molecular weight. As for nagara bean defatted flour, nagara bean tempeh defatted flour and nagara bean tempeh concentrate cannot separate the protein properly. The protein in defatted nagara flour cannot be separated due to the large amount of carbohydrates, so the protein cannot be separated properly. The protein in the defatted flour and the nagara bean tempeh concentrate did not separate very well, because the nagara bean tempeh protein had experienced the breaking of peptide bonds into amino acids.

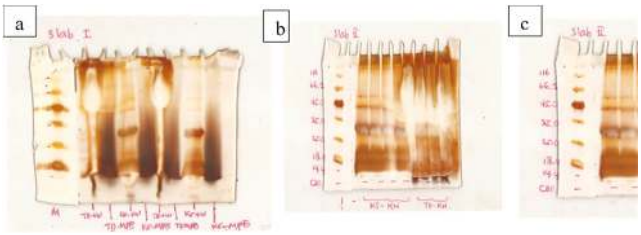

Figure 1. Types of protein in concentrate and defatted nagara flour and nagara bean tempeh. The molecular weight read is 64.90; 50.86; and 34.77 kilodaltons (kDa). a: TD-KN (nagara bean defatted flour), TD-MPE (nagara bean tempeh defatted flour), KS-KN (nagara bean protein concentrate), KS-MPE (nagara bean tempeh protein concentrate); b: TD-KN and KS-KN; c. KS-KN

In the nagara bean protein concentrate, the polypeptides that were mostly found were at a molecular weight of 64.90; 50.86; and 34.77 kilodaltons (kDa). Based on the research of [17], in cowpea (Vigna unguiculata L. Walp) found in California, especially in the globulin fraction, the majority of polypeptides found were with molecular weights of 65, 60, 56 and 50 kDa and the minority of polypeptides found were with molecular weight 42 – 28 kDa. In the albumin fraction, the majority of polypeptides are with molecular weights of 90, 91, 32 and 30. In the glutelin fraction there are several bands with molecular weights of 101, 68, 31 and 29 kDa. As for the prolamin fraction, there are 4 dominant bands, namely 105, 62, 59 and 54 kDa. Based on this, the nagara beans are also thought to contain globulin and albumin.

Most of the protein found in cowpea is globulin. According to [19] Vigna unguiculata bean (L.) Walp. contains 51% globulins, 45% albumins, 3% glutelin, and 1% prolamin. As for [14] stated that the protein content in cowpea in Ethiopia was dominated by the globulin and albumin fractions of 38.4–49.1% and 19.6–22.5%, while the glutelin fraction was 6.4 to 10.4% and prolamin of 1.0–1.14%.

4. Conclusion

Nagara beans in various forms and processes have the potential to produce protein. The amino acid composition is dominated by polar amino acids, especially glutamic acid and aspartic acid. In addition, nagara beans also contain essential amino acids, such as lysine, phenylalanine, threonine and leucine. Most of the protein in nagara beans is globulin and albumin.

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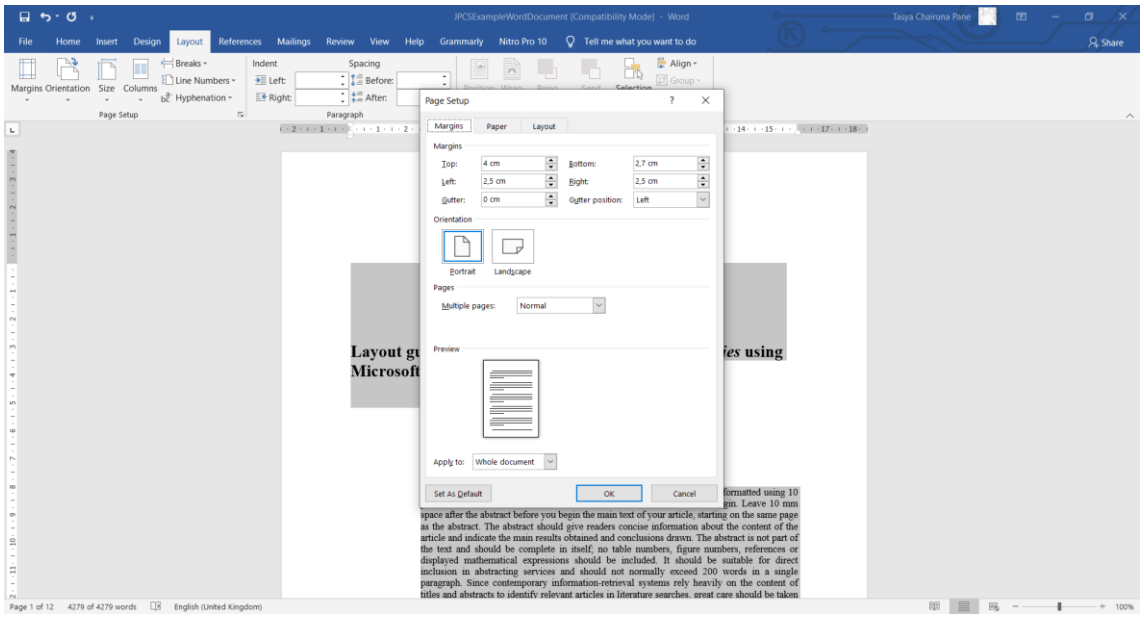

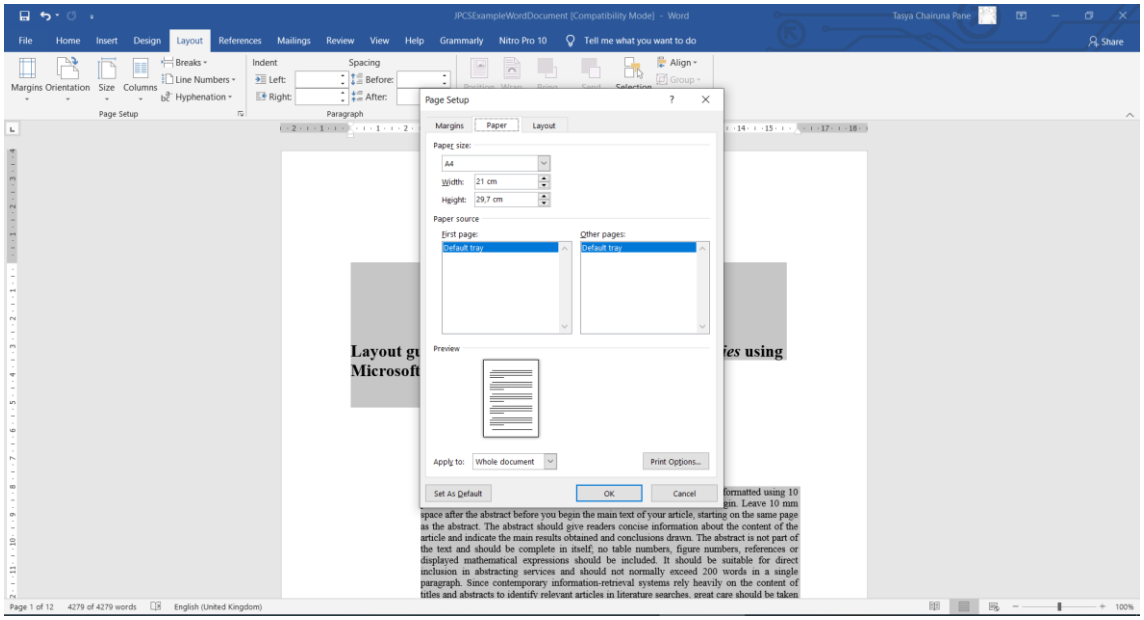

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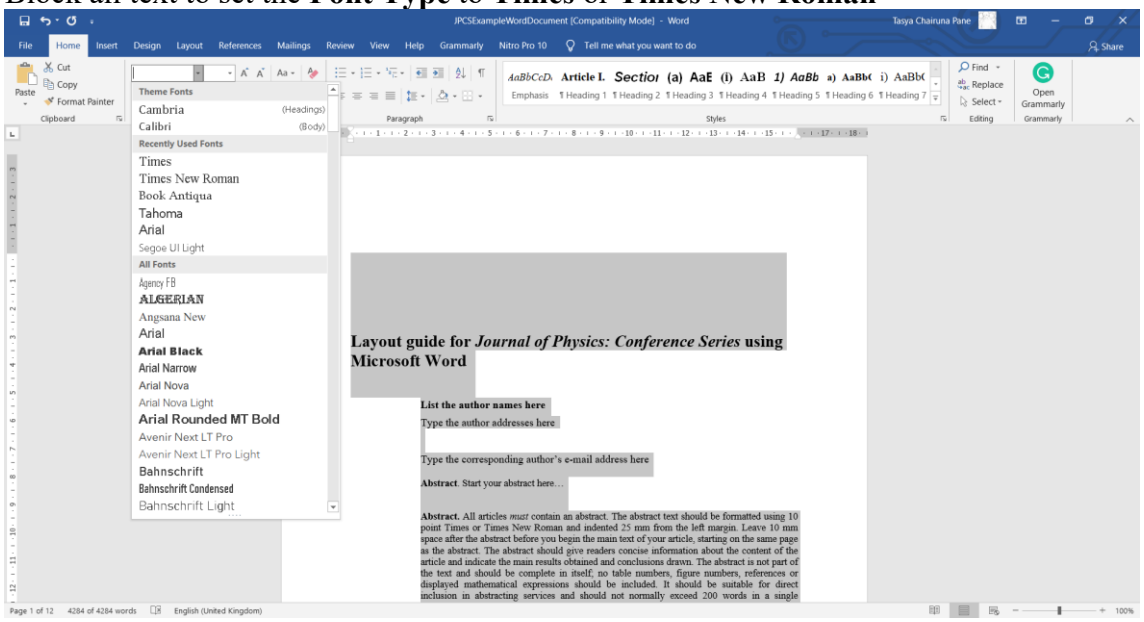
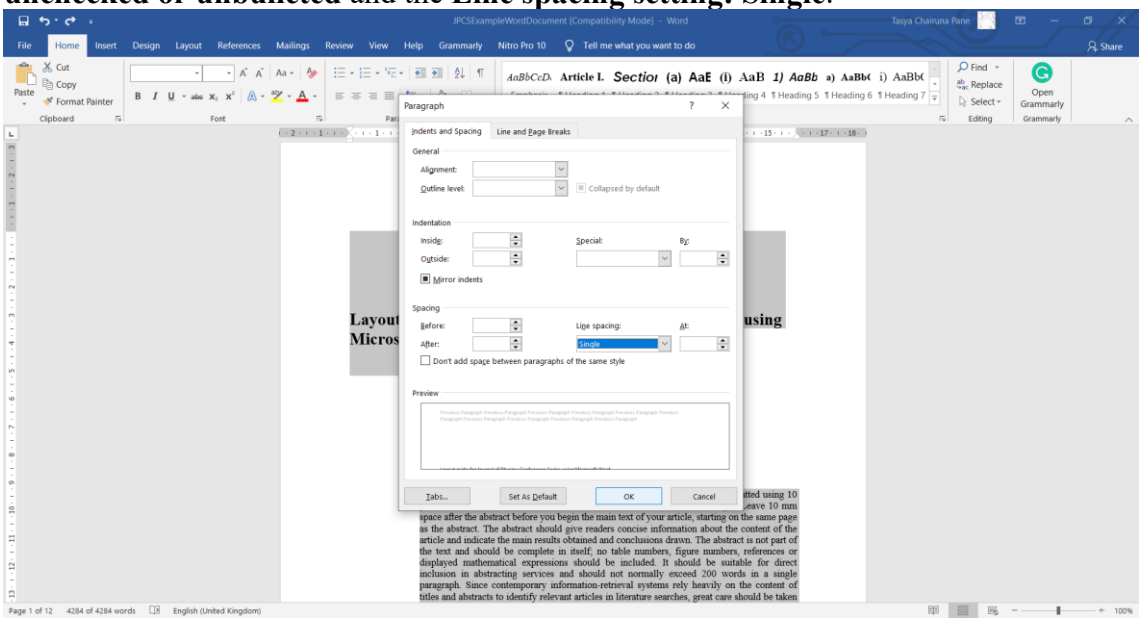


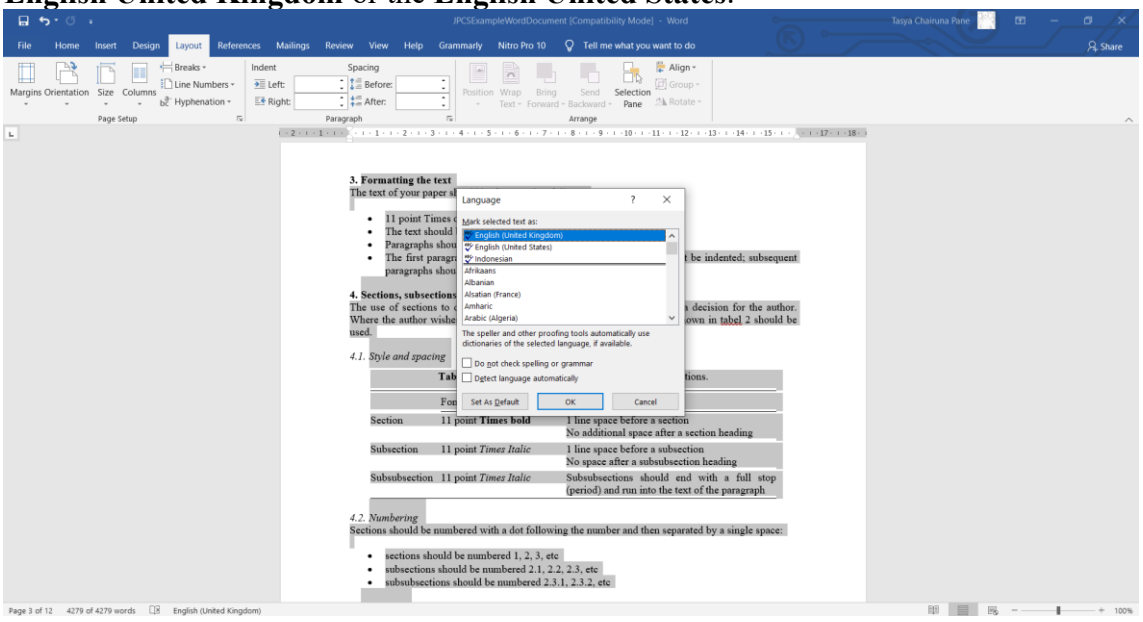
Block seluruh tulisan. Periksa bagian ***Line and Paragraph Spacing****, atur* ***Line Spacing Options*** *dan pastikan* ***Don't add space between paragraphs of the same style tidak tercentang atau tertandai*** *dan* ***pengaturan Line spacing: Single****.*

Block all text. Check the **Line and Paragraph Spacing** section, set the **Line Spacing Options** and make sure **Don't add space between paragraphs of the same style is unchecked or unbulleted** and the **Line spacing setting: Single**.

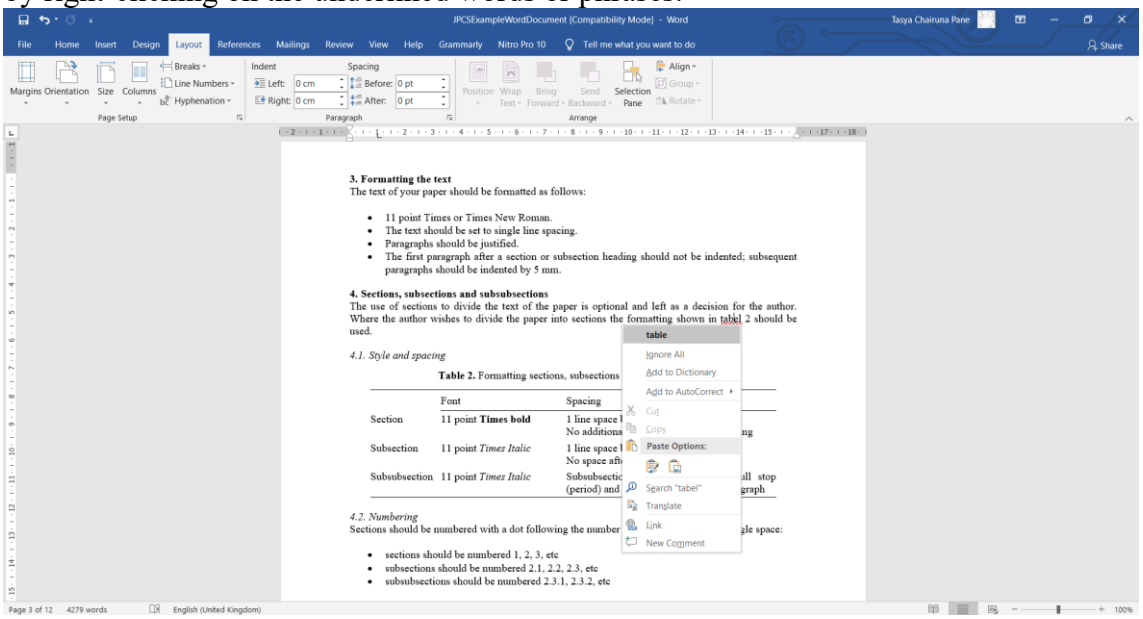


Block seluruh tulisan. Klik bagian jenis Bahasa di bawah, Artikel ditulis dalam ***English United Kingdom*** *atau* ***English United States****.*

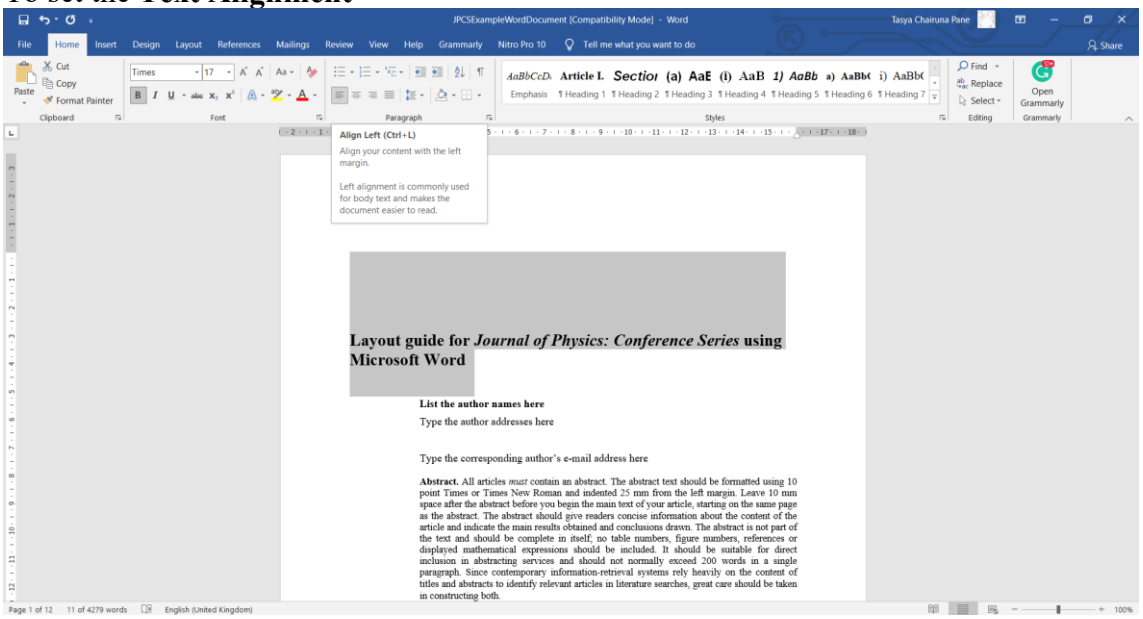
Block all text. Click on the Language type section below, Articles are written in the **English United Kingdom** or the **English United States**.



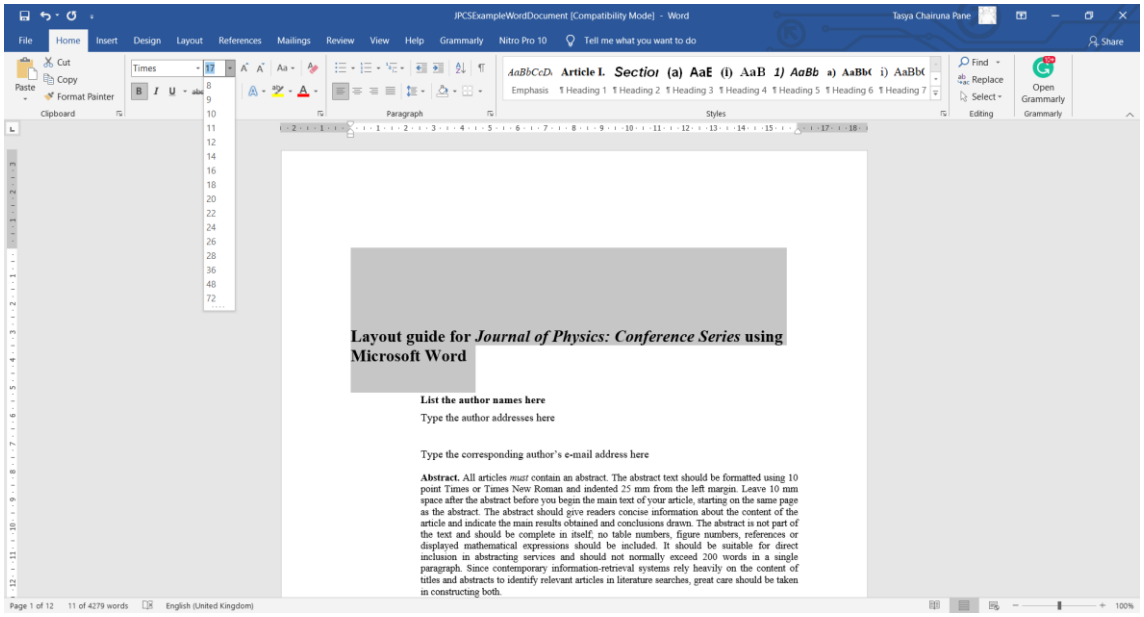
Mohon diperiksa ulang pengetikan kata atau frasa yang bergaris merah atau biru di Word dengan mengklik kanan pada kata atau frasa yang digarisbawahi.
Please double-check the typing of the words or phrases underlined in red or blue in Word by right-clicking on the underlined words or phrases.



*Untuk mengatur **Perataan Teks***
To set the **Text Alignment**

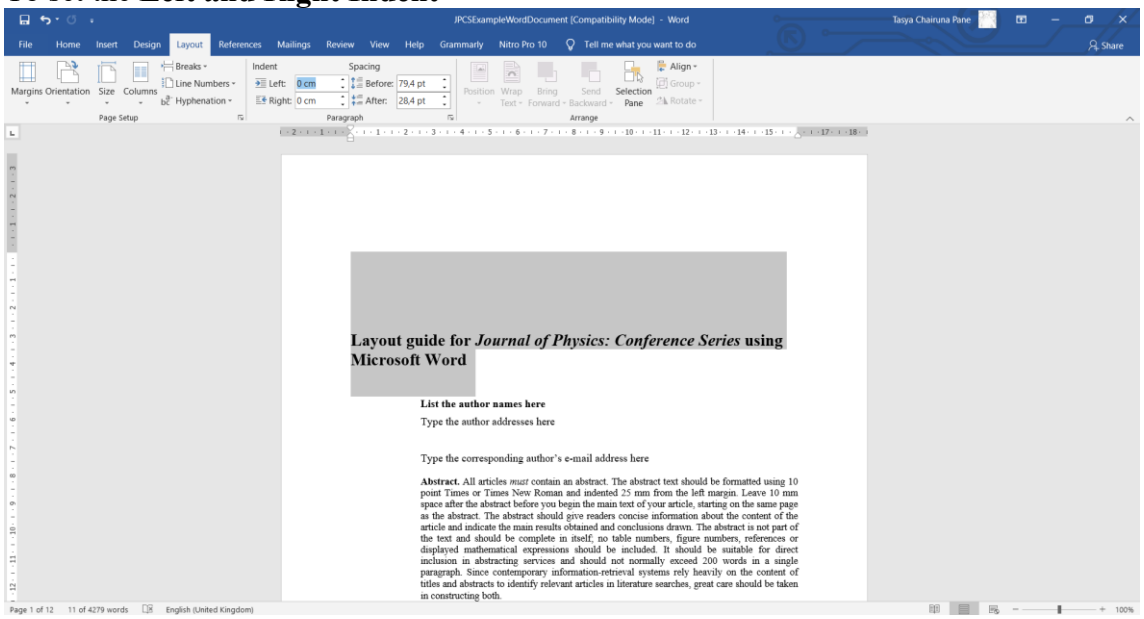


Untuk mengatur ***Font Size***
To set the **Font Size**

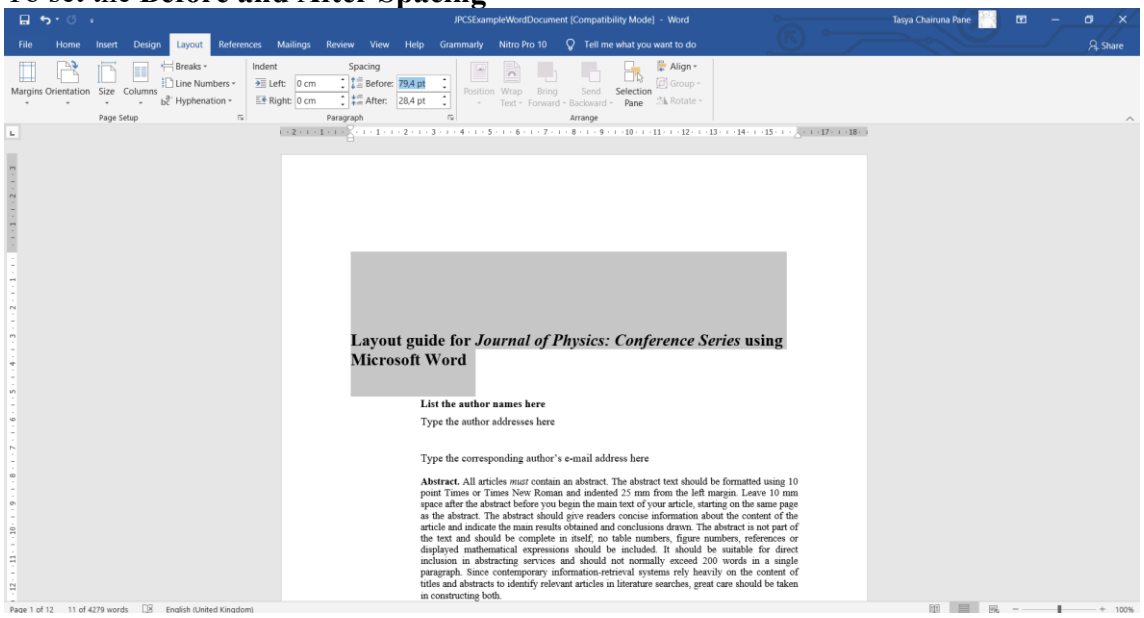


Huruf *pada seluruh isi artikel adalah* ***Times*** *atau* ***Times New Roman dengan Ukuran 11****, kecuali* ***Judul 17****, dan* ***Abstrak 10****.*
The **font** for the entire contents of the article is **Times** or **Times New Roman** with **size 11**, except for the **title 17** and the **abstract 10**.

Untuk mengatur ***Inden Kiri dan Kanan***
To set the **Left and Right Indent**



*Untuk mengatur **Spasi Sebelum dan Sesudah***
To set the **Before and After Spacing**



*Gunakan pengaturan **Spasi Sebelum dan Sesudah** untuk mengatur jarak ke bawah atau ke atas antar bagian daripada memberikan spasi berupa baris kosong tambahan dengan menekan **Enter** berulangkali secara manual.*
Use the **Before and After Spacing** settings to set the downward or upward spacing between sections instead of inserting additional blank lines by pressing **Enter** manually.

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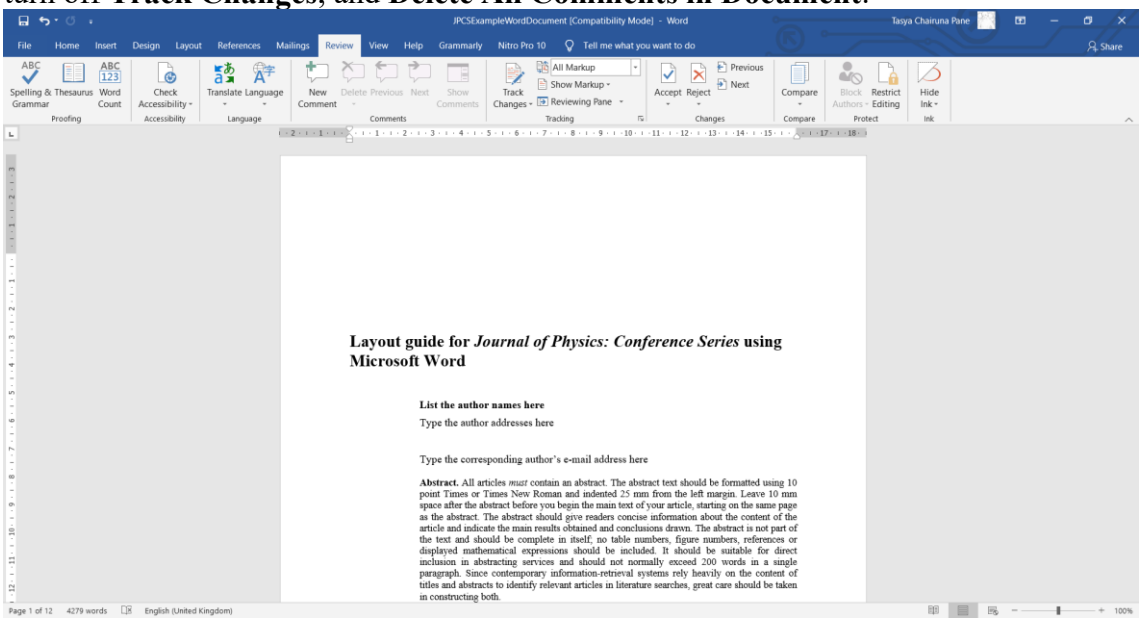

GENERAL COMMENTS
KOMENTAR UMUM

1. Make sure to use a Manuscript's structure which consists of an Introduction, Methods, Results and Discussion, Conclusions, References, and Acknowledgement (optional).
   Pastikan gunakan struktur Manuskrip yang terdiri dari Introduction, Methods, Results and Discussion, Conclusions, References, and Acknowledgement (optional).
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   Lakukan proofreading untuk memperbaik-i kualitas keterbacaan bahasa Inggris dan memperbaiki kesalahan terutama pada aspek grammar dan spelling.
5. Please follow IOP referencing style.
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6. The minimum number of your references is 10 and 80% should be international journals.
   Jumlah minimal referensi adalah 10 item dan 80% harus berupa jurnal internasional.
7. Make sure that all tables and figures have a good readability level.
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8. As this is an international publication, local aspects need to be discussed from a global perspective.

Karena manuskrip ini merupakan publikasi internasional, maka penulis agar membahas isu dari perspektif global.

JUDUL

*Ditulis dalam **bentuk kalimat (Sentence case)**, huruf besar hanya pada awal judul dan awal kata yang membutuhkan huruf besar (seperti nama daerah, nama spesies, dll), bukan besar pada setiap kata (Capitalize each word). **Teks rata kiri (Align text to the left)**, **Ukuran huruf 17**, dengan **setting Indent: Left 0 cm, Right 0 cm**, dan **Spacing: Before 79.4 pt, After 28.4 pt**, tanpa titik di akhirnya.*

Misalnya

Layout guide for *Journal of Physics: Conference Series* using Microsoft Word

TITLE

Written in **sentence form (Sentence case)**, capital letters are only at the beginning of the title and the beginning of words that require capital letters (such as regional names, species names, etc.), not capital letters on each word (Capitalize each word). **Left aligned text (Align text to the left)**, **Font size 17**, with **Indent settings: Left 0 cm, Right 0 cm**, and **Spacing: Before 79.4 pt, After 28.4 pt**, without full stop at the end.

For example

Layout guide for *Journal of Physics: Conference Series* using Microsoft Word

DAFTAR NAMA PENULIS

***Teks rata kiri (Align text to the left)**, **Ukuran huruf 11**, dengan **setting Indent: Left 2.5 cm, Right 0 cm**, dan **Spacing: Before 0 pt, After 5.7 pt**, tanpa titik di akhirnya. **Setelah nama Corresponding author** harus ditandai dengan **bintang (*)**. **Nama depan dan tengah harus disingkat**.*

Misalnya

Tasya Chairuna Pane, Muhammad Khaliqi, R. B. M. Ibrahim Fatoni, and Putri Chandra Ayu harus ditulis **T C Pane, M Khaliqi*, R B M I Fatoni and P C Ayu**

LIST OF AUTHORS' NAMES

Align text to the left (Align text to the left), **Font size 11**, with **Indent settings: Left 2.5 cm, Right 0 cm**, and **Spacing: Before 0 pt, After 5.7 pt**, without full stop at the end. **After the Corresponding author's name** must be marked with an **asterisk (*)**. **First and middle names should be abbreviated**.

For example

Tasya Chairuna Pane, Muhammad Khaliqi, R. B. M. Ibrahim Fatoni, and Putri Chandra Ayu should be written **T C Pane, M Khaliqi*, R B M I Fatoni and P C Ayu**

DAFTAR AFILIASI PENULIS

***Teks rata kiri (Align text to the left)**, **Ukuran huruf 11**, dengan **setting Indent: Left 2.5 cm, Right 0 cm**, dan **Spacing: Before 0 pt, After 0 pt**, dengan titik di akhirnya, khusus untuk **afiliasi yang paling bawah Spacing: Before 0 pt, After 24 pt**. Jika para penulis berasal dari afiliasi yang berbeda atau mencantumkan lebih dari 1 afiliasi, urutan dan penomoran harus berurut dari afiliasi penulis pertama hingga penulis terakhir.*

Misalnya

T C Pane[1,2], M Khaliqi[3]*, R B M I Fatoni[2,4] and P C Ayu[1,3]

[1]Universitas …..
[2]Badan …..
[3]Institut …..
[4]Balai …..

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Contoh:

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Left aligned text (Align text to the left), **Font size 11**, with **Indent settings: Left 2.5 cm, Right 0 cm**, and **Spacing: Before 0 pt, After 0 pt**, with full stop at the end, specifically for the **lastest (very bottom) affiliation, Spacing: Before 0 pt, After 24 pt**. If the authors come from different affiliations or include more than 1 affiliation, the order and numbering must be sequential from the first author's affiliation to the last author.

For example

T C Pane[1,2], M Khaliqi[3]*, R B M I Fatoni[2,4] and P C Ayu[1,3]

[1]Universitas …..
[2]Badan …..
[3]Institut …..
[4]Balai …..

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Example:

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E-MAIL CORRESPONDING AUTHOR
***Teks rata kiri (Align text to the left)**, **Ukuran huruf 11**, dengan **setting Indent: Left 2.5 cm, Right 0 cm**, dan **Spacing: Before 0 pt, After 12 pt**, tanpa titik di akhirnya. **Sebelum alamat E-mail Corresponding author** harus ditandai dengan **bintang (*)**.*
Misalnya
E-mail: *muhammadkhaliqi@usu.ac.id

CORRESPONDING AUTHOR'S E-MAIL
Align text to the left (Align text to the left), **Font size 11**, with **Indent settings: Left 2.5 cm, Right 0 cm**, and **Spacing: Before 0 pt, After 12 pt**, without full stop at the end. **Before the Corresponding author's E-mail address** must be marked with an **asterisk (*)**.
For example
E-mail: *muhammadkhaliqi@usu.ac.id

ABSTRAK
*Tulisan **Abstract** ditulis **Tebal (Bold)** dan diakhiri dengan **titik**. Kemudian setelah titik langsung disambung dengan isi abstrak (**tidak ditulis Tebal) maksimal 200 kata**, dan ditulis **tanpa menambahkan kata kunci**. **Teks rata kanan-kiri (Justify)**, **Ukuran huruf 10**, dengan **setting Indent: Left 2.5 cm, Right 0 cm**, dan **Spacing: Before 0 pt, After 22.7 pt**.*
Misalnya
Abstract. All articles must contain an abstract……

ABSTRACT
Abstract text is written in **Bold** and ended with a **full stop**. Then after the full stop is directly followed with abstract content (**not written in bold**) a **maximum of 200 words**, and written **without adding keywords**. **Align text to right-left (Justify)**, **Font size 10**, with **Indent settings: Left 2.5 cm, Right 0 cm**, and **Spacing: Before 0 pt, After 22.7 pt**.
For example
Abstract. All articles must contain an abstract……

JUDUL BAGIAN DAN PARAGRAF
Artikel terdiri dari ***judul bagian*** *sebagai berikut:*
1. Introduction
2. Materials and methods
3. Results and discussion
4. Conclusions and suggestions
References
Acknowledgements *(hanya jika dibutuhkan ucapan terima kasih)*

Selain ***judul bagian****, artikel boleh memiliki* ***sub bagian*** *dan* ***sub sub bagian****.*
Seluruh ***judul bagian, sub bagian, dan sub sub bagian*** *ditulis dalam* ***bentuk kalimat (Sentence case)****, dengan huruf besar hanya pada awal judul dan awal kata yang membutuhkan huruf besar (seperti nama daerah, nama spesies, dll), bukan besar pada setiap kata (Capitalize each word).* ***Teks rata kanan-kiri (Justify)****,* ***Ukuran huruf 11****, dengan* ***setting Indent: Left 0 cm, Right 0 cm****, dan* ***Spacing: Before 12 pt, After 0 pt****.*

Paragraf pertama *setelah* ***judul bagian*** *dan* ***sub bagian****, baris pertamanya tidak menjorok masuk ke dalam.* ***Seluruh paragraf setelah paragraf pertama (paragraph kedua dan seterusnya)*** *harus ditulis dengan baris pertama* ***menjorok masuk ke dalam (first line indent) 2 ketuk (0.5 cm)****.* ***Teks rata kanan-kiri (Justify)****,* ***Ukuran huruf seluruh teks isi paragraph 11****, dengan* ***setting Indent: Left 0 cm, Right 0 cm****, dan* ***Spacing: Before 0 pt, After 0 pt****.*

Judul bagian *ditulis dengan* ***Tebal (Bold)****, antara* ***nomor judul bagian*** *dengan* ***judul bagian masuk 2 ketuk (0.5 cm)****, tanpa titik di akhirnya.* ***Isi paragraf*** *ditulis* ***dibawah judul bagian****.*
Contoh:
1. Introduction
The 1st paragraph text……
The 2nd paragraph text……

Judul sub bagian *ditulis dengan* ***Miring (Italic)****, antara* ***nomor judul sub bagian*** *dengan* ***judul sub bagian masuk 3 ketuk (0.75 cm)****, tanpa titik di akhirnya.* ***Isi paragraf*** *ditulis* ***dibawah judul sub bagian****.*
Contoh:
1.1. Introduction
The 1st paragraph text……
The 2nd paragraph text……

Judul sub sub bagian *ditulis dengan* ***Miring (Italic****), antara* ***nomor judul sub sub bagian*** *dengan* ***judul sub sub bagian masuk 4 ketuk (1 cm)*** *dan diakhiri dengan titik. Kemudian setelah titik langsung* ***disambung dengan isi paragraf*** *(isi paragraph* ***tidak ditulis Miring****).*
Contoh:
1.1.1. Introduction. The 1st paragraph text follows on from the subsubsection titles but should not be in italic.
The 2nd paragraph text……

SECTION TITLES AND PARAGRAPH

The article consists of the following **section titles**:

1. Introduction
2. Materials and methods
3. Results and discussion
4. Conclusions and suggestions
References
Acknowledgements (only if acknowledgements are needed)

In addition to **section** titles, articles may have **sub-sections** and **sub-sub-sections**.
All **section**, **sub-section**, and **sub-sub-section titles** are written in **sentence form (Sentence case)**, with capital letters only at the beginning of the title and the beginning of words that require capital letters (such as area names, species names, etc.), not capital letters on each word (Capitalize each word). **Align text to right-left (Justify)**, **Font size 11**, **with Indent settings: Left 0 cm, Right 0 cm**, and **Spacing: Before 12 pt, After 0 pt**.

The **first paragraph** after the **section** and **sub-section titles**, the first line is not indented. The **rest paragraphs after the first paragraph** (**second paragraph and so on**) must be written with the **first line indented (first line indent) 2 taps (0.5 cm)**. **Align text to right-left (Justify)**, the **size of the entire text in paragraph 11**, with the **Indent setting: Left 0 cm, Right 0 cm**, and **Spacing: Before 0 pt, After 0 pt**.

Section titles are written in **Bold**, between the **number of the section title** and the **section title click 2 taps (0.5 cm indent)**, without full stop at the end. The **contents of the paragraph** are written **below the section titles**.
Example:

1. Introduction

The 1st paragraph text……
The 2nd paragraph text……

Sub-section titles are written in **Italic**, between the **number of the sub-section title** and the **sub-section title click 3 taps (0.75 cm indent)**, without full stop at the end. **The contents of the paragraph** are written **under the sub-section titles**.
Example:

1.1. Introduction

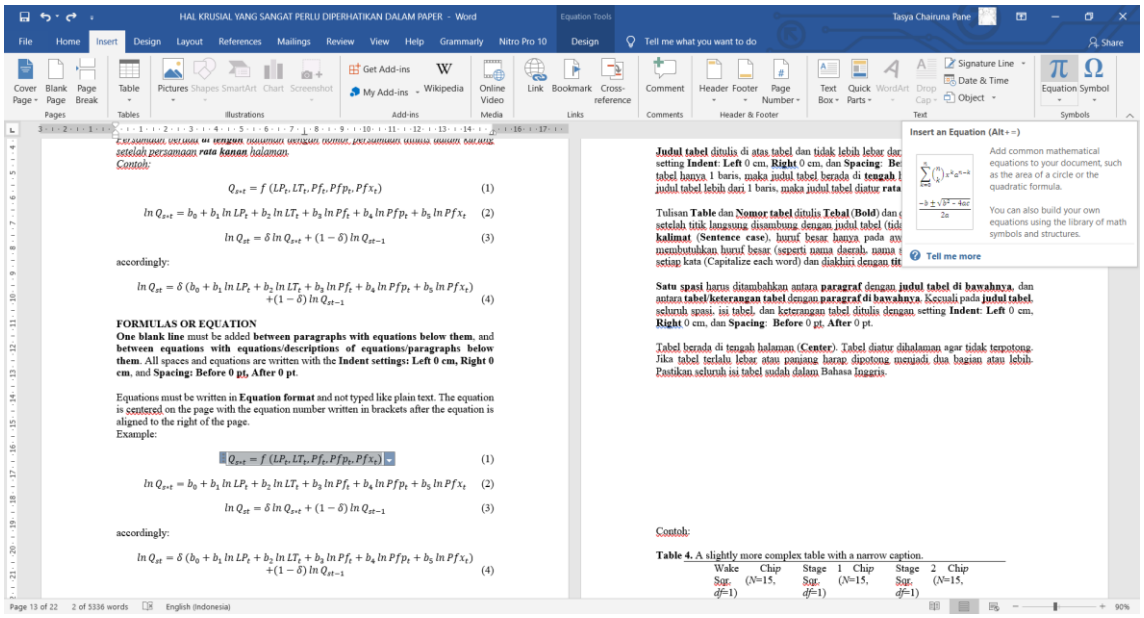
The 1st paragraph text……
The 2nd paragraph text……

The **sub-sub-section titles** are written in **Italic**, between the **numbers of the sub-sub-section title** and the **sub-sub-section title click 4 taps (1 cm indent)** and end with a full stop. Then after the full stop **directly followed with the contents of the paragraph** (**not written in Italic**).
Example:

1.1.1. Introduction. The 1st paragraph text follows on from the subsubsection titles but should not be in italic.
The 2nd paragraph text……

RUMUS ATAU PERSAMAAN

Satu baris kosong *harus ditambahkan* ***antara paragraf dengan persamaan di bawahnya****, dan* ***antara persamaan dengan persamaan/keterangan persamaan/paragraf di bawahnya****. Seluruh spasi dan persamaan ditulis dengan* ***setting Indent: Left 0 cm, Right 0 cm****, dan* ***Spacing: Before 0 pt, After 0 pt****.*



Persamaan harus ditulis dalam ***format Equation*** *dan tidak diketik seperti teks biasa.* ***Persamaan berada di tengah*** *halaman dengan* ***nomor persamaan ditulis dalam kurung setelah persamaan rata kanan*** *halaman.*

Contoh:

The before paragraph text……

$$Q_{s*t} = f\ (LP_t, LT_t, Pf_t, Pfp_t, Pfx_t) \tag{1}$$

$$ln\ Q_{s*t} = b_0 + b_1\ ln\ LP_t + b_2\ ln\ LT_t + b_3\ ln\ Pf_t + b_4\ ln\ Pfp_t + b_5\ ln\ Pfx_t \tag{2}$$

$$ln\ Q_{st} = \delta\ ln\ Q_{s*t} + (1-\delta)\ ln\ Q_{st-1} \tag{3}$$

accordingly:

$$ln\ Q_{st} = \delta\ (b_0 + b_1\ ln\ LP_t + b_2\ ln\ LT_t + b_3\ ln\ Pf_t + b_4\ ln\ Pfp_t + b_5\ ln\ Pfx_t) + (1-\delta)\ ln\ Q_{st-1} \tag{4}$$

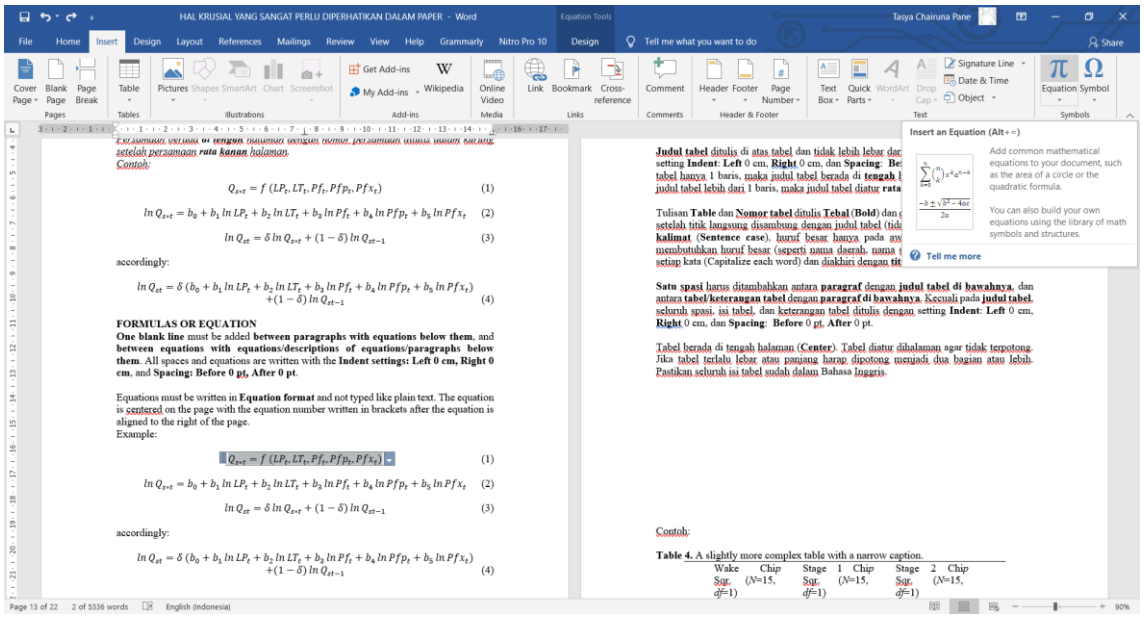
Descriptions:

Descriptions of the formulas ……

The after paragraph text……

FORMULAS OR EQUATION

One blank line must be added **between paragraphs with equations below them**, and **between equations with equations/descriptions of equations/paragraphs below them**. All spaces and equations are written with the **Indent settings: Left 0 cm, Right 0 cm**, and **Spacing: Before 0 pt, After 0 pt**.



Equations must be written in **Equation format** and not typed like plain text. The **equation is centred** on the page with the **equation number written in brackets after the equation is aligned to the right** of the page.

Example:

The before paragraph text……

$$Q_{s*t} = f\ (LP_t, LT_t, Pf_t, Pfp_t, Pfx_t) \tag{1}$$

$$ln\ Q_{s*t} = b_0 + b_1\ ln\ LP_t + b_2\ ln\ LT_t + b_3\ ln\ Pf_t + b_4\ ln\ Pfp_t + b_5\ ln\ Pfx_t \tag{2}$$

$$ln\ Q_{st} = \delta\ ln\ Q_{s*t} + (1 - \delta)\ ln\ Q_{st-1} \tag{3}$$

accordingly:

$$ln\ Q_{st} = \delta\ (b_0 + b_1\ ln\ LP_t + b_2\ ln\ LT_t + b_3\ ln\ Pf_t + b_4\ ln\ Pfp_t + b_5\ ln\ Pfx_t) + (1 - \delta)\ ln\ Q_{st-1} \tag{4}$$

Descriptions:

Descriptions of the formulas ……

The after paragraph text……

PENULISAN ANGKA DAN MATA UANG

Seluruh angka harus ditulis dalam format internasional dengan koma (,) sebagai pemisah antar ribuan dan titik (.) sebagai pemisah ke desimal.

Contoh: 1,000.5 (seribu koma lima)

Perlu dicatat bahwa seluruh mata uang harus ditulis dalam istilah internasional, misalnya Rupiah (Rp) harus ditulis Indonesian Rupiah (IDR).

WRITING NUMBERS AND CURRENCY

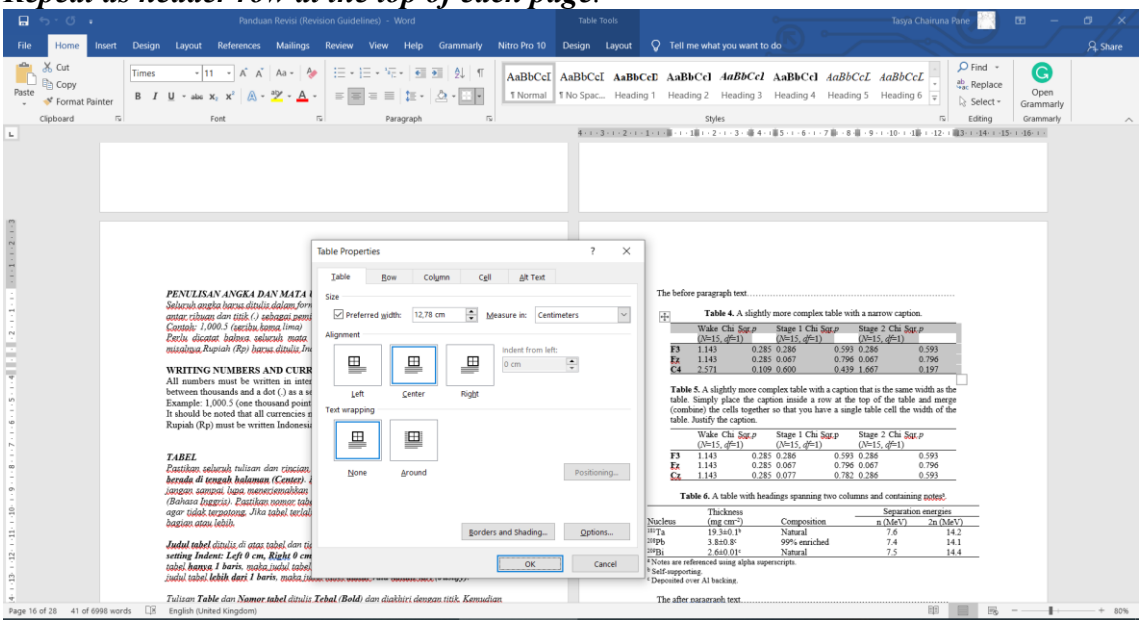
All numbers must be written in international format with a comma (,) as a separator between thousands and a dot (.) as a separator for decimals.

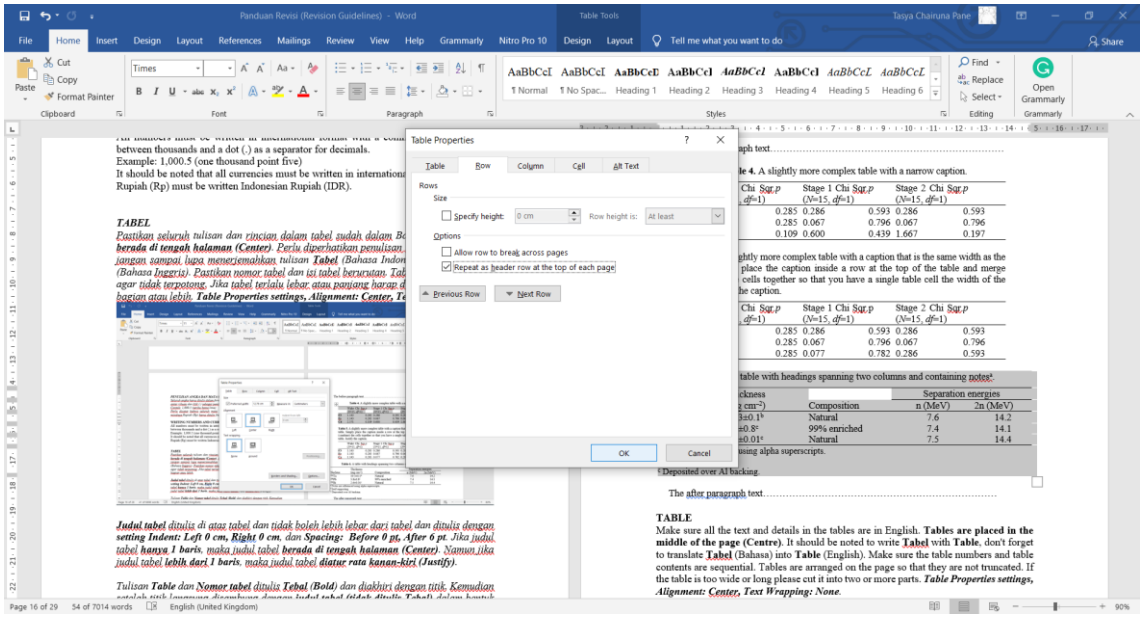
Example: 1,000.5 (one thousand point five)

It should be noted that all currencies must be written in international terms, for example Rupiah (Rp) must be written Indonesian Rupiah (IDR).

TABEL

Pastikan seluruh tulisan dan rincian dalam tabel sudah dalam Bahasa Inggris. ***Tabel berada di tengah halaman (Center)****. Perlu diperhatikan penulisan* ***Tabel*** *dengan* ***Table****, jangan sampai lupa menerjemahkan tulisan* ***Tabel*** *(Bahasa Indonesia) menjadi* ***Table*** *(Bahasa Inggris). Pastikan nomor tabel dan isi tabel berurutan. Tabel diatur di halaman agar tidak terpotong. Jika tabel terlalu lebar atau panjang harap dipotong menjadi dua bagian atau lebih.* ***Table Properties settings, Alignment: Center, Text Wrapping: None,*** *kemudian klik* ***Row, jangan centang Allow row to break across pages*** *dan* ***Centang Repeat as header row at the top of each page****.*





Judul tabel *ditulis di atas tabel dan tidak boleh lebih lebar dari tabel dan ditulis dengan* ***setting Indent: Left 0 cm, Right 0 cm****, dan* ***Spacing: Before 0 pt, After 6 pt****. Jika judul tabel* ***hanya 1 baris****, maka judul tabel* ***berada di tengah halaman (Center)****. Namun jika judul tabel* ***lebih dari 1 baris****, maka judul tabel* ***diatur rata kanan-kiri (Justify)****.*

Tulisan ***Table*** *dan* ***Nomor tabel*** *ditulis* ***Tebal (Bold)*** *dan diakhiri dengan titik. Kemudian setelah titik langsung disambung dengan* ***judul tabel (tidak ditulis Tebal)*** *dalam bentuk* ***kalimat (Sentence case)****, dengan huruf besar hanya pada awal judul dan awal kata yang membutuhkan huruf besar (seperti nama daerah, nama spesies, dll), bukan besar pada setiap kata (Capitalize each word), dan diakhiri dengan* ***titik*** *(.). Jika ada* ***keterangan table****,* ***Ukuran hurufnya 10 dan ditempatkan di bawah tabel****.*

Satu baris kosong *harus ditambahkan antara* ***paragraf*** *dengan* ***judul tabel di bawahnya****, dan antara* ***tabel/keterangan tabel*** *dengan* ***paragraf di bawahnya****.* ***Kecuali pada judul tabel, seluruh isi tabel, dan keterangan tabel*** *ditulis dengan* ***setting Indent: Left 0 cm, Right 0 cm****, dan* ***Spacing: Before 0 pt, After 0 pt****.*

Contoh:

The before paragraph text……

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

	Wake Chi Sqr.*p* (*N*=15, *df*=1)		Stage 1 Chi Sqr.*p* (*N*=15, *df*=1)		Stage 2 Chi Sqr.*p* (*N*=15, *df*=1)	
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.*p* (*N*=15, *df*=1)		Stage 1 Chi Sqr.p (*N*=15, *df*=1)		Stage 2 Chi Sqr.*p* (*N*=15, *df*=1)	
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

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

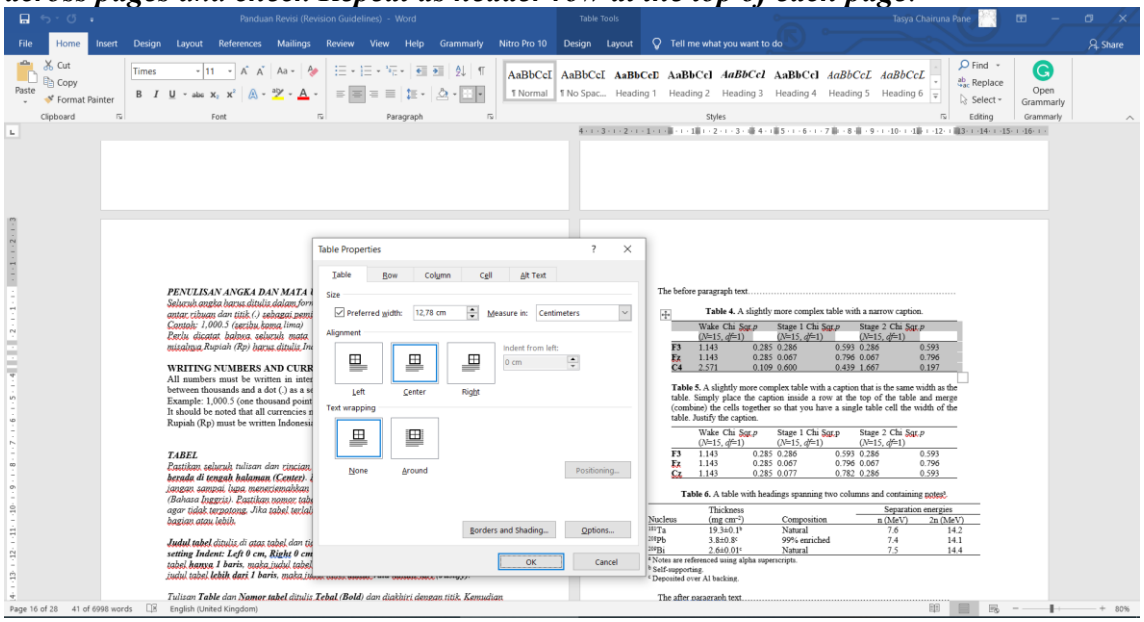
Nucleus	Thickness (mg cm^{-2})	Composition	Separation energies	
			n (MeV)	2n (MeV)
^{181}Ta	19.3±0.1[b]	Natural	7.6	14.2
^{208}Pb	3.8±0.8[c]	99% enriched	7.4	14.1
^{209}Bi	2.6±0.01[c]	Natural	7.5	14.4

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

The after paragraph text……

TABLE

Make sure all the text and details in the tables are in English. **Tables are placed in the middle of the page (Centre)**. It should be noted to write **Tabel** with **Table**, don't forget to translate **Tabel** (Bahasa) into **Table** (English). Make sure the table numbers and table contents are sequential. Tables are arranged on the page so that they are not truncated. If the table is too wide or long please cut it into two or more parts. ***Table Properties settings, Alignment: Center, Text Wrapping: None,*** *then click* ***Row, uncheck Allow row to break across pages*** *and* ***check Repeat as header row at the top of each page****.*



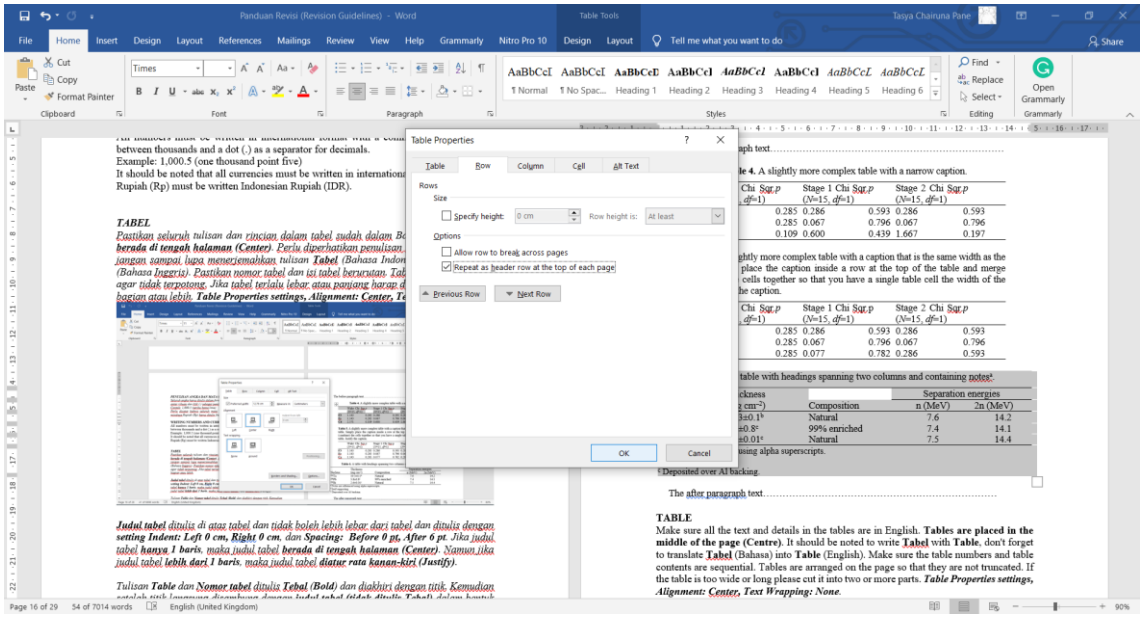


Table titles are written above the table and cannot be wider than the table and are written with **Indent settings: Left 0 cm, Right 0 cm**, and **Spacing: Before 0 pt, After 6 pt**. If the table title is **only 1 line**, then the table title is **in the middle of the page (Centre)**. However, if the table title is **more than 1 line**, then the table title is **aligned to right-left (Justify)**.

Table text and **table numbers** are written in **Bold** and ended with a full stop. Then after the full stop is directly followed with the **table title (not written in Bold)** in a **sentence form (Sentence case)**, with capital letters only at the beginning of the title and the beginning of words that require capital letters (such as area names, species names, etc.), not capital letters on each word (Capitalize each word), and ended with a **full stop (.)**. If there are **table descriptions**, the **font size is 10 and placed below the table**.

One blank line must be added between the **paragraph** with the **table title below it**, and between the **table/table description** and the **paragraph below it**. **Except for table titles, all table contents and table descriptions** are written with **Indent settings: Left 0 cm, Right 0 cm**, and **Spacing: Before 0 pt, After 0 pt**.

Example:

The before paragraph text……

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

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F3	1.143	0.285	0.286	0.593	0.286	0.593
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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.*p* (*N*=15, *df*=1)		Stage 1 Chi Sqr.p (*N*=15, *df*=1)		Stage 2 Chi Sqr.*p* (*N*=15, *df*=1)	
F3	1.143	0.285	0.286	0.593	0.286	0.593
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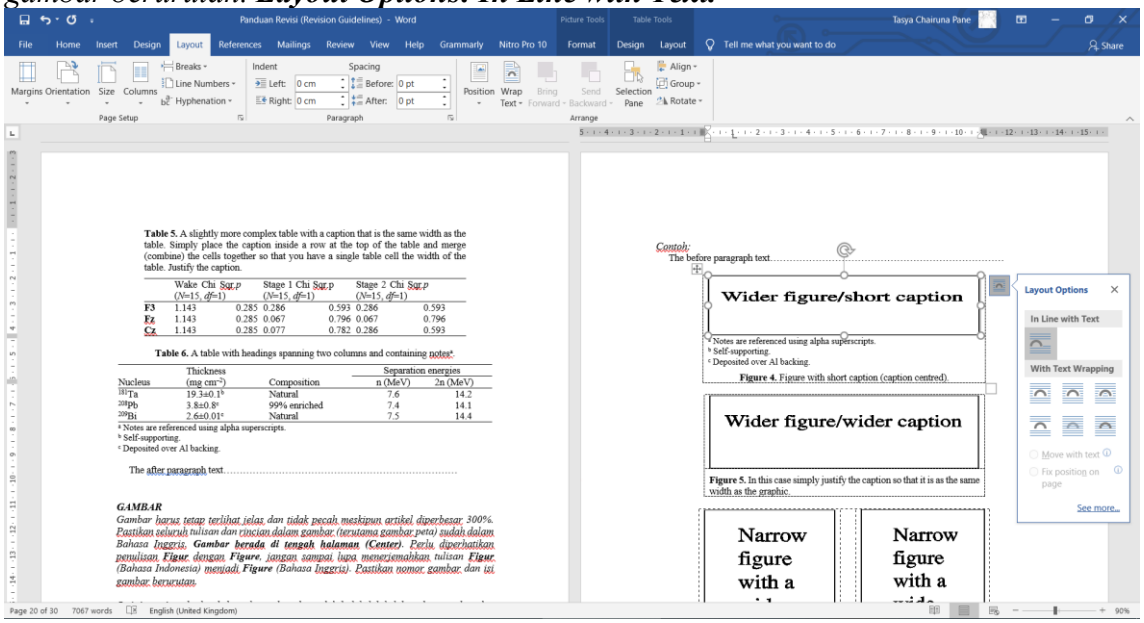
The after paragraph text……

GAMBAR

Gambar harus tetap terlihat jelas dan tidak pecah meskipun artikel diperbesar 300%. Pastikan seluruh tulisan dan rincian dalam gambar (terutama gambar peta) sudah dalam Bahasa Inggris. ***Gambar berada di tengah halaman (Center)****. Perlu diperhatikan penulisan* ***Figur*** *dengan* ***Figure****, jangan sampai lupa menerjemahkan tulisan* ***Figur*** *(Bahasa Indonesia) menjadi* ***Figure*** *(Bahasa Inggris). Pastikan nomor gambar dan isi gambar berurutan.* ***Layout Options: In Line with Text.***



Judul gambar *ditulis di bawah gambar dan tidak boleh lebih lebar dari gambar dan ditulis dengan* ***setting Indent: Left 0 cm, Right 0 cm****, dan* ***Spacing: Before 6 pt, After 0 pt****. Jika judul gambar hanya* ***1 baris****, maka judul gambar berada* ***di tengah halaman (Center)****. Namun jika judul gambar* ***lebih dari 1 baris****, maka judul gambar* ***diatur rata kanan-kiri (Justify)****.*

Tulisan ***Figure*** *dan* ***Nomor gambar*** *ditulis* ***Tebal (Bold)*** *dan diakhiri dengan titik. Kemudian setelah titik langsung disambung dengan* ***judul gambar (tidak ditulis Tebal)*** *dalam bentuk* ***kalimat (Sentence case)****, dengan huruf besar hanya pada awal judul dan awal kata yang membutuhkan huruf besar (seperti nama daerah, nama spesies, dll), bukan besar pada setiap kata (Capitalize each word), dan diakhiri dengan* ***titik (.)****. Jika ada* ***keterangan gambar****,* ***Ukuran hurufnya 10 dan ditempatkan antara gambar dan judul gambar****.*

Satu baris kosong *harus ditambahkan antara* ***paragraph*** *dengan* ***gambar di bawahnya****, dan antara* ***judul gambar*** *dengan* ***paragraph di bawahnya****. Kecuali pada* ***judul gambar****,* ***seluruh gambar, dan keterangan gambar*** *ditulis dengan* ***setting Indent: Left 0 cm, Right 0 cm****, dan* ***Spacing: Before 0 pt, After 0 pt****.*

Contoh:

The before paragraph text……

[a] Notes are referenced using alpha superscripts.
[b] Self-supporting.
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Figure 4. Figure with short caption (caption centred).

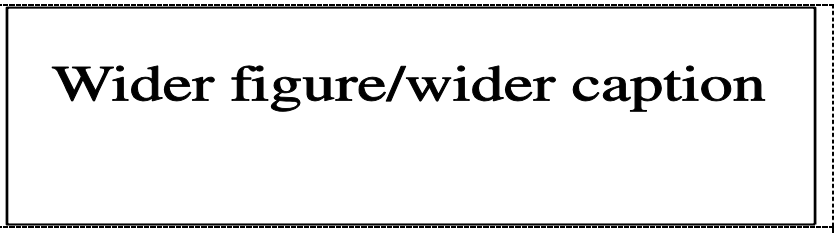

Figure 5. In this case simply justify the caption so that it is as the same width as the graphic.

Narrow figure with a wide caption.		Narrow figure with a wide caption.
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.

The after paragraph text……

FIGURE

Figures must remain clear and unbroken even if the article is enlarged to 300%. Make sure all the text and details in the figures (especially map figures) are in English. **Figures are placed in the middle of the page (Centre)**. It should be noted to write **Figur** with **Figure**, don't forget to translate **Figur** (Bahasa) into **Figure** (English). Make sure the figure numbers and figure contents are sequential. ***Layout Options: In Line with Text.***

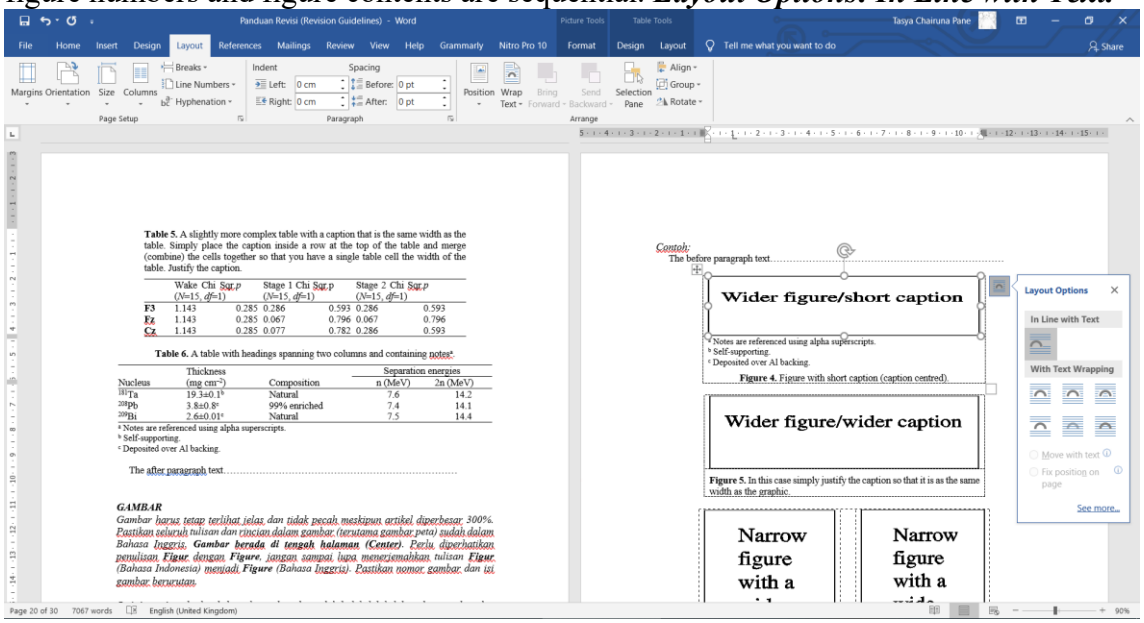

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Figure text and **figure numbers** are written in **Bold** and ended with a full stop. Then after the full stop is directly followed with the **figure title (not written in Bold)** in a **sentence form (Sentence case)**, with capital letters only at the beginning of the title and the beginning of words that require capital letters (such as area names, species names, etc.), not capital letters on each word (Capitalize each word), and ended with a **full stop (.)**. If there are **figure descriptions**, the **font size is 10 and placed between the figure and the figure title**.

One blank line must be added between the **paragraph** with the **figure below it**, and between the **figure title** and the **paragraph below it**. **Except for figure titles, all figures and figure descriptions** are written with **Indent settings: Left 0 cm, Right 0 cm**, and **Spacing: Before 0 pt, After 0 pt**.

Example:

The before paragraph text……

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[c] Deposited over Al backing.

Figure 4. Figure with short caption (caption centred).

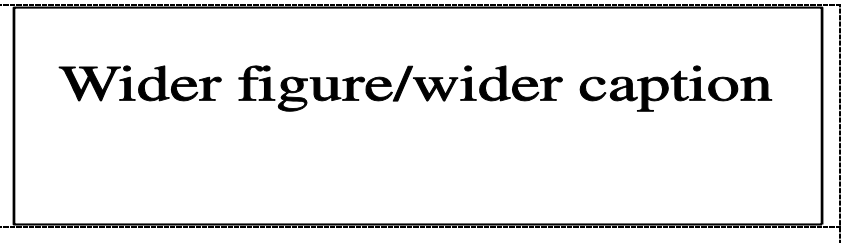

Figure 5. In this case simply justify the caption so that it is as the same width as the graphic.

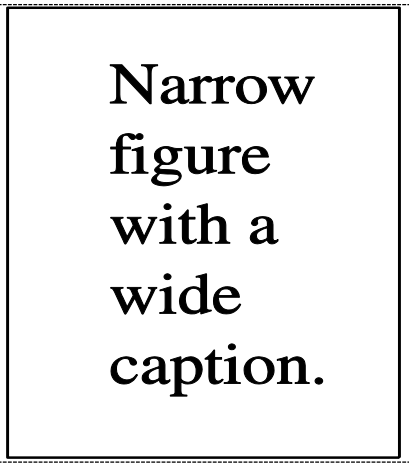

Figure 6. These two figures have been placed side-by-side to save space. Justify the caption.

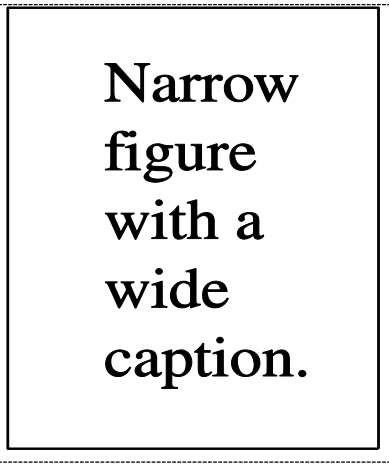

Figure 7. These two figures have been placed side-by-side to save space. Justify the caption.

The after paragraph text……

KESIMPULAN DAN SARAN

*Kesimpulan dan saran harus ditulis dalam **bentuk paragraf** dan bukan dalam bentuk poin.*

CONCLUSIONS AND SUGGESTIONS

Conclusions and suggestions should be written in **paragraph form** and not in bullet points.

REFERENSI

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Contoh menulis referensi dalam paragraf:
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Examples of writing references in paragraphs:
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3rd paragraph [4-10].
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Lunneborg CE 2005 Jonckheere – Terpstra Test *Encyclopedia of Statistics in Behavioral Science* (John Wiley & Sons, Ltd.) p 252
Soesilowati ES 2009 *Peluang Usaha Produk Halal di Pasar Global: Perilaku Konsumen Muslim dalam Konsumsi Makanan Halal [Business Opportunities for Halal Products in Global Markets: Muslim Consumer Behaviors in Halal Food Consumption]* (Jakarta, Indonesia: Pusat Penelitian Ekonomi, Lembaga Ilmu Pengetahuan Indonesia [Centre for Economic Research, Indonesian Institute of Sciences]) pp 1–164
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Pujiyanto 2017 *BPJPH Diresmikan, Menag: Peran MUI Tetap Penting [BPJPH Officially Opened, Minister of Religious Affairs: MUI's Role is Still Important]* (Kementerian Agama Republik Indonesia [Minister of Religious Affairs of the Republic of Indonesia]) Available from: https://kemenag.go.id/berita/read/505865/bpjph-diresmikan--menag--peran-mui-tetap-penting

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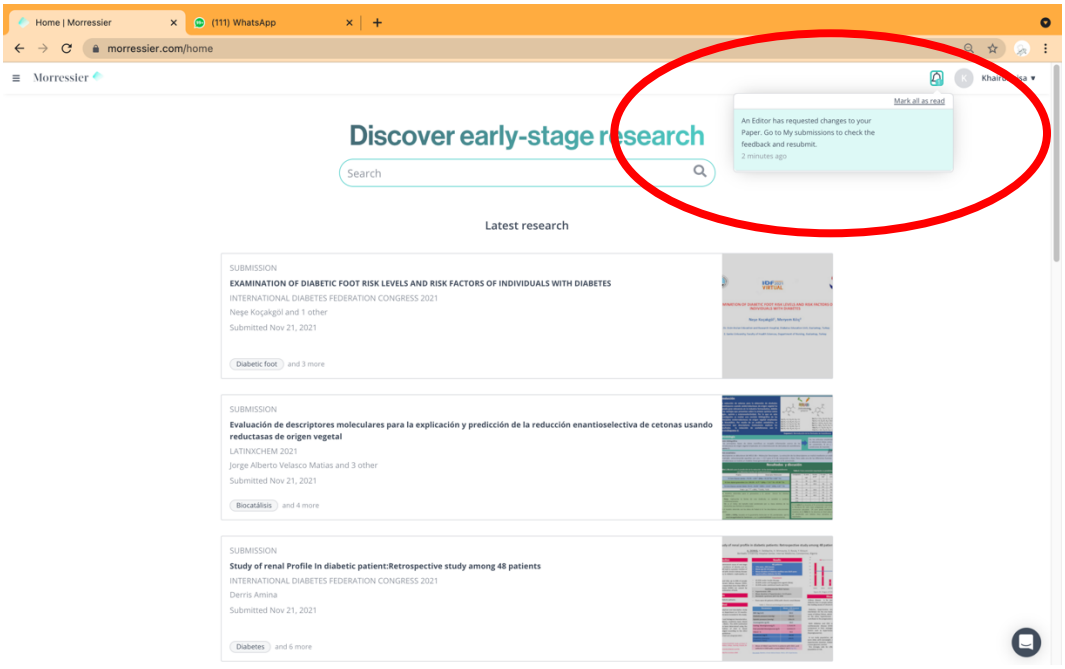

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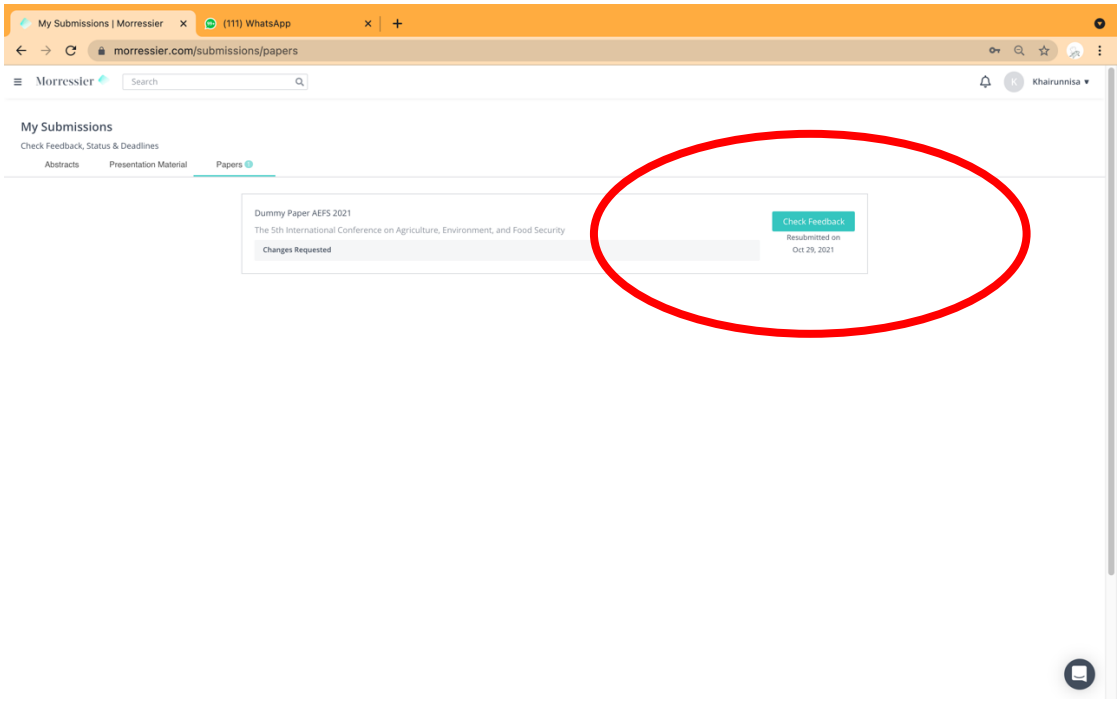

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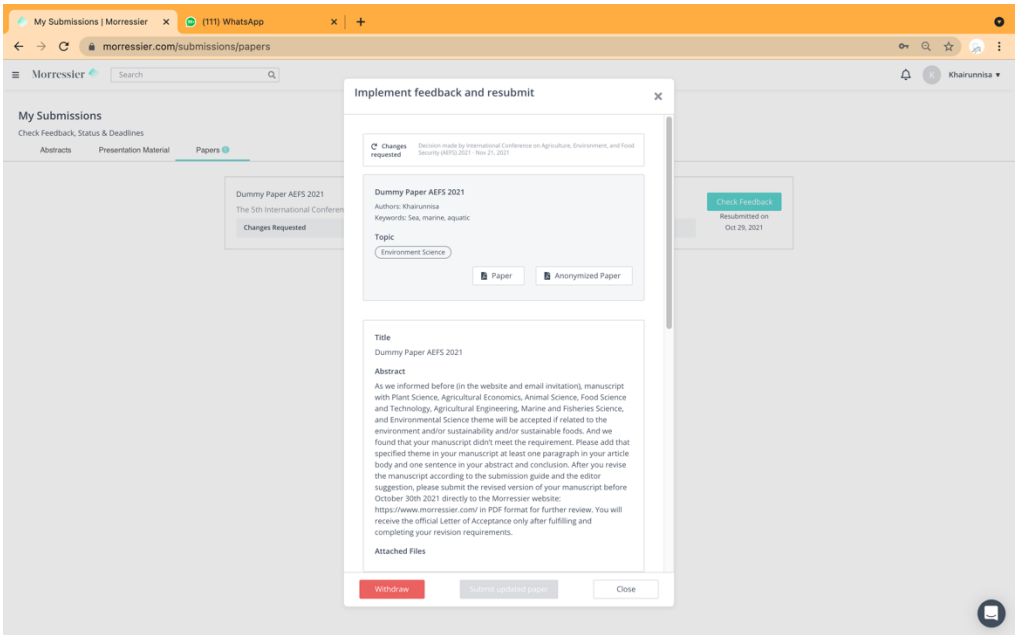

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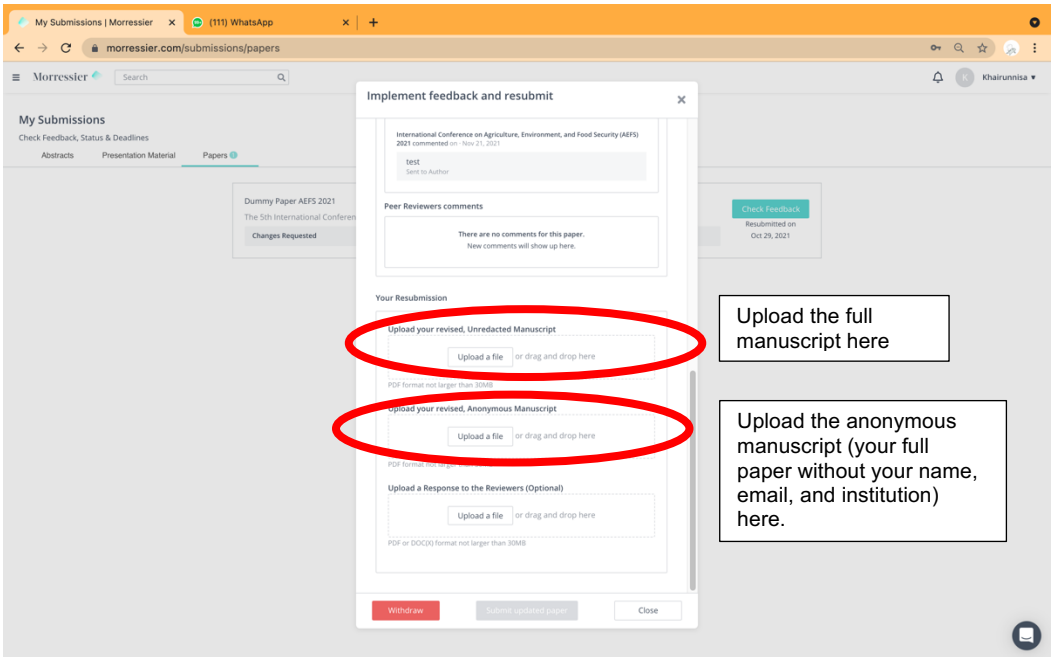

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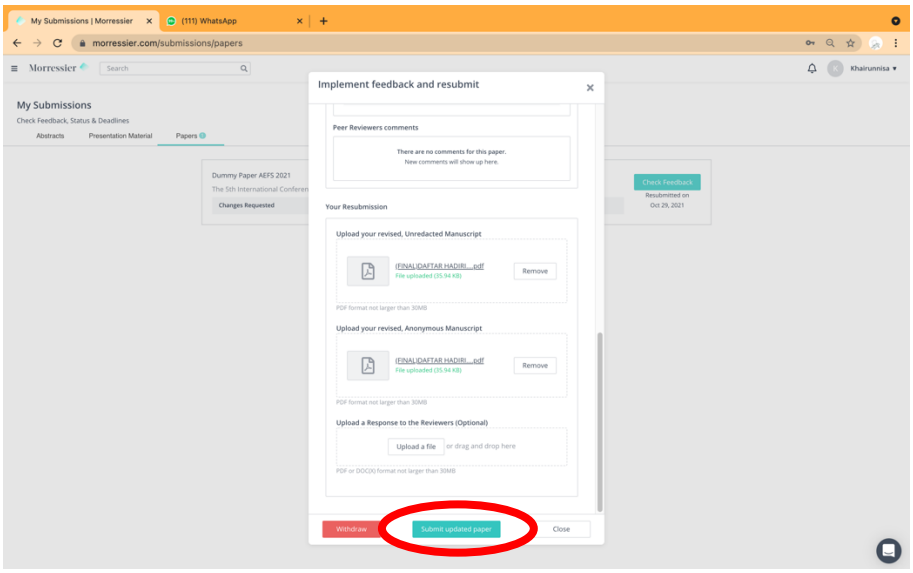

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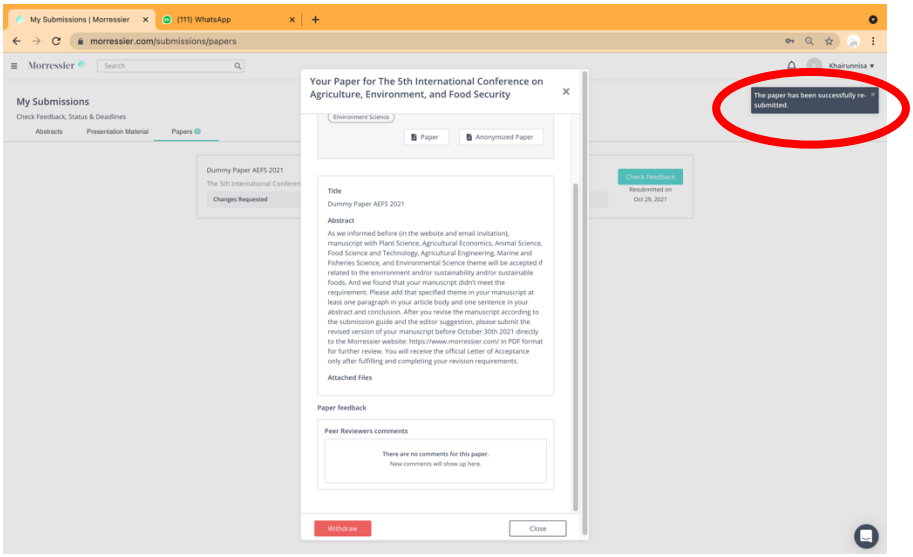

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AUTHOR AGREEMENT STATEMENT

Paper ID : __57_____

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