



Abdi Ismail &lt;abdiismail1993@gmail.com&gt;

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**Manuscript Needs Revision (#IJE-2201-5118 (R1))**

1 message

**International Journal of Engineering** <editorial@e-mail.sinaweb.net>

8 March 2022 at 01:41

Reply-To: International Journal of Engineering &lt;ije.editor8@gmail.com&gt;

To: tuswan.18041@mhs.its.ac.id

Cc: elinovitasari5@gmail.com, abdiismail1993@gmail.com, aditya@ft.uns.ac.id

Manuscript ID: IJE-2201-5118

Manuscript Title: **Experimental Evaluation on a New Bio-Based Resin Properties as Core Material Sandwich for Lightweight Ship Structure**

Authors: Tuswan Tuswan, Eli Novita Sari, Abdi Ismail, Aditya Rio Prabowo

Dear Respectful Author Prof./ **Dr. Tuswan Tuswan**

Evaluation process of the above mentioned manuscript has been reviewed. The comments of the reviewer(s) are included at the bottom of this letter.

The reviewer(s) have recommended publication, but also suggest some revisions to your manuscript. Therefore, I invite you to respond to the reviewer(s) comments and revise your manuscript within the period of defined time.

Because we are trying to facilitate timely publication of manuscripts submitted to journal, your revised manuscript should be uploaded as soon as possible. A marked or highlighted manuscript is required to observe any changes and revision made by the respectful author. If it is not possible for you to submit your revision in a reasonable amount of time, we may have to consider your paper as a new submission.

Once again, thank you for submitting your manuscript to this journal and I look forward to receiving your revision.

Truly yours,

Editorial Office of **International Journal of Engineering**

1. Please cite IJE's published articles related to your work.
2. Highlight any changes in your revised paper.
3. Prepare author response to reviewers. Answer exactly for any given comments and questions.

Reviewers Recommendation:

**Reviewer 1:**

Reviewer Comment For Author:

Interesting results and novelty work. A paper focuses on Experimental Evaluation on a New Bio-Based Resin Properties as Core Material Sandwich for Lightweight Ship Structure. Though the intention of the authors is highly commendable, there is lot of problems particularly in the presentation throughout the manuscript. Besides there are many grammatical mistakes throughout the manuscript, particularly in respect of use of singular and plural with the subject or verb. In view of the above comments, whole manuscript should be properly written to make it acceptable by International Journal of Engineering. I highly recommended this article to be accepted and published in the revised version.

As suggestion, please revise the title to:

Experimental Evaluation on palm oil and Sesame oil-Based Resin Properties as Core Material Sandwich for Lightweight Ship Structure

Abstract:

The abstract given here starts without any background for the present work. Of course, it contains brief details about experimental aspects and the obtained results. However this abstract does not follow the norm of an abstract, which should state briefly:

1. The purpose of the study undertaken, what are you trying to solve
2. brief mention of experimental aspects (without using abbreviations)
3. highlights of the results numerically
4. Important conclusions based on the obtained results
5. Potential applications

Therefore, it is suggested that the Abstract to be modified as per the suggestions given above.

Introduction

Introduction section is long with a many references based on the literature survey conducted by the authors. This is very good. However, this lacks in proper presentation of literature survey, which should have been systematic whereby existing scientific gaps should have been brought out. This should have given justification for the present study, which should be followed by the objectives of this study. In fact there is large amount of literature available on the characterization of bioresin. Similarly, a large number of methods to obtain these materials have been used mentioning their advantages and limitations. None of these have been brought out in this study whereby the authors have not justified why they have chosen the method they have used in their study. It should be noted that normally 'Introduction' should give brief background through literature survey for the study citing previous published work where-by scientific gaps that exist should be brought out. This would have led to justification for the present study. It is therefore suggested that 'Introduction Section' should be revised as suggested above because this Section is an important one from the point of view of taking up the present study.

Relevant article on resin should be cited such:

Polym Test 2020;81. <https://doi.org/10.1016/j.polymertesting.2019.106186>.

Int J Polym Sci 2019;2019. <https://doi.org/10.1155/2019/5258621>.

Polymers (Basel) 2021;13:471. <https://doi.org/10.3390/polym13030471>.

Int J Biol Macromol 2021. <https://doi.org/10.1016/j.ijbiomac.2021.10.221>.

Nanomaterials 2021;11:2186. <https://doi.org/10.3390/nano11092186>.

Coatings 2021;11:1355. <https://doi.org/10.3390/coatings11111355>.

In my opinion the paper will have good merit if such applications can be demonstrated and reported. Can you give some example?

Indonesia is the leading and largest palm oil producer, concentrating on two of its five major islands: Borneo and Sumatra. The primary domestic use of palm oil consumption is used as a basis for biodiesel but using epoxidized palm oil as matrix applications is limited. Please revise this sentences.

Materials and Methods:

Normally, this section should have two main subsections. The first one is Materials which should give details of all materials used in the study, where from they were procured, known characteristics, if available (for e.g. unsaturated polyester resins, MEXP, KOH, VE, PO, VO and SO, where do you get it, what is the purity of the chemical and etc.).

The second subsection should be Methods, where methodologies used in the study should be given in a systematic way using sub section with numbers for each of the properties. First the processing or preparation aspects of the final material should be given followed by the characterization of prepared materials including preparation of samples for any specific property or morphology studies should be presented in a systematic way. Here one should also clearly mention the number of samples used, any standards followed for variety of properties, make and model of the instruments used for characterization, their accuracy and experimental conditions used, etc.

It should be known to the authors when one publishes any scientific paper, the results presented therein should be such they should be reproducible by any other person when the experiment is repeated using the same materials. In the present paper, it would be difficult for any other person to repeat the experiments because the chosen materials do not have any pre-history, which is required for other researchers to carryout experiments to check the possible reproducibility of the procedure adopted by these authors.

Some of the paragraph should be under results and discussion and if it is already there then this becomes repetition and hence can be deleted. Secondly, this Section is methods and hence only results should be mentioned and then it should be discussed preferably comparing it with earlier reported similar results by other researchers.

#### Results & Discussion

Well written and easy for the reader to understand what the authors have conveyed.

Some of the paragraph should be under Methods and if it is already there then this becomes repetition and hence can be deleted. Secondly, this Section is Results & Discussion and hence only results should be mentioned and then it should be discussed preferably comparing it with earlier reported similar results by other researchers.

Throughout the manuscript, there are no comparison had been done with other published journal. Therefore, please support your statements with other researcher's work in the section result and discussion. It should be discussed preferably comparing it with earlier reported similar results by other researchers.

What is the equilibrium day for water absorption?

Please provide DTG graph.

Please elaborate your FTIR finding and label in the Figure 4.

Word in Figure 5 is too small. Please revise this section.

How many sample did for each experiment? Please do ANNOVA test and standard deviation for all data collected and presented.

#### Conclusions

Conclusions given here are do not reflect what had been achieved including many speculations. It is too long and should be in 1 paragraph. Hence these need to be suitably modified. It may be remembered that this Section forms a summary of all the major observations/ results obtained. Accordingly, here presentation should consist of the main Results or the observations of the study in short sentences probably with bullet points. This should stand alone or form a subsection of a Discussion or Results Section. Hence better to rewrite this Section based on the comments given in the whole text.

#### General Comments:

The paper though contains some interesting results and novelty work, it lacks in its proper presentation in the whole manuscript. Of course there is need for better language throughout the manuscript. It is suggested that the authors should take the help of native English speaking person to take care of this problem. In view of these, the paper is highly recommended and should be accepted for publication in the revised form. It is suggested that the authors should revise the paper in the light of above comments/suggestions.

#### Manuscript Evaluation Form:

[https://www.ije.ir/author?\\_\\_au=0kJGjYIWROseQF9fv9Fi6kUDgUJMCMXCvqQqdFzRtrnwyRyllmNK4dMQT2U0Fvjf](https://www.ije.ir/author?__au=0kJGjYIWROseQF9fv9Fi6kUDgUJMCMXCvqQqdFzRtrnwyRyllmNK4dMQT2U0Fvjf)

#### Reviewer 2:

Reviewer Comment For Author:

The topic of the article under the title: “Experimental Evaluation on a New Bio-Based Resin Properties as Core Material Sandwich for Lightweight Ship Structure” is in line with the International Journal of Engineering. The paper is original scientific work supported by the laboratory research. The organization of the article is appropriate. Before the publication, the article requires slight changes, including:

- Abstract: add the measurable results;
- Introduction: What about reinforcement by natural fibers (renewable)?
- Introduction: Lack of information about the aim of the research;
- Introduction: Please stress the novelty of the provided research (comparison with state-of-art);
- 2. 2. – please add the information about the samples preparation for SEM investigation;
- Discussion – lack of discussion and comparison the results with the up-to-date literature.

Manuscript Evaluation Form:

[https://www.ije.ir/author?\\_\\_au=8m7NiY5n9QbxjeZsR9RDPox\\_S0qQMW\\_.zwJ5dmffZbH9uODkehVlwQtmcmOKRqZc](https://www.ije.ir/author?__au=8m7NiY5n9QbxjeZsR9RDPox_S0qQMW_.zwJ5dmffZbH9uODkehVlwQtmcmOKRqZc)



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**Fwd: Manuscript Needs Revision (#IJE-2201-5118 (R2))**

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Tuswan \_ <tuswan.18041@mhs.its.ac.id>  
To: tuswan10@gmail.com

Tue, Mar 29, 2022 at 3:24 AM

----- Forwarded message -----

From: **International Journal of Engineering** <editorial@e-mail.sinaweb.net>  
Date: Mon, 28 Mar 2022 at 22:22  
Subject: Manuscript Needs Revision (#IJE-2201-5118 (R2))  
To: <tuswan.18041@mhs.its.ac.id>  
Cc: <elinovitasari5@gmail.com>, <abdiismail1993@gmail.com>, <aditya@ft.uns.ac.id>

Manuscript ID: IJE-2201-5118 (R1)

Manuscript Title: **Experimental Evaluation on a New Bio-Based Resin Properties as Core Material Sandwich for Lightweight Ship Structure**

Authors: Tuswan Tuswan, Eli Novita Sari, Abdi Ismail, Aditya Rio Prabowo

Dear Respectful Author **Dr. Tuswan Tuswan**

Evaluation process of the above mentioned manuscript has been reviewed. The comments of the reviewer(s) are included at the bottom of this letter.

The reviewer(s) have recommended publication, but also suggest some revisions to your manuscript. Therefore, I invite you to respond to the reviewer(s) comments and revise your manuscript within the period of defined time.

Because we are trying to facilitate timely publication of manuscripts submitted to journal, your revised manuscript should be uploaded as soon as possible. A marked or highlighted manuscript is required to observe any changes and revision made by the respectful author. If it is not possible for you to submit your revision in a reasonable amount of time, we may have to consider your paper as a new submission.

Once again, thank you for submitting your manuscript to this journal and I look forward to receiving your revision.

Truly yours,

Editorial Office of **International Journal of Engineering**

Reviewers Recommendation:

**Reviewer 1:**

Reviewer Comment For Author:

The article entitle: "Experimental Evaluation on a New Bio-Based Resin Properties as Core Material Sandwich for Lightweight Ship Structure" was significantly improved. It is almost ready to be published. One small suggestion i to describe more detailed novelty aspects in intruduction part.



Abdi Ismail &lt;abdiismail1993@gmail.com&gt;

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**Manuscript Published Online (#IJE-2201-5118 (R2))**

1 message

**International Journal of Engineering** <editorial@e-mail.sinaweb.net>

12 June 2022 at 23:29

Reply-To: International Journal of Engineering &lt;ije.editor8@gmail.com&gt;

To: tuswan.18041@mhs.its.ac.id

Cc: elinovitasari5@gmail.com, abdiismail1993@gmail.com, aditya@ft.uns.ac.id

Manuscript ID: IJE-2201-5118 (R2)

Manuscript Title: **Experimental Evaluation on Palm oil and Sesame oil-Based Resin Properties as Core Sandwich Material for Lightweight Ship Structure**

Authors: Tuswan Tuswan, Eli Novita Sari, Abdi Ismail, Aditya Rio Prabowo

Dear respectful author Prof./ Dr. **Dr. Tuswan Tuswan**

I am pleased to inform you that your article is published online. Kindly visit:

<https://www.ije.ir/>

Your paper may be published in print in one of the upcoming issues based on previous arrangement. To save environment we normally do not provide hard copies unless previously arranged such services with our MERC printing house.

I am sorry, I cannot say exactly promise you in which issue or transactions we can publish; because we have a huge number of online articles that are waiting for printing.

After publication, the corresponding author will receive the published article.

I wish you great success in your research and also Thanking you for sharing your scientific findings with us.

Truly yours,

Editorial Office of **International Journal of Engineering****IJE editorial office appreciates if you upload the pdf file of your article in Social Media Sites such as Facebook, Twitter, LinkedIn, ResearchGate, Academia, etc. for more visibility.**[Unsubscribe](#)

## REBUTTAL

Dear:

Prof. G.D. Najafpour, Ph.D.

Editor-in-Chief

International Journal of Engineering (IJE)

Thank you for giving us the opportunity to submit a revised draft of our manuscript titled *Experimental Evaluation on Palm oil and Sesame oil-Based Resin Properties as Core Material Sandwich for Lightweight Ship Structure* by Tuswan Tuswan, Eli Novita Sari, Abdi Ismail, Aditya Rio Prabowo to *International Journal of Engineering (IJE)*. We appreciate the time and effort you and the reviewers have dedicated to providing your valuable feedback on my manuscript. We are grateful to the reviewers for their insightful comments on my paper. We have been able to incorporate changes to reflect most of the suggestions provided by the reviewers. We have highlighted the changes in blue font colour within the revised manuscript. Here is a point-by-point response to the reviewers' comments and concerns.

Yours sincerely,

Dr. Tuswan, S.T.

## **EDITOR COMMENTS**

1. Please cite IJE's published articles related to your work.
2. Highlight any changes in your revised paper.
3. Prepare author response to reviewers. Answer exactly for any given comments and questions.

Author response:

Thank you for the editor for allowing me to submit revised version of the manuscript. The changes in the revised manuscript have been highlighted in the blue font colour. Moreover, we have cited 5 published articles related to our topic in the International Journal of Engineering:

1. Muniraj, D., Sreehari, V., "Experimental Damage Evaluation of Honeycomb Sandwich with Composite Face Sheets under Impact Load", International Journal of Engineering, Vol. 34, No. 4, (2021), 999-1007. DOI: 10.5829/ije.2021.34.04a.26
2. Khalkhali, A., Narimanzadeh, N., Khakshournia, S., Amiri, S., "Optimal Design of Sandwich Panels Using Multi-Objective Genetic Algorithm and Finite Element Method", International Journal of Engineering, Vol. 27, No. 3, (2014), 395-402. DOI: 10.5829/idosi.ije.2014.27.03c.06
3. Amrane, M., Bensahal, D., "Effects of Material and Geometrical Parameters on the Free Vibration of Sandwich Beams", International Journal of Engineering, Vol. 29, No. 2, (2016), 222-228. DOI: 10.5829/idosi.ije.2016.29.02b.11
4. EL-Wazery, M., EL-Kelity, A., Elsad, R., "Effect of Water Absorption on the Tensile Characteristics of Natural/ Synthetic Fabrics Reinforced Hybrid Composites", International Journal of Engineering, Vol. 33, No. 11, (2020), 2339-2346. DOI: 10.5829/ije.2020.33.11b.24
5. Arief, Y., Makmud, M., Sahari, J., Junian, S., Wahit, M., "Tensile and Physical Properties of Linear Low Density Polyethylene-natural Rubber Composite: Comparison between Size and Filler Types", International Journal of Engineering, Vol. 29, No. 9, (2016), 1257-1262. DOI: 10.5829/idosi.ije.2016.29.09c.11

## **REVIEWER 1:**

1. Interesting results and novelty work. A paper focuses on Experimental Evaluation on a New Bio-Based Resin Properties as Core Material Sandwich for Lightweight Ship Structure. Though the intention of the authors is highly commendable, there is lot of problems particularly in the presentation throughout the manuscript. Besides there are many grammatical mistakes throughout the manuscript, particularly in respect of use of singular and plural with the subject or verb. In view of the above comments, whole manuscript should be properly written to make it acceptable by International Journal of Engineering. I highly recommended this article to be accepted and published in the revised version.

Author response: Thank you for forwarding these helpful review reports. We are most grateful for the time reviewer 1 spent on providing suggestions on how to improve our paper. In our revision, we have tried to address your suggestion as well as possible and specified in detail



below. We have conducted substantial revision in our manuscript by providing point-by-point responses in the whole manuscript to give an unambiguous framework of research presentation. We have rechecked the grammatical structure and tenses error of the entire revised manuscript by native English scholar and using Grammarly premium.

2. As a suggestion, please revise the title to:

Experimental Evaluation on palm oil and Sesame oil-Based Resin Properties as Core Material Sandwich for Lightweight Ship Structure.

Author response: The title of the manuscript has been revised to:

Experimental Evaluation on Palm Oil and Sesame oil-Based Resin Properties as Core Material Sandwich for Lightweight Ship Structure.

3. Abstract:

The abstract given here starts without any background for the present work. Of course, it contains brief details about experimental aspects and the obtained results. However this abstract does not follow the norm of an abstract, which should state briefly:

1. The purpose of the study undertaken, what are you trying to solve
2. brief mention of experimental aspects (without using abbreviations)
3. highlights of the results numerically
4. Important conclusions based on the obtained results
5. Potential applications

Therefore, it is suggested that the Abstract to be modified as per the suggestions given above.

Author response: We agree with your suggestion. We revised the abstract to follow the suggested norm of an abstract. The updated abstract is as follow:

Research on lightweight material on ship structure has taken giant steps during the last decade. One reason is that shipping activities have increased and, therefore, the possibility of increasing the carrying cargo capacity in a realistic way using advanced lightweight material. This article summarizes a research investigation regarding the experimental tests of vinyl ester bio resin material using palm oil and sesame oil based on Lloyd's Register standard. Several tests are conducted, including density, water absorption test, Fourier transformed infrared test (FTIR), scanning electron microscope (SEM), and mechanical tests to evaluate the effect of 2-10% addition of vegetable oils on mechanical properties. The influence of the addition of vegetable oils is successfully characterized using physical measurements, which indicate the possible formation of a polymer blend to increase in elongation value. Mechanical testing shows that adding vegetable oils causes a decrease in average density, hardness, bending strength, and tensile strength. The bending strength decreases about 9.20 – 47.06% for 2-10% palm oil addition and 5.33 – 42.40% for sesame oil addition. Moreover, vegetable oil causes a tensile

strength decrease of about 5-18.75% on palm oil and 3.75-13.75% on sesame oil. As summarized, bio resin based on sesame oil has better mechanical behavior with the oil addition of 4-8% fulfills all Lloyd's Register criteria.

#### 4. Introduction

Introduction section is long with a many references based on the literature survey conducted by the authors. This is very good. However, this lacks in proper presentation of literature survey, which should have been systematic whereby existing scientific gaps should have been brought out. This should have given justification for the present study, which should be followed by the objectives of this study. In fact there is large amount of literature available on the characterization of bioresin. Similarly, a large number of methods to obtain these materials have been used mentioning their advantages and limitations. None of these have been brought out in this study whereby the authors have not justified why they have chosen the method they have used in their study. It should be noted that normally 'Introduction' should give brief background through literature survey for the study citing previous published work where-by scientific gaps that exist should be brought out. This would have led to justification for the present study. It is therefore suggested that 'Introduction Section' should be revised as suggested above because this Section is an important one from the point of view of taking up the present study.

Author response:

The authors would like to thank the reviewer for the comment. We have improved the introduction section by making it more concise, using relevant and newer references, and sharpening state of the art.

#### 5. Relevant article on resin should be cited such:

Polym Test 2020;81. <https://doi.org/10.1016/j.polymertesting.2019.106186>.

Int J Polym Sci 2019;2019. <https://doi.org/10.1155/2019/5258621>.

Polymers (Basel) 2021;13:471. <https://doi.org/10.3390/polym13030471>.

Int J Biol Macromol 2021. <https://doi.org/10.1016/j.ijbiomac.2021.10.221>.

Nanomaterials 2021;11:2186. <https://doi.org/10.3390/nano11092186>.

Coatings 2021;11:1355. <https://doi.org/10.3390/coatings11111355>.

Author response:

The authors would like to thank you for the suggestion. We have done citations on these relevant papers in the introduction section.

On the other hand, several nanocomposites [15,16] have not been tested according to the request of Lloyd's Register [6]. Various natural fibers [17-19] also do not meet the Lloyd's Register criteria [6], including the elongation at break criteria. The critical point is needed to be addressed, including the material brittleness and elongation threshold.

[6] Lloyd's Register, "Rules for the Application of Sandwich Panel Construction to Ship Structure". 2020.

- [15] Nurazzi, N.M., Sabaruddin, F.A., Harussani, M.M., Kamarudin, S.H., Rayung, M., Asyraf, M.R.M., Aisyah, H.A., Norrrahim, M.N.F., Ilyas, R.A., Abdullah, N., Zainudin, E.S., Sapuan, S.M., Khalina, A., “Mechanical Performance and Applications of CNTs Reinforced Polymer Composites—A Review”. *Nanomaterials*, Vol. 11, No. 9, (2021). DOI: 10.3390/nano11092186
- [16] Alias, A.H., Norizan, M.N., Sabaruddin, F.A., Asyraf, M.R.M., Norrrahim, M.N.F., Ilyas, A.R., Kuzmin, A.M., Rayung, M., Shazleen, S.S., Nazrin, A., Sherwani, S.F.K., Harussani, M.M., Atikah, M.S.N., Ishak, M.R., Sapuan, S.M., Khalina, A., “Hybridization of MMT/Lignocellulosic Fiber Reinforced Polymer Nanocomposites for Structural Applications: A Review”. *Coatings*, Vol. 11, No. 11, (2021). DOI: 10.3390/coatings11111355
- [17] Aisyah, H.A., Paridah, M.T., Sapuan, S.M., Ilyas, R.A., Khalina, A., Nurazzi, N.M., Lee, S.H., Lee, C.H., “A Comprehensive Review on Advanced Sustainable Woven Natural Fibre Polymer Composites”. *Polymers*, Vol. 13, No. 3, (2021). DOI: 10.3390/polym13030471
- [18] Aisyah, H. A., Paridah, M. T., Sapuan, S. M., Khalina, A., Berkalp, O. B., Lee, S. H., Lee, C. H., Nurazzi, N.M., Ramli, N., Wahab, M.S., Ilyas, R. A., “Thermal Properties of Woven Kenaf/Carbon Fibre-Reinforced Epoxy Hybrid Composite Panels”. *International Journal of Polymer Science*, Vol. 2019, (2019). DOI: 10.1155/2019/5258621
- [19] Abral, H., Ariksha, J., Mahardika, M., Handayani, D., Aminah, I., Sandrawati, N., Sapuan, S.M., Ilyas, R.A., “Highly transparent and antimicrobial PVA based bionanocomposites reinforced by ginger nanofiber”. *Polymer Testing*, Vol. 81, No. 106186, (2020). DOI: 10.1016/j.polymertesting.2019.106186

6. In my opinion the paper will have good merit if such applications can be demonstrated and reported. Can you give some example?

Author response: Thank you for this valuable suggestion. We have reported the application of the proposed material to several ship structures in the last paragraph of the Result and Discussion section.

Several ship structures have been used to sandwich panels, including the deck [16], hull [33-35], and ramp door [1,10]. Lloyd's Register has suggested other ship parts that can also be applied to sandwich panels, including double bottom floors and girders, primary structural members, corrugated bulkheads, and any structure directly in contact with the oil cargo [6]. Furthermore, this ductile and non-corrosive composite material can be used as the blade material of the Vertical Axis Hydrokinetic Turbine [36].

7. Indonesia is the leading and largest palm oil producer, concentrating on two of its five major islands: Borneo and Sumatra. The primary domestic use of palm oil consumption is used as a basis for biodiesel but using epoxidized palm oil as matrix applications is limited. Please revise this sentences.

Author response: Thank you for the suggestion. We have removed the sentence to make the introduction section more concise.

8. Materials and Methods:

Normally, this section should have two main subsections. The first one is Materials which should give details of all materials used in the study, where from they were procured, known characteristics, if available (for e.g. unsaturated polyester resins, MEXP, KOH, VE, PO, VO and SO, where do you get it, what is the purity of the chemical and etc.).

Author response: We agree with your suggestion. We have added the brief explanation on the Sub section 2.1.

9. The second subsection should be Methods, where methodologies used in the study should be given in a systematic way using sub section with numbers for each of the properties. First the processing or preparation aspects of the final material should be given followed by the characterization of prepared materials including preparation of samples for any specific property or morphology studies should be presented in a systematic way. Here one should also clearly mention the number of samples used, any standards followed for variety of properties, make and model of the instruments used for characterization, their accuracy and experimental conditions used, etc.

Author response: Thanks for your careful reading of our manuscript. We have added material details, instrumentation specifications, and standards used for each test in sections 2.1 and 2.2.

10. It should be known to the authors when one publishes any scientific paper, the results presented therein should be such they should be reproducible by any other person when the experiment is repeated using the same materials. In the present paper, it would be difficult for any other person to repeat the experiments because the chosen materials do not have any pre-history, which is required for other researchers to carryout experiments to check the possible reproducibility of the procedure adopted by these authors.

Author response: The suggestions are gratefully appreciated. We agree with your suggestion. We have added material details, instrumentation specifications, and standards used for each test in sections 2.1 and 2.2.

11. Some of the paragraph should be under results and discussion and if it is already there then this becomes repetition and hence can be deleted. Secondly, this Section is methods and hence only results should be mentioned and then it should be discussed preferably comparing it with earlier reported similar results by other researchers.

Author response: The authors would like to thank the reviewer for the valuable feedback. We agree with your suggestion. We have made the Methods section and Result & Discussion section more concise and systematic. We have also added discussion by comparing the results of this study with related references.

The addition of 2-10% vegetable oil into vinyl ester specimen causes a decrease of about 5.00 - 18.75% for palm oil and 3.75 - 13.75% for sesame oil. The obtained result is linear to the previous findings where the addition of 4.wt% vegetable oil causes a decrease of about 4.92 – 5.97% on hardness value [28].

The result shows that the addition of vegetable oil causes a tensile strength decrease of about 5-18.75% on VE-Palm oil and 3.75-13.75% on VE-Sesame oil. The previous report shows that tensile strength decreases in the range 3.5 – 45.6% due to 5-20% palm oil addition into vinyl ester specimens [32].

It can be found that the addition of 2-10% vegetable oil causes an elongation increase of about 46.6 – 173.3% for VE-Palm oil and 33.3% - 140% for VE-Sesame oil. The previous study was also noticed a similar result where the addition of vegetable oil (sesame, palm, and coconut oils) causes an increase of elongation value [28,32]. It is caused due to a large number of long-chain polymer chemical structures and the easier movement of molecules [13].

The results show that the bending strength decrease is calculated about 9.20 – 47.06% for VE-Palm oil and 5.33 – 42.40% for VE-Sesame oil. A similar previous study showed that the flexural strength decreases by 38.9% due to adding 5-20% palm oil into vinyl ester specimens [32].

## 12. Results & Discussion

Well written and easy for the reader to understand what the authors have conveyed. Some of the paragraphs should be under Methods, and if it is already there, then this becomes repetition and hence can be deleted. Secondly, this Section is Results & Discussion, and hence only results should be mentioned, and then it should be discussed preferably comparing it with earlier reported similar results by other researchers.

Author response: We thank you for the substantial comment. We have deleted some redundant information in Result and Discussion section specifically in the explanation of water absorption, FTIR and SEM. Moreover, we have also added quantitative analysis to explain the result more clearly by adding the standard deviation of the test result and decrease and increase percentage due to the addition of vegetable oil. Also, we have added some discussion with earlier literature to compare the obtained result with previous research finding. We have added the citation number ..... in the result and discussion section. All changes have been highlighted in blue font colour. The example of comparative discussions between previous studies is as follow:

The result of both specimen types experiences a decreasing trend as the increase of fraction volume of vegetable oil. It can be found that pure vinyl ester specimens experience the highest

density, whereas the lowest one is the specimen with the highest addition of palm and sesame oil. It can be found that the addition of 2-10% palm oil causes a density decrease in the range 10.08-10.61% and 10.43-10.88% decrease for the addition of sesame oil. Similar result was noticed by previous literature [...] that density value decreases due to addition of vegetable oil (soybean and coconut oils) to vinyl ester specimen.

The addition of 2-10% vegetable oil into vinyl ester specimen causes a decrease of about 5.00 - 18.75% for palm oil and 3.75 - 13.75% for sesame oil. The obtained result is linear to the previous findings where the addition of 4.wt% vegetable oil causes a decrease about 4.92 – 5.97% on hardness value [Tuswan].

The result shows that the addition of vegetable oil causes a tensile strength decrease of about 5-18.75% on VE-Palm oil and 3.75-13.75% on VE-Sesame oil. Previous report shows that tensile strength decreases in the range 3.5 – 45.6% due to 5-20% palm oil addition into vinyl ester specimens [Fakhari].

It can be found that the addition of 2-10% vegetable oil causes an elongation increase of about 46.6 – 173.3% for VE-Palm oil and 33.3% - 140% for VE-Sesame oil. The previous study was also noticed similar result where the addition of vegetable oil (sesame, palm, and coconut oils) causes an increase of elongation value [Fakhari, Tuswan].

The results show that the bending strength decrease is calculated about 9.20 – 47.06% for VE-Palm oil and 5.33 – 42.40% for VE-Sesame oil. Similar previous study showed the flexural strength decreases until 38.9% due to addition of 5-20% palm oil into vinyl ester specimens [fakhri].

13. Throughout the manuscript, there are no comparison had been done with other published journal. Therefore, please support your statements with other researcher's work in the section result and discussion. It should be discussed preferably comparing it with earlier reported similar results by other researchers.

Author response: We agree with your suggestion. We have added some representative earlier literature to support the result statement and compare the obtained result with previous findings.

14. What is the equilibrium day for water absorption?

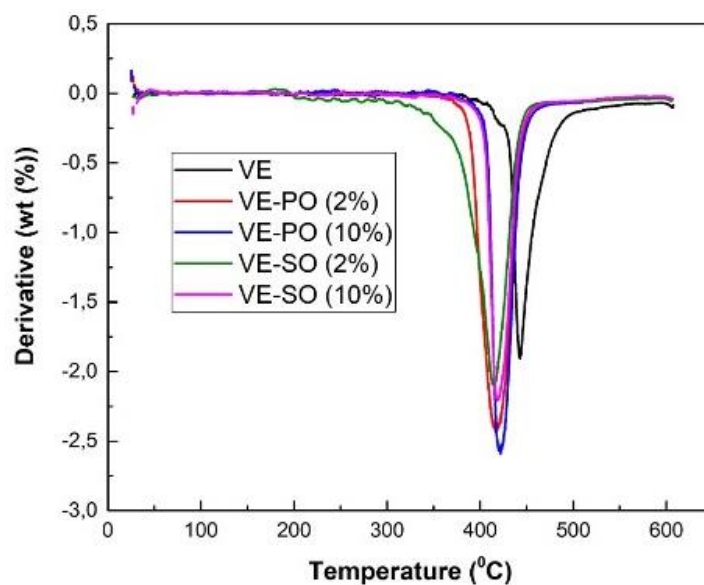
Author response: The equilibrium day for water absorption in our case in the day seventh. We have added some explanation in the result of water absorption test.

Water absorption experiences an increasing trend from day 1 and day 5. However, from day 5 to day 7, it experiences constant water absorption. Water absorption becomes less from day 5 to 7 because the material is in a state of saturation with water. This causes the water

absorption of the specimen to be lower. The ability to absorb water in the specimen occurs in the surface area. This is due to the basic nature of vegetable oils, which are non-miscible or insoluble in water. Water absorption becomes less from day 5 to 7 because the material experiences a state of saturation with water. Therefore, it causes the water absorption of the specimen to decrease. The ability to absorb water in the sample occurs in the surface area. It is due to the basic nature of vegetable oils, which are non-miscible or insoluble in water. It can be seen from the plot that water absorption by bio resin increases monotonically with immersion time until an equilibrium condition is reached after 168 h, where saturation is experienced in all samples (Daramola, 2018).

15. Please provide DTG graph.

Author response: Thank you for the suggestion. We have added DTA graph of different material including VE, VE-Palm oil (2%,10%), VE- Sesame oil (2%,10%) in Figure 4b.



(b)

**Figure 4.** (a) TGA and (b) DTG of different material types.

16. Please elaborate your FTIR finding and label in the Figure 4.

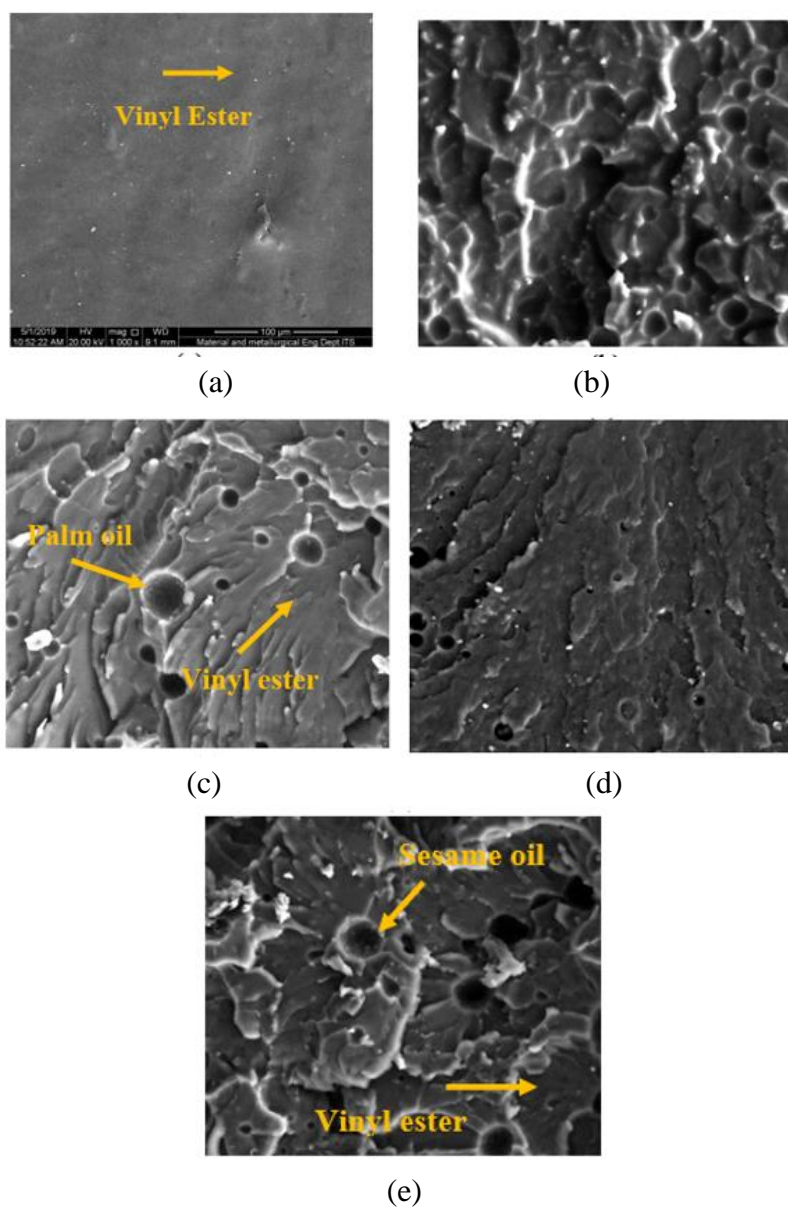
Author response: We have elaborated the FTIR result in Figure 4 in more detail by adding the further explanation.

As expected, the spectra present the same band patterns due to the similar structures of vegetable oils. The spectra presented in Figure 5 shows bands corresponding to the stretching vibration of the carbonyl group of the ester linkage (at ca.  $1700\text{ cm}^{-1}$  C=O functional group

double bonds) from the vinyl ester and the oil structure (Coates, 2000). The band appearing (at ca.  $1600 - 1500 \text{ cm}^{-1}$  C=C functional group double bonds) can be ascribed to the stretching vibration of the double bond from maleic anhydride (Liu et al., 2014). C=O in the absorption at ca. of  $1200 \text{ cm}^{-1}$ . It proves that vegetable oil esters form new bonds with pure vinyl esters in the form of a benzene ring with 4 free atoms and a benzene ring with 5 free atoms. Vinyl ester polymer bio-resin with 2% palm oil filler has a steeper wave transmittance than other sample types.

17. Word in Figure 5 is too small. Please revise this section.

Author response: the text in Figure 5 is increased. The updated version is as follow:

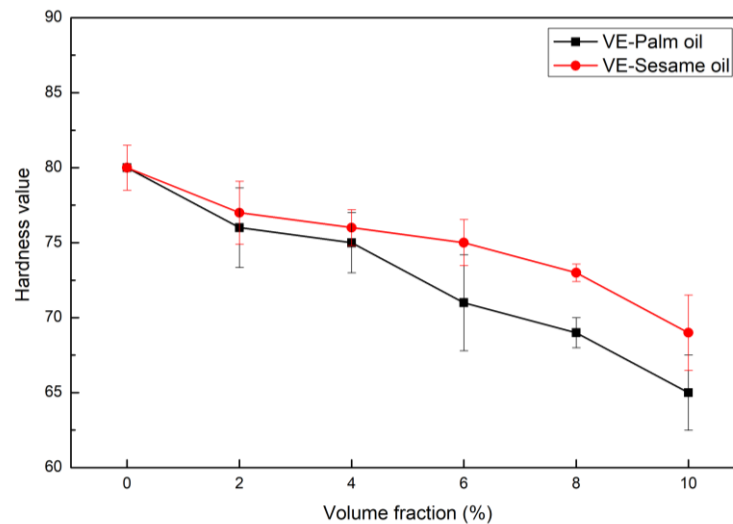




**Figure 5.** SEM characterization result of (a) Pure VE, (b) VE-Palm oil (2%) , (c) VE-Palm oil (10%), (d) VE-Sesame oil (2%), (e) VE-Sesame oil (10%).

18. How many sample did for each experiment? Please do ANNOVA test and standard deviation for all data collected and presented.

Author response: We use a total of 3 specimens which are averaged for each volume fraction variation on density, water absorption, hardness, tensile, and bensing tests. We have added the explanation of the standard deviation result for each test. In this case, standard deviation is used to measure the degree of similarity or closeness of the data for specimens with the same volume fraction. One example for standard deviation test is depicted by vertical line in a graph. All changes due to explanation of standard deviation is highlighted in blue font colour. Moreover, we think there is no urgency to conduct ANOVA test because we only use 3 speciment for each volume fraction variation so we assume that the variant difference between is not significant. ANOVA was used to test the difference in the mean of the data more than two groups. By only conducting standard deviation test is good enough.



**Figure 6.** Result of shore D hardness test.

19. Conclusions

Conclusions given here are do not reflect what had been achieved including many speculations. It is too long and should be in 1 paragraph. Hence these need to be suitably modified. It may be remembered that this Section forms a summary of all the major observations/ results obtained. Accordingly, here presentation should consist of the main Results or the observations of the study in short sentences probably with bullet points. This should stand alone or form a subsection of a Discussion or Results Section. Hence better to rewrite this Section based on the comments given in the whole text.

Author response: We agree with your statement. We have revised the conclusion more clearly. The updated conclusion section is as follow:

Several experimental tests are carried out in order to measure the optimum composition and mechanical properties of bio-resin based on Lloyd's Register standard. The effect of the addition of volume fraction of sesame and palm oil into bio-resin is investigated. Several conclusions can be stated, as follow:

1. The oil addition indicates the ability to bind to other elements leading to the potential formation of a polymer blend and elongation increment value due to a longer carbon chain.
2. The testings reveal that adding vegetable oil can decrease the density, hardness, and strength properties but increase the elongation.
3. VE-Sesame oil has better mechanical behavior than VE-Palm oil, with the oil addition of 4-8% is recommended and fulfills the Lloyd's Register standard.

20. General Comments:

The paper though contains some interesting results and novelty work, it lacks in its proper presentation in the whole manuscript. Of course there is need for better language throughout the manuscript. It is suggested that the authors should take the help of native English speaking person to take care of this problem. In view of these, the paper is highly recommended and should be accepted for publication in the revised form. It is suggested that the authors should revise the paper in the light of above comments/suggestions.

Author response: Thank you for forwarding these above helpful review reports. We have conducted substantial revision in our manuscript by providing point-by-point responses. We ensure the all comments have been answered comprehensively.

**REVIEWER 2:**

The topic of the article under the title: "Experimental Evaluation on a New Bio-Based Resin Properties as Core Material Sandwich for Lightweight Ship Structure" is in line with the International Journal of Engineering. The paper is original scientific work supported by the laboratory research. The organization of the article is appropriate. Before the publication, the article requires slight changes, including:

1. Abstract: add the measurable results;

Author response: We have added the measurable result in the abstract section. The updated abstract is as follow:

Research on lightweight material on ship structure has taken giant steps during the last decade. One reason is that shipping activities have increased and, therefore, the possibility of

increasing the carrying cargo capacity in a realistic way using advanced lightweight material. This article summarizes a research investigation regarding the experimental tests of vinyl ester bio resin material using palm oil and sesame oil based on Lloyd's Register standard. Several tests are conducted, including density, water absorption test, Fourier transformed infrared test (FTIR), scanning electron microscope (SEM), and mechanical tests to evaluate the effect of 2-10% addition of vegetable oils on mechanical properties. The influence of the addition of vegetable oils is successfully characterized using physical measurements, which indicate the possible formation of a polymer blend to increase in elongation value. Mechanical testing shows that adding vegetable oils causes a decrease in average density, hardness, bending strength, and tensile strength. The bending strength decreases about 9.20 – 47.06% for 2-10% palm oil addition and 5.33 – 42.40% for sesame oil addition. Moreover, vegetable oil causes a tensile strength decrease of about 5-18.75% on palm oil and 3.75-13.75% on sesame oil. As summarized, bio resin based on sesame oil has better mechanical behavior with the oil addition of 4-8% fulfills all Lloyd's Register criteria.

## 2. Introduction: What about reinforcement by natural fibers (renewable)?

Author response: The authors would like to thank the reviewer for the comment. Composite reinforced by natural fibers have been reported in various references, but not many of these composites have met all of the Lloyd's Register criteria.

On the other hand, several nanocomposites [15,16] have not been tested according to the request of Lloyd's Register [6]. Various natural fibers [17-19] also do not meet the Lloyd's Register criteria [6], including the elongation at break criteria. The critical point is needed to be addressed, including the material brittleness and elongation threshold.

[6] Lloyd's Register, "Rules for the Application of Sandwich Panel Construction to Ship Structure". 2020.

[15] Nurazzi, N.M., Sabaruddin, F.A., Harussani, M.M., Kamarudin, S.H., Rayung, M., Asyraf, M.R.M., Aisyah, H.A., Norrrahim, M.N.F., Ilyas, R.A., Abdullah, N., Zainudin, E.S., Sapuan, S.M., Khalina, A., "Mechanical Performance and Applications of CNTs Reinforced Polymer Composites—A Review". *Nanomaterials*, Vol. 11, No. 9, (2021). DOI: 10.3390/nano11092186

[16] Alias, A.H., Norizan, M.N., Sabaruddin, F.A., Asyraf, M.R.M., Norrrahim, M.N.F., Ilyas, A.R., Kuzmin, A.M., Rayung, M., Shazleen, S.S., Nazrin, A., Sherwani, S.F.K., Harussani, M.M., Atikah, M.S.N., Ishak, M.R., Sapuan, S.M., Khalina, A., "Hybridization of MMT/Lignocellulosic Fiber Reinforced Polymer Nanocomposites for Structural Applications: A Review". *Coatings*, Vol. 11, No. 11, (2021). DOI: 10.3390/coatings11111355

[17] Aisyah, H.A., Paridah, M.T., Sapuan, S.M., Ilyas, R.A., Khalina, A., Nurazzi, N.M., Lee, S.H., Lee, C.H., "A Comprehensive Review on Advanced Sustainable Woven Natural Fibre Polymer Composites". *Polymers*, Vol. 13, No. 3, (2021). DOI: 10.3390/polym13030471

[18] Aisyah, H. A., Paridah, M. T., Sapuan, S. M., Khalina, A., Berkalp, O. B., Lee, S. H., Lee, C. H., Nurazzi, N.M., Ramli, N., Wahab, M.S., Ilyas, R. A., "Thermal Properties of

Woven Kenaf/Carbon Fibre-Reinforced Epoxy Hybrid Composite Panels”. International Journal of Polymer Science, Vol. 2019, (2019). DOI: 10.1155/2019/5258621

[19] Abrial, H., Arikisa, J., Mahardika, M., Handayani, D., Aminah, I., Sandrawati, N., Sapuan, S.M., Ilyas, R.A., “Highly transparent and antimicrobial PVA based bionanocomposites reinforced by ginger nanofiber”. Polymer Testing, Vol. 81, No. 106186, (2020). DOI: 10.1016/j.polymertesting.2019.106186

3. Introduction: Lack of information about the aim of the research;

Author response: The suggestions are gratefully appreciated. We have improved the introduction section by making it more concise, using relevant and newer references, sharpening state of the art and strengthening the aim of the research in the last paragraph of the introduction section.

To address this issue, vinyl ester bio-based resin combined with palm oil and sesame oil with several compositions is proposed to be developed as the core material of the ship sandwich structure. The proposed core material must meet the Lloyd's Register criteria [6], such as density, hardness, tensile strength, and elongation at break. Physical tests, characterization tests, and mechanical tests were carried out to check the suitability of the proposed bio-based resin against Lloyd's Register criteria [6] and to further analyze various compositions of vegetable oils.

4. Introduction: Please stress the novelty of the provided research (comparison with state-of-art);

Author response: The authors would like to thank the reviewer for the valuable feedback. We have corrected the introduction section by making it more concise, using relevant and newer references, sharpening state of the art and strengthening the aim of the research.

5. Please add the information about the samples preparation for SEM investigation;

Author response: We have added the information regarding samples preparation for SEM test.

Moreover, the SEM test was performed to obtain a morphological image of the sample. The morphology of composites was investigated at the fractured surface of samples using SEM, FEI INSPECT S50 at 20 kV. The cross-section of investigated samples is coated with 100 Å thick C in the sputter coater.

6. Discussion – lack of discussion and comparison the results with the up-to-date literature.

Author response:

We have updated the result and discussion section and also compare it to the up-to-date literature. We have added the reference number ... to compare the obtained result with previous findings. Several discussion with earlier literature in the revised manuscript:

The result of both specimen types experiences a decreasing trend as the increase of fraction volume of vegetable oil. It can be found that pure vinyl ester specimens experience the highest density, whereas the lowest one is the specimen with the highest addition of palm and sesame oil. It can be found that the addition of 2-10% palm oil causes a density decrease in the range 10.08-10.61% and 10.43-10.88% decrease for the addition of sesame oil. Similar result was noticed by previous literature [...] that density value decreases due to addition of vegetable oil (soybean and coconut oils) to vinyl ester specimen.

The addition of 2-10% vegetable oil into vinyl ester specimen causes a decrease of about 5.00 - 18.75% for palm oil and 3.75 - 13.75% for sesame oil. The obtained result is linear to the previous findings where the addition of 4.wt% vegetable oil causes a decrease about 4.92 – 5.97% on hardness value [Tuswan].

The result shows that the addition of vegetable oil causes a tensile strength decrease of about 5-18.75% on VE-Palm oil and 3.75-13.75% on VE-Sesame oil. Previous report shows that tensile strength decreases in the range 3.5 – 45.6% due to 5-20% palm oil addition into vinyl ester specimens [Fakhari].

It can be found that the addition of 2-10% vegetable oil causes an elongation increase of about 46.6 – 173.3% for VE-Palm oil and 33.3% - 140% for VE-Sesame oil. The previous study was also noticed similar result where the addition of vegetable oil (sesame, palm, and coconut oils) causes an increase of elongation value [Fakhari, Tuswan].

The results show that the bending strength decrease is calculated about 9.20 – 47.06% for VE-Palm oil and 5.33 – 42.40% for VE-Sesame oil. Similar previous study showed the flexural strength decreases until 38.9% due to addition of 5-20% palm oil into vinyl ester specimens [fakhri].