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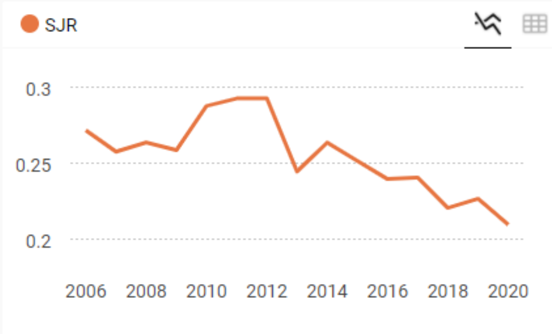
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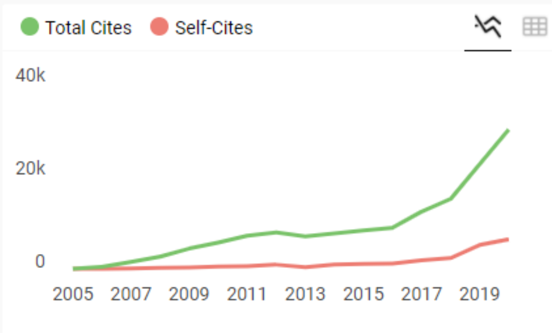
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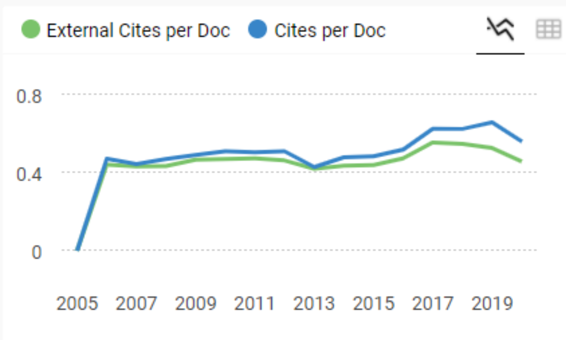
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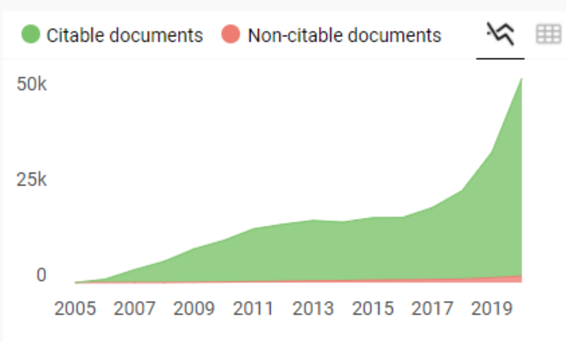
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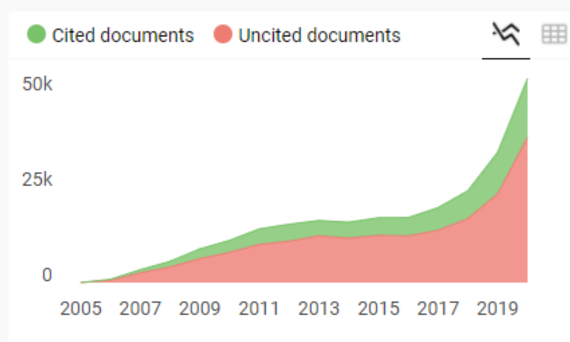
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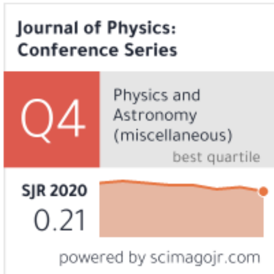

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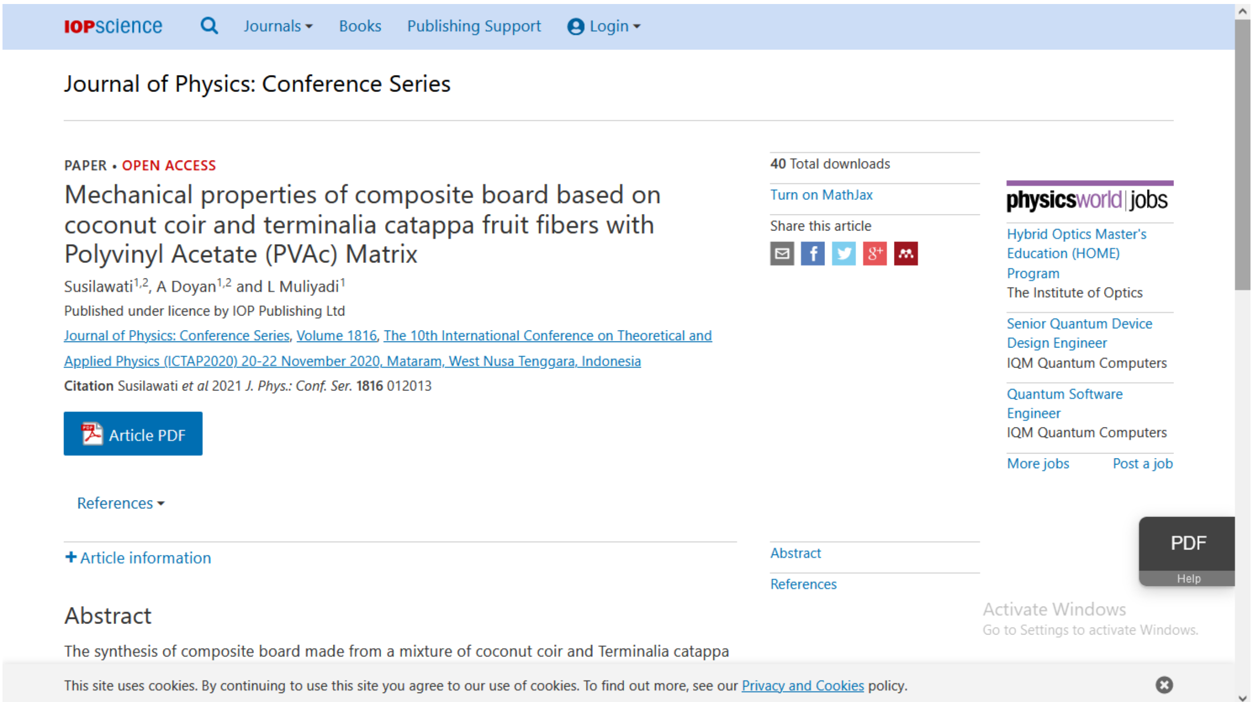

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Mechanical properties of composite board based on coconut coir and terminalia catappa fruit fibers with Polyvinyl Acetate (PVAc) Matrix

Susilawati[1,2], A Doyan[1,2] and L Muliyadi[1]

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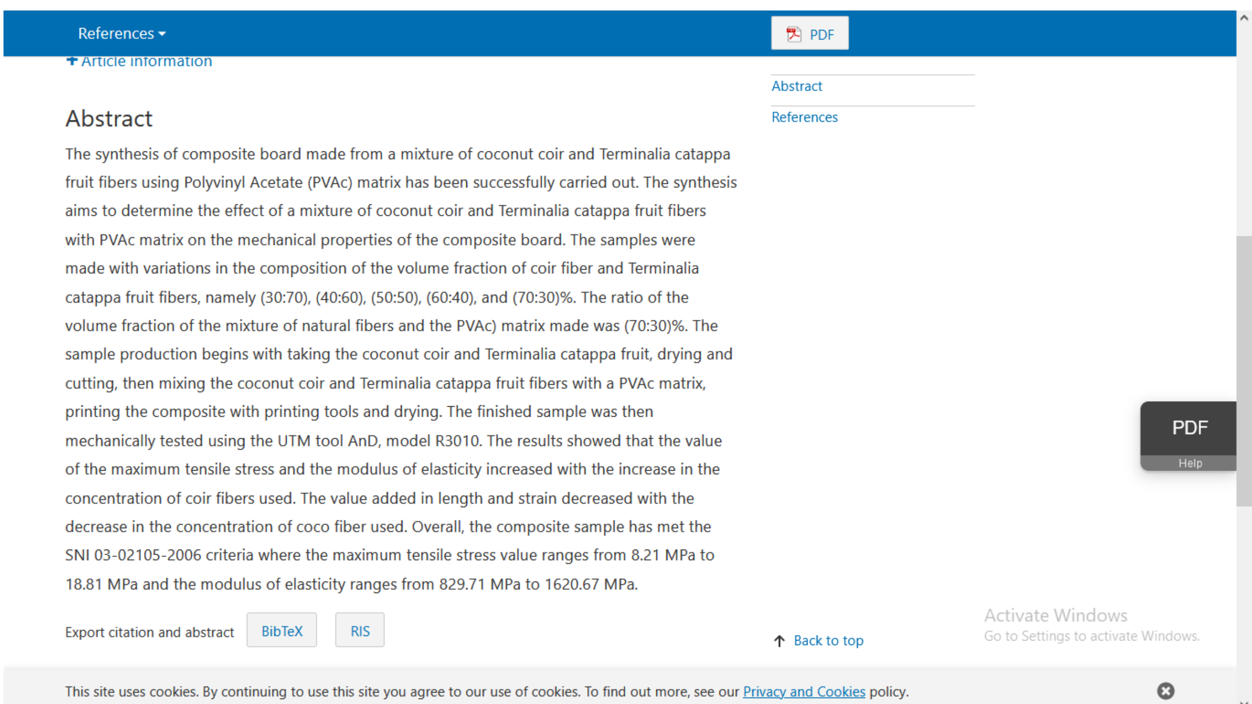

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Abstract

The synthesis of composite board made from a mixture of coconut coir and Terminalia catappa fruit fibers using Polyvinyl Acetate (PVAc) matrix has been successfully carried out. The synthesis aims to determine the effect of a mixture of coconut coir and Terminalia catappa fruit fibers with PVAc matrix on the mechanical properties of the composite board. The samples were made with variations in the composition of the volume fraction of coir fiber and Terminalia catappa fruit fibers, namely (30:70), (40:60), (50:50), (60:40), and (70:30)%. The ratio of the volume fraction of the mixture of natural fibers and the PVAc) matrix made was (70:30)%. The sample production begins with taking the coconut coir and Terminalia catappa fruit, drying and cutting, then mixing the coconut coir and Terminalia catappa fruit fibers with a PVAc matrix, printing the composite with printing tools and drying. The finished sample was then mechanically tested using the UTM tool AnD, model R3010. The results showed that the value of the maximum tensile stress and the modulus of elasticity increased with the increase in the concentration of coir fibers used. The value added in length and strain decreased with the decrease in the concentration of coco fiber used. Overall, the composite sample has met the SNI 03-02105-2006 criteria where the maximum tensile stress value ranges from 8.21 MPa to 18.81 MPa and the modulus of elasticity ranges from 829.71 MPa to 1620.67 MPa.

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Mechanical properties of composite board based on coconut coir and terminalia catappa fruit fibers with Polyvinyl Acetate (PVAc) Matrix

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Mechanical properties of composite board based on coconut coir and terminalia catappa fruit fibers with Polyvinyl Acetate (PVAc) Matrix

Susilawati[1,2], A Doyan[1,2] and L Muliyadi[1]

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Abstract. The synthesis of composite board made from a mixture of coconut coir and Terminalia catappa fruit fibers using Polyvinyl Acetate (PVAc) matrix has been successfully carried out. The synthesis aims to determine the effect of a mixture of coconut coir and Terminalia catappa fruit fibers with PVAc matrix on the mechanical properties of the composite board. The samples were made with variations in the composition of the volume fraction of coir fiber and Terminalia catappa fruit fibers, namely (30:70), (40:60), (50:50), (60:40), and (70:30)%. The ratio of the volume fraction of the mixture of natural fibers and the PVAc) matrix made was (70:30)%. The sample production begins with taking the coconut coir and Terminalia catappa fruit, drying and cutting, then mixing the coconut coir and Terminalia catappa fruit fibers with a PVAc matrix, printing the composite with printing tools and drying. The finished sample was then mechanically tested using the UTM tool AnD, model R3010. The results showed that the value of the maximum tensile stress and the modulus of elasticity increased with the increase in the concentration of coir fibers used. The value added in length and strain decreased with the decrease in the concentration of coco fiber used. Overall, the composite sample has met the SNI 03-02105-2006 criteria where the maximum tensile stress value ranges from 8.21 MPa to 18.81 MPa and the modulus of elasticity ranges from 829.71 MPa to 1620.67 MPa.

1. Introduction

The era of industry 4.0 as it is today, technological developments, especially in the industrial sector, are advancing rapidly. This technological development certainly has an impact on increasing noise, especially in building spaces. This noise results in the disruption of human health, especially in the hearing system. Therefore, a soundproof material is needed as a tool that functions as a silencer [1].

Various materials used as sound absorbers include glass wool [2], eggshells [3], Rockwool [4], and foam [5]. This material has a less affordable price so that the sound suppressor using this material is expensive. Agricultural waste materials that can be used as sound-absorbing materials are coconut coir fiber [6], Terminalia catappa fiber [7], areca nut fiber [8], palm fruit fiber [9], banana fiber [10], and pineapple fiber [11]. Of the several natural fiber materials, coconut coir fiber is very good as a sound suppressor because it can reduce noise at high frequencies [12], besides that, Terminalia catappa fruit fibers are known to produce a more homogeneous composite [13]. However, it is not yet known how the effect of the combination of the two natural fibers on the characteristics of the composite itself so that further investigation is needed regarding the effect of the combination of the two natural fibers on the characteristics of the composite.

This study focuses on the manufacture of composite boards using a mixture of coir fiber and ketapang fruit fibers with the Polyvinyl Acetate (PVAc) matrix. Research using a combination of the two natural fibers is expected to improve the quality of the composite board formed so that it can be used as a sound-absorbing material.

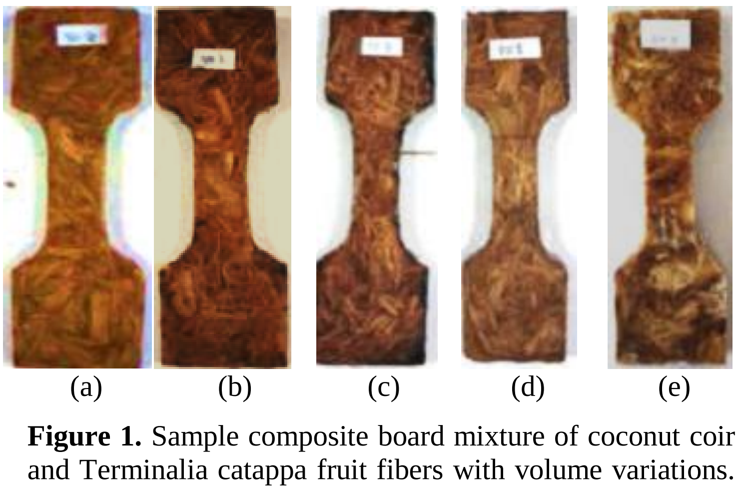
2. Method

The composite synthesis in this study used a mixture of coconut coir and Terminalia Catappa fruit fibers with the Polyvinyl Acetate (PVAc) matrix. The samples were made by varying the volume composition of coir fiber and Terminalia catappa fruit fiber, namely (30:70), (40:60), (50:50), (60:40), and (70:30)%. The ratio of the volume of the mixture of natural fibers and the PVAc matrix made was (30:70)%. The sample was made by preparing coconut coir fiber and Terminalia catappa fruit, drying and cutting the 2 cm fiber, then mixing coconut coir and Terminalia catappa fruit fibers with a PVAc matrix, then printing the composite with a printing tool and drying the samples to dry. The finished sample was then mechanically tested using the UTM tool AnD, model R3010.

3. Result and Discussion

This research has made a sample composite board with a percentage of natural fibers (coconut coir and Terminalia catappa fruit fibers) and a PVAc matrix of 30% and 70%. The comparison of the volume of coconut coir and Terminalia catappa fruit fibers is (30:70), (40:60), (50:50), (60:40), and (70:30)%. The finished sample was subjected to a mechanical test using the UTM tool AnD, model R3010.

Mechanical properties are the ability of a material to withstand the load given to it. Testing of the mechanical properties of the composite material of coconut coir and Terminalia catappa fruit fibers was carried out by measuring the tensile strength and compressive strength. The tensile test is a material deformation caused by a tensile load or the strength limit of a material to accept a pull. While the bending test is the ability of the material to accept stress [14, 15]. The sample used to perform the tensile test was formed with a size of 20 cm x 2.5 cm with a thickness of 0.75 cm as shown in Figure 1 below.



(a) (b) (c) (d) (e)

Figure 1. Sample composite board mixture of coconut coir and Terminalia catappa fruit fibers with volume variations. (a) 30: 70%, (c) 40: 60%, (d) 50: 50%, (e) 60: 40%, and (f) 70: 30%

Based on the tensile test performed, data were obtained in the form of maximum tensile stress, strain, length gain, and modulus of elasticity. The maximum tensile stress is obtained from the maximum load regarding the cross-sectional area of the sample under test. The composite material of coconut coir and Terminalia catappa fruit fibers has maximum tensile stress that varies according to the concentration used. The maximum tensile stress values obtained from the concentration (30:70)%, (40:60)%, (50; 50)%, (60:40)%, (70:30)% are 8.21; 8.76; 10,14; 12.46 and 18.81 M.Pa. This means that the value of the maximum tensile stress increases with the increase in the concentration of coconut coir fiber used. The highest maximum tensile stress is found in the sample with a coconut coir fiber concentration of 70%, and the lowest is in the composite with a concentration of 30%. The decrease in the tensile strength of the composite was caused by imperfect bonds between the fibers and the matrix along with the increase in the volume of the Terminalia catappa fiber in the composite, causing the number of voids. Also, the random fiber orientation is not able to optimally withstand the applied force in the direction where the force acts [16, 17]. The composite sample has met the SNI 03-02105-2006 criteria. The SNI standard value for tensile stress is at least 0.8 MPa [18]. The maximum tensile stress value is shown in Figure 2.

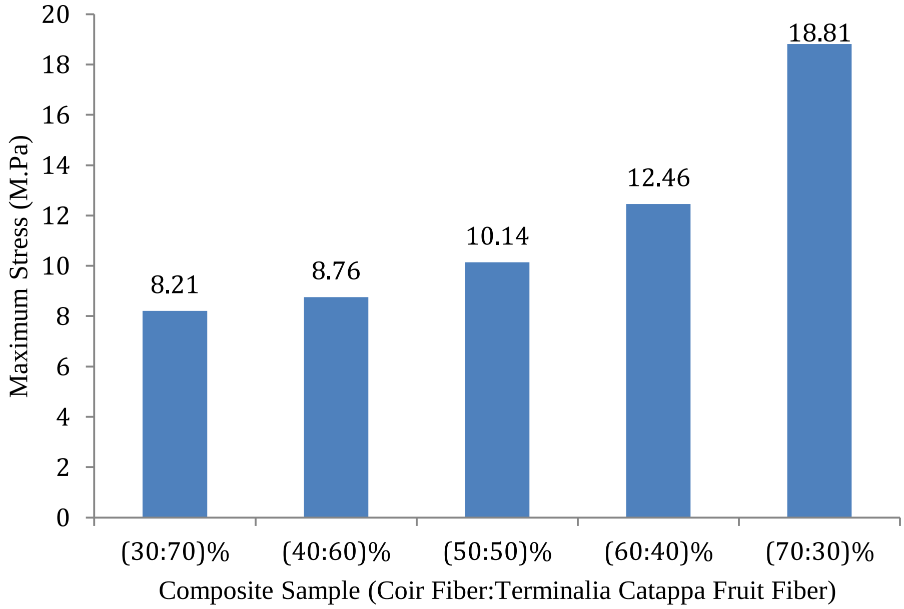


Figure 2. Graph of the maximum tensile stress of a composite mixture of coconut coir and Terminalia catappa fruit fibers

The load received by the composite sample of a mixture of coconut coir and Terminalia catappa fruit fibers increased length. The length added value obtained from the concentration (30:70)%, (40:60)%, (50; 50)%, (60:40)%, (70:30)% is 0.12; 0.09; 0.07; 0.04 and 0.05mm. This means that the value-added in length decreases with the decrease in the concentration of coconut coir fiber used. The highest value-added in length was found in the sample with a coconut coir fiber concentration of 30%, and the lowest was in the composite with a concentration of 60%. The added value of the composite length is shown in Figure 3.

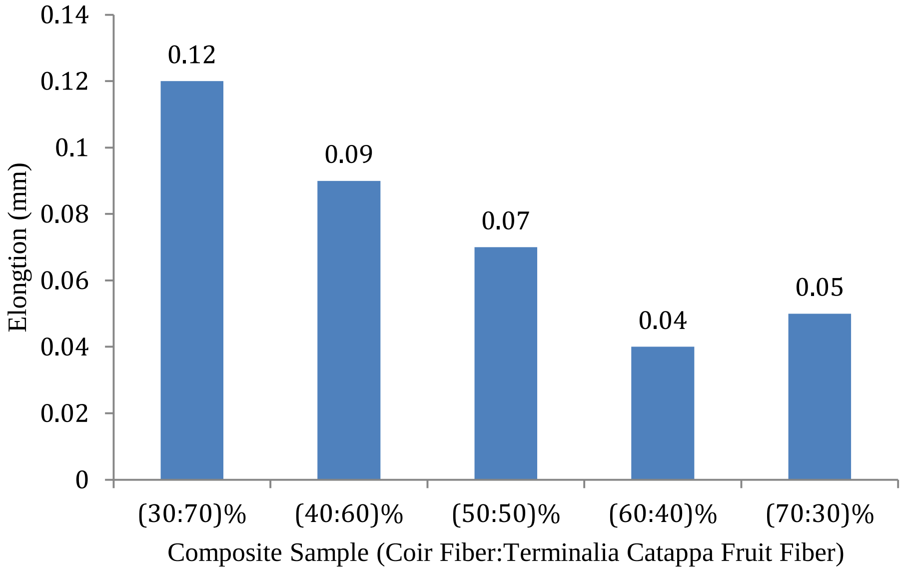


Figure 3. Graphic length increase of the composite mixture of coconut coir and Terminalia catappa fruit fibers on the tensile test

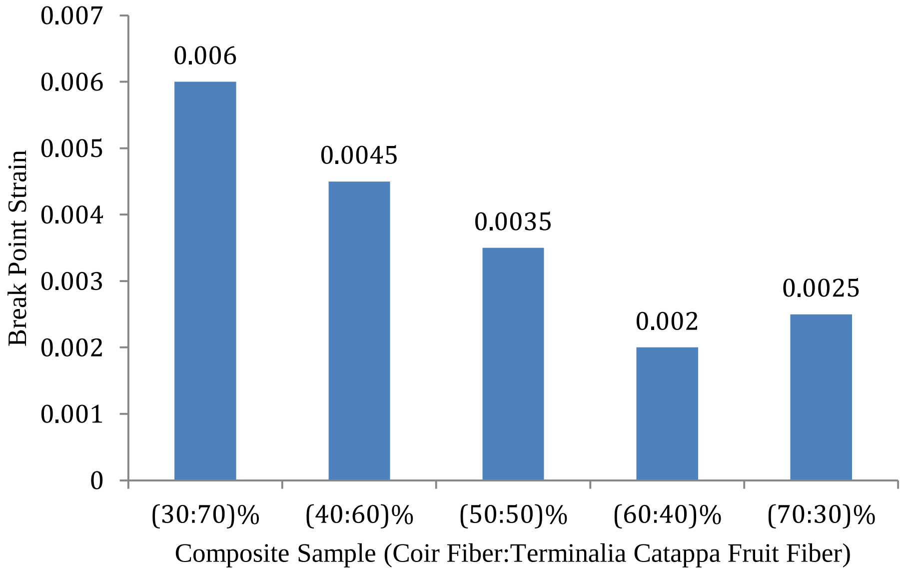


Figure 4. Graph strain composite mixture of coconut coir and Terminalia catappa fruit fibers the tensile test

The strain graph of the composite mixture of coconut coir and Terminalia catappa fruit fibers on the tensile test is shown in Figure 4. The strain value obtained from the concentration (30:70)%, (40:60)%, (50; 50)%, (60 : 40)%, (70:30)% namely 0.006; 0.0045; 0.0035; 0.002 and 0.0025. This means that the value of the strain decreases with the decrease in the concentration of coconut coir fiber used. The highest value of strain was found in the sample with a coconut coir fiber concentration of 30%, and the lowest was in the composite with a concentration of 60%.

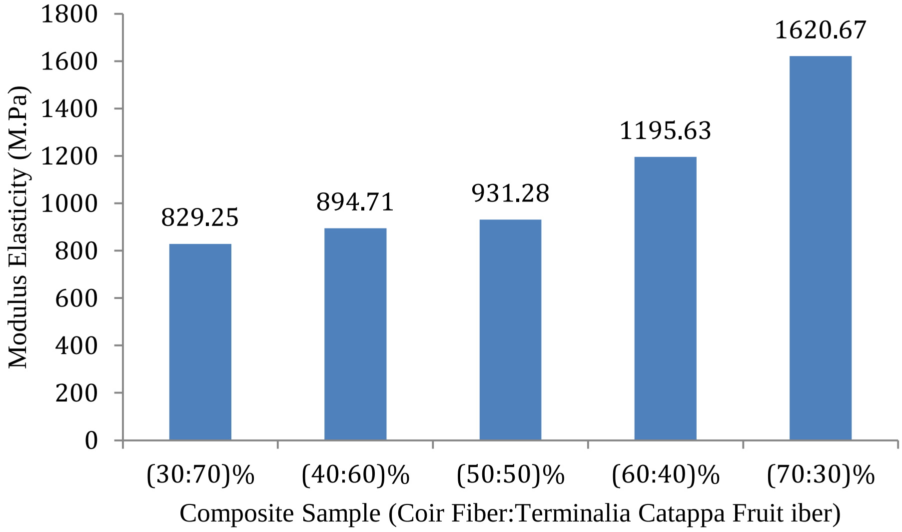


Figure 5. Graph of the modulus of elasticity of the composite mixture of coconut coir and Terminalia catappa fruit fibers

Another data obtained from the tensile test is the modulus of elasticity (Figure 5). The modulus of elasticity is a measure of the strength of a material for its elasticity. The greater the strain, the smaller the value of the elasticity of the material. In the tensile strength test, the sample is given a longitudinal pull. The modulus of elasticity obtained from the concentration (30:70)%, (40:60)%, (50; 50)%, (60:40)%, (70:30)%, namely 829.25; 894.71; 931.28; 1195.63 and 1620.67 M.Pa. This means that the modulus of elasticity increases with the increase in the concentration of coir fiber used. The highest modulus of elasticity was found in the sample with a coconut coir fiber concentration of 70%, and the lowest was in the composite with a concentration of 30%. The increase in the modulus of elasticity was due to the properties of the PVAc matrix which was able to adhere to the fibers well so that the fiber interactions could coalesce [19]. The composite sample has met the SNI 03-02105-2006 criteria. The SNI standard value for tensile stress is a minimum of 15000 N/cm^2 or 150 MPa [20].

4. Conclusion

Composite synthesis using a mixture of coconut coir fiber and ketapang fruit fiber with Polyvinyl Acetate (PVAc) matrix has been successfully carried out. The results showed that the results showed that the value of the maximum tensile stress and modulus of elasticity increased along with the increase in the concentration of coco fiber used. The maximum tensile stress value and the highest modulus of elasticity were found in the sample with a coconut fiber concentration of 70%, namely 18.81 M.Pa and 1620.67 M.Pa, while the lowest was in the composite with a concentration of 30%, namely 8.21 M.Pa and 829.25 M.Pa. The value added in length and strain decreased with the decrease in the concentration of coir fiber used. The highest value of added length and strain was found in samples with a coconut fiber concentration of 30%, namely 0.12 mm and 0.006, while the lowest was in the composite with a concentration of 60%, namely 0.004 mm and 0.002. Overall the composite sample has met the criteria of SNI 03-02105-2006 where the maximum tensile stress value ranges from 8.21 MPa to 18.81 MPa and the modulus of elasticity ranges from 829.71 MPa to 1620.67 MPa.

Acknowledgments
Our gratitude goes to the Physics Laboratory of the University of Mataram and all those who have helped to publish this article.

References

[1] Taufik M, Doyan A, Susilawati, Hakim S and Muliyadi L 2020 Acoustic Characteristics Board of Areca Nuts Fiber Composites *Journal of Physics: Conference Series* **1572** 1-6 DOI: 10.1088/1742-6596/1572/1/012004

[2] Su J, Zheng L and Deng Z 2019 Study on Acoustic Properties at Normal Incidence of Three-Multilayer Composite Made of Glass Wool, Glue and Polyurethane Foam *Applied Acoustics* **156** 319–326 DOI: https://doi.org/10.1016/j.apacoust.2019.07.016.

[3] Ganesan K, Kailasanathan C, Sanjay M R, Senthamaraikannan P and Saravanakumar S S 2018 A New Assessment on Mechanical Properties of Jute Fiber Mat With Egg Shell Powder/Nanoclay-Reinforced Polyester Matrix Composites *Journal of Natural Fibers* **17** 482-490 DOI: 10.1080/15440478.2018.1500340

[4] Huang M and Zhang Y 2019 Carbon Emissions Analysis of Rock Wool Board Products *Materials Science Forum* **993** 1545-1551 DOI: 10.4028/www.scientific.net/MSF.993.1545

[5] Lee J and Jung I 2019 Tuning Sound Absorbing Properties of Open Cell Polyurethane Foam by Impregnating Graphene Oxide *Applied Acoustics* **151** 10–21 DOI: https://doi.org/10.1016/j.apacoust.2019.02.029

[6] Hwang C L, Tran V A, Hong J W and Hsieh Y C 2016 Effects of Short Coconut Fiber on the Mechanical Properties, Plastic Cracking Behavior, and Impact Resistance of Cementitious Composites *Construction and Building Materials* **127** 984–992 DOI: 10.1016/j.conbuildmat.2016.09.118

[7] Durowaye, Lawal S, Sekunowo G and Onwuegbuchulem A 2018 Synthesis and characterization of hybrid polypropylene matrix composites reinforced with carbonized Terminalia catappa shell particles and Turritella communis shell particles *Journal of Taibah University for Science* **12** 79–86 DOI: 10.1080/16583655.2018.1451112

[8] Jahan E, Akter M and Hasan M 2020 Effect of Fibre Ratio and Chemical Treatment on The Properties of Pineapple Leaf and Betel Nut Husk Fibre-Reinforced Hybrid Polypropylene Composites *Advances in Materials and Processing Technologies* **6** 637-646 DOI: 10.1080/2374068X.2020.1732057

[9] Chafidz A, Augustia V, Zulkania A, Subagyo A, Kaavessina M and Rizal M 2018 Date Palm Fiber Reinforced High Density Polyethylene Composites: Effect of Fiber Loadings on the Melt Rheological Behavior *Key Engineering Materials* **773** 40-45 DOI: 10.4028/www.scientific.net/KEM.773.40

[10] Saravanan R and Gnanavel C 2020 Synthesis and Characterization of Treated Banana Fibers and Selected Jute Fiber Based Hybrid Composites *Materials Today: Proceedings* **21** 988-992 DOI: https://doi.org/10.1016/j.matpr.2019.09.143

[11] Mercy J M, Sivashankari P, Sangeetha M, Kavitha K R and Prakash S 2020 Genetic Optimization of Machining Parameters Affecting Thrust Force during Drilling of Pineapple Fiber Composite Plates–an Experimental Approach *Journal of Natural Fibers* 1-12 DOI: 10.1080/15440478.2020.1788484

[12] Hapiz P, Doyan A and Sedijani P 2018 Mechanical Test Of Betel Palm Fiber Composite Materials *Journal of Research in Science Education* **4** 1-10

[13] Dahlan I, Doyan A and Kosim 2018 Tensile Test of Terminalia Catappa Fruit Fiber Composite Material *IOSR Journal of Applied Physics (IOSR-JAP)* **10** 63-67 DOI: 10.9790/4861-1003026367

[14] Khotimah K, Susilawati and Soeprianto H 2015 Sound *Absorption* Properties of Banana Rod Fiber Composites – Polyester *Science Education Research Journal* **1** 91-101

[15] Susilawati, Doyan A and Kurniawan E 2014 Physical Properties of Composite Polymers *Proceeding of the National Seminar on Physics and Its Application IV* (Department of Physics Fst Airlangga)

[16] Doyan A, Susilawati and Multazam M 2014 Characteristics of Water Hyacinth Composite Board With Poly Vinyl Acetate Matrix *Proceedings of the National Seminar on Physics and*

Its Application IV (Department of Physics Fst Airlangga)

[17] Paryanto 2012 Effect of Orientation and Volume Fraction of Pineapple Leaf Fiber (Ananas comosus) on Tensile Strength of Unsaturated Polyester Composites (UP) *Dinamika Teknik Mesin* **2**(1)

[18] Dahlan I 2018 Manufacture and Characterization of the Fruit Fiber Composite Material of Terminalia Catappa as a Sound Wave Absorpter *Thesis* Mataram University

[19] Benedictus S Y, Anna Catharina S P and Yessy L 2015 Influence of Polyvinyl Acetate Matrix (PVAc) on Paying Grass Fiber Composite Material (cyperus alternifolius) Reviewed against Mechanical Strength *National Seminar on Civil Engineering, State University of Malang. Development of Technology and Human Resources to Support Environmentally Sound Development*

[20] Kosim, Wahyudi, Susilawati and Doyan A 2017 Mechanical Properties of Composite Boards Made From Coconut Coir Fiber and Banana Stalk Fiber *Journal of Physics and Technology Education* **3** 207-215

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Letter of Invitation (LoI)

No: 11/committee/ICTAP /2020

Author (s) : Susilawati, A. Doyan, L. Muliyadi

Dear Author (s),

On behalf of the 10th ICTAP & SFN XXXIII Committee, I would like to thank you for submitting your full paper. This conference will hold virtually on November 20th – 22nd, 2020; therefore, I am pleased to inform you that your initial article entitled **"Mechanical Properties of Composite Board Based on Coconut Coir and Terminalia Catappa Fruit Fibers with Polyvinyl Acetate (PVAc) Matrix"** is accepted to be presented at this conference.

This Letter of Acceptance is for your presentation only. Your paper will be reviewed before publication and assigned to its appropriate platform by the board of reviewers. For this purpose, the final revision of your article must include any suggestions during your presentation and the review results.

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Mataram, November 11st, 2020

Sincerely,

Aris Doyan, Ph.D

Chairman of ICTAP & SFN 2020

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Article Title : Mechanical Properties of Composite Board Based on Coconut Coir and Terminalia Catappa Fruit Fibers with Polyvinyl Acetate (PVAc) Matrix

Criteria	Comment
Technical Criteria	
• Scientific merit: notably scientific rigour, accuracy and correctness.	I think it is good enough in term of rigour and accuracy
• Clarity of expression; communication of ideas; readability and discussion of concepts.	Good organize and easy to read
• Sufficient discussion of the context of the work, and suitable referencing.	I think it is enough
Quality Criteria	
• Originality: Is the work relevant and novel?	Yes it is original but not novel because the reason is not clear, just “interest to” and no explanation why should be mix with Terminalia catappa. In the results and discussion section, no explanation what the use of Terminalia catappa. Mechanically, it is not very needed. No proof if it could make the composite more homogenous. In introduction, soundproof material was discussed and it was not clear why mechanical properties of the composite was studied instead of sound absorption
• Motivation: Does the problem considered have a sound motivation? All papers should clearly demonstrate the scientific interest of the results.	No, it is not clear. The composite board would be used as soundproof or normal board or both. No data for sound absorption.
• Repetition: Have significant parts of the manuscript already been published?	No
• Length: Is the content of the work of sufficient scientific interest to justify its length?	Yes
Presentation Criteria	

• Title: Is it adequate and appropriate for the content of the article?	Yes
• 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
• Diagrams, figures, tables and captions: Are they essential and clear?	Yes but not using graphic software, low resolution
• Text and mathematics: Are they brief but still clear? If you recommend shortening, please suggest what should be omitted.	Yes, they still could be read and understandable
• Conclusion: Does the paper contain a carefully written conclusion, summarizing what has been learned and why it is interesting and useful?	The summary in Conclusion is very good.

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*Publish after mandatory minor or major revision

Best Regards,

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We sincerely appreciate and thank you for the payment.

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International Conference on Theoretical and Applied Physics ★ 10th ICTAP SFNXXXIII 2020 ★ Simposium Fisika Nasional

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10th ICTAP and SFN XXXIII Committee
University of Mataram

10th ICTAP & SFNXXXIII

20th - 22nd November 2020

10th International Conference on Theoretical and Applied Physics & Simposium Fisika Nasional XXXIII

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