Hasanudin Hasanudin <hasanudin@mipa.unsri.ac.id>

Invitation to Review for the Journal of Science and Technology - JST-3286-2021

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Kepada: hasanudin@mipa.unsri.ac.id, hasanudinkf@gmail.com
Cc: journal.officer-2@upm.edu.my, executive_editor.pertanika@upm.edu.my

26-Nov-2021

Dear Dr. Hasanudin,

Greetings from Pertanika. An article with Manuscript ID JST-3286-2021, titled "Esterification of Acetin Production with Reactant Formulas from By-products of Biodiesel Industry using New Materials Based on Wetland Commodities" has been submitted to Pertanika for intended publication in the Journal of Science and Technology (JST).

I invite you to review this manuscript. The abstract appears at the end of this letter. I would be most grateful if you could find the time to read the article. Please let me know, preferably within 3 days, if you accept my invitation to review. If you are unable to review at this time, I would appreciate you recommending another expert reviewer(s) via email to the Chief Executive Editor at executive_editor.pertanika@upm.edu.my and cc to journal.officer-2@upm.edu.my

Should you agree to review the article, I would be glad if you could complete and return your review within 2 weeks from the date you click the “Agreed” link below.

Please note that your name will be listed and publish in our journal. However, owing to budget constraint, Pertanika is discontinuing the token monitoring reward with immediate effect. We realize that our expert reviewers greatly contribute to the high standards of the journal, and we thank you for your present and/or future participation.

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MANUSCRIPT DETAILS

TITLE: Esterification of Acetin Production with Reactant Formulas from By-products of Biodiesel Industry using New Materials Based on Wetland Commodities

ABSTRACT: All components of wetland biomass are useful and can produce new materials that function as heterogeneous catalysts. Heterogeneous catalysts have advantages in esterification of glycerol from biodiesel by product industry. The research aimed to produce new materials with specific components, crystalline properties, pore sizes and catalyst morphology. Furthermore, testing the performance of the resulting catalyst in converting glycerol from biodiesel industry products into acetin products. The methods included preparation of raw materials, sorting and purification, extraction and synthesis of catalysts, characterization of catalysts from various biomass sources, and the developing reactant formulas from biodiesel by-products with the esterification process. Product identification using Gas Chromatography-Mass Spectrometry. Yield silica(SiO2) obtained from the synthesis of pineapple leaves, sugar palm peel and orange peel catalysts, obtained Si of 40.017% and Al of 4.115%. The results of the diffractogram showed all catalyst synthesis had crystalline form with typical-silicon-oxide peaks. The pore size of the SiO2 catalyst extract based on wetland commodities ranged 4.328 to 5.658nm and the surface area ranged 10.884 to 263.475m2g-1. Morphological results showed that the extracts of SiO2 catalyst of palm fruit peel, pineapple leaves, and orange peel were composed of a round-shaped densely porous structure. These results met standard characteristics of silica catalysts. In the developed reactant formula, a ratio of 1:7 and 1:9 gives the highest yield of the best acetin product selectivity. The results obtained could be recommended for the development of acetin for non-food industries, such as for perfume solvents and plasticizer products. In the energy sector, triacetin is used as a biodiesel additive and can increase the octane number

Hasanudin Hasanudin <hasanudin@mipa.unsri.ac.id>

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26-Nov-2021

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Sincerely,
Chief Executive Editor
Journal of Science and Technology

> Esterification of Acetin Production with Reactant Formulas from By-products of Biodiesel Industry using New Materials Based on Wetland Commodities

Reviewer Affiliation
Universitas Sriwijaya, Chemistry
Manuscript ID:
JST-3286-2021
Manuscript Type
Regular Article
Keywords
esterification, acetin, biodiesel, reactants, catalyst
Scope of the Journal
Manufacturing and process technologies and engineering, Environment technology/ industry, New materials and technologies, Mechanical and industrial engineering
Date Assigned:
26-Nov-2021
Date Review Returned:
08-Dec-2021

Recommendation

Return to Author(s) for Important Modifications

Would you be willing to review a revision of this manuscript?

Yes

Confidential Comments to the Editor

The manuscript is recommended for publication after major revision by author and reevaluation by reviewer

Comments to the Corresponding Author

ABSTRACT
Page 3 of 14
• Line number 11-12: The author should briefly mention the research gap that has not been answered
• Line number 16: Is there another suitable word representing "reactant formula"?
• Line number 17: Does the author mean selectivity?
• add space before the unit
• Line number 23: what does the standard refer to?
• Line number 24: Why are there two types of ratios that give the highest selectivity? Please elaborate.

INTRODUCTION
Page 4 of 14
• Line number 8: Is agriculture the only source of biomass? The author should add why agricultural biomass is potential.
• Line number 9: what kind of "industrial"?

• Line number 10-15: What does the author trying to convey in this paragraph? Only the classification or what? It should be more assertive
• Line number 16-17: Very interesting; however, do any other advantages exist, such as physicochemical properties, etc, of palm fruit peels, pineapple leaves, and orange peel as a raw material for catalyst according to the literature?
• Line number 23-29: t it seems that the author should describe the advantages of biomass in a broader and proper perspective (especially for the catalysis) as well as the development of this biomass according to other reports.
• Line number 30-31: This paragraph should be linked to the previous paragraph. The idea of the text should be connected from one paragraph to another.
• Line number 35-36: The use of homogeneous catalysts have been mentioned in paragraph one, does this sentence necessary? (line number: 5)
• Line number 55-56: The authors should state a literature review on the studies of acetin production using a relevant catalyst, or at least state a research gap according to previous reports.
Page 5 of 14
• Line number 9-10: What instrumentation does the author use for catalyst characterization?

MATERIALS AND METHODS
Page 5 of 14
• Line number 18: where does the biodiesel industry come from? Consider informing the place, etc.
• Line number 20-21: Specify the supplier as well the chemical grade.
• Line number 34: The author must include a reference regarding this method
• Line number 36: Why does the author use 3M NaOH solution in a ratio of 1:4 (w/t). Is there any argumentation that satisfies this thing?
• Line number 42-43: add the atmospheric condition, pressure, heating rate, etc
• Line number 53-54: In the results and discussion section, the author only explains the physical properties of density of glycerol. It seems that there are data that have not been explained.

Page 6 of 14
• Line number 4: The author must inform the instrumentation condition (brand, etc) for the reproducibility purpose
• Line number 23: Please describe the GCMS instrumentation condition as well as the method of the analysis of acetin composition.

RESULTS AND DISCUSSIONS
Page 6 of 14
• Line number 31-35: Why was the silica content in palm peel the largest, while the lowest aluminum content was in the orange peel? How does the author interpret this data in the form of catalyst property?
Page 7 of 14
• Line number 5: The author may be able to expand the discussion on the effect of biomass feedstock over Si/Al ratio if necessary
• Line number 17-21: If the structures were changed from amorphous to the crystal, what does the implication of this data over the catalyst property?
• Line number 44-45: please add a legend for each diffractograms catalyst
Page 8 of 14
• Line number 8-10: The author should relate these data to the results of the XRF analysis. Also, why does the difference biomass relatively give the same XRD result?
• Line number 43-44: We know that the calcination could open the pores of the catalyst. However, It can be seen that the SiO2 of palm peel extract gives the largest pore size. Why would this happen?
• Line number 47-48: It is good if the author also does a control treatment to see the pore size without

calcination.
Page 9 of 14
• Line number 22-28: It is good if the research results follow previous reports. However, Figure 4 shows that the surface area of SiO2 of orange peel extract was much larger than that of SiO2 of palm peel and pineapple leaf extract. The author should explain this phenomenon.
• Line number 50: The SEM morphology of orange peel and pineapple leaf looks relatively the same, but the morphology of palm peel gives a big difference. How does the author respond to this?
Page 10 of 14
• Line number 19-23: What does the meaning of this composition regarding the catalyst property? The author should elaborate on it.
• Line number 51-52: Why is there only 57.5% glycerol yield obtained? It looks like almost half the product as impurities
Page 11 of 14
• Line number 28: What underlies this variation?
• Line number 29: why does the author use this condition? i.e, reference?
Page 12 of 14
• Line number 39-42: Very interesting results. The author should explain how the mole ratio of glycerol to acetic acid affects the selectivity of the product.
• Line number 43-36: These catalysts produced all of the acetin, especially for SiO2 pineapple leaves; this is very interesting. Why does this catalyst give such a good selectivity?
• Line number 47-49: The catalyst produces the highest monoacetin composition but does not produce diacetin and triacetin. Why does this happen? Also, several catalysts at different ratios produce only triacetin. The author should explain this phenomenon
• Line number 52-55: It can be seen that the catalyst gives the difference selectivity over the acetin. What possible reason could answer this phenomenon? Citing the other study might be necessary
• Overall, please recheck the grammatical errors

Files attached

Comments to the Corresponding Author.pdf PDF - This file is for the Editor only
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Author's Response
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08-Dec-2021

Dear Dr. Hasanudin,

Thank you for reviewing manuscript # JST-3286-2021 entitled "Esterification of Acetin Production with Reactant Formulas from By-products of Biodiesel Industry using New Materials Based on Wetland Commodities" for the Journal of Science and Technology.

On behalf of the Journal of Science and Technology Editorial Board, we appreciate your time and effort in reviewing the article. To acknowledge your valued contribution, we will be publishing your name as our valuable reviewer in our journal.

We thank you for your participation in the online review process and hope that we may call upon you again to review future manuscripts.

Sincerely,
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13-Jan-2022

Dear Dr. Hasanudin,

Greetings from Pertanika. An article with Manuscript ID JST-3286-2021.R1, titled "Esterification of Acetin Production from By-products of Biodiesel Industry Using Heterogeneous Catalysts Based on Wetland Commodities" has been submitted to Pertanika for intended publication in the Journal of Science and Technology (JST).

The above article has been reviewed by you previously where you had recommended that the article could be published subject to MAJOR MODIFICATIONS made by the author and returned to the reviewer for re-evaluation. The author has since made the necessary amendments as per comments given by one or more independent reviewers. The responses of the author to your comments are also attached for your reference.

I invite you to review this revised manuscript. The abstract appears at the end of this letter. I would be most grateful if you could find the time to read the article. Please let me know preferably within 3 days if you accept my invitation to review.

Should you agree to review the article, I would be glad if you could complete and return your review within 2 weeks from the date you click the “Agreed” link below.

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TITLE: Esterification of Acetin Production from By-products of Biodiesel Industry Using Heterogeneous Catalysts Based on Wetland Commodities

ABSTRACT: The peculiarities of wetland commodities are very unique and can produce new materials which function as catalysts. The research objective was to determine the best catalyst components, crystallin properties, pore size, catalyst morphology and selectivity in producing acetin. The research started from sampling, sorting, purification, extraction, catalyst synthesis, characterization and determining the molar ratio between glycerol sourced from biodiesel industry by-products and CH3COOH. Determination of catalyst components by X-Ray Fluorescene spectrometry, crystallinity by X-ray Diffraction, pore size by Brunauer-Emmett-Teller and morphology of the resulting catalyst used Scanning Electron Microscopy- Energy Dispersive X-Ray. Selectivity of the target compound in the form of acetin, either monoacetin, diacetin or triacetin used Gas Chromatography-Mass Spectrometry. The catalyst of orange peels obtained silica 29.201% and alumina 4.115%, pineapple leaves obtained silica 34.072% and alumina 0.074% and sugar palm peels obtained silica 40.017% and alumina 0.953%. The diffractogram results showed that all heterogeneous catalysts had sharp and narrow peaks, meaning that the crystallinity of the sample was high according to the typical peak of SiO2. The pore size of the orange peel catalyst was 4.328 nm with a surface area of 263.475 m2 g-1, pineapple leaf catalyst had a pore size of 4.850 nm and a surface area of 35.983 m2 g-1 and sugar palm peel catalyst was 5.658 nm with a surface area of 10.884 m2 g-1. The results of the morphological test of orange peels were composed of a very heterogeneous dense porous structure, pineapple leaves were amorphous, while those of sugar palm peels were composed of small, irregular pores. All the resulting heterogeneous catalysts met the characteristics of standard SiO2 silica catalysts. The best acetin selectivity results in a 1:9 molar ratio.

JST-3286-2021.R1--Amended-MS---Responses-to-Comments----RW01.pdf
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13-Jan-2022

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> Esterification of Acetin Production from By-products of Biodiesel Industry Using Heterogeneous Catalysts Based on Wetland Commodities

Reviewer Affiliation
Universitas Sriwijaya, Chemistry
Manuscript ID:
JST-3286-2021.R1
Manuscript Type
Regular Article
Keywords
esterification, acetin, biodiesel, catalyst, selectivity
Scope of the Journal
Manufacturing and process technologies and engineering, Environment technology/ industry, New materials and technologies, Mechanical and industrial engineering
Date Assigned:
13-Jan-2022
Date Review Returned:
18-Jan-2022

Recommendation

Accept as is

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Yes

Confidential Comments to the Editor

The manuscript is recommended for publication after major revision by author and reevaluation by reviewer

Comments to the Corresponding Author

I believe that the manuscript has been satisfactorily improved after revision. Therefore I can recommend it to be published.

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Hasanudin Hasanudin <hasanudin@mipa.unsri.ac.id>

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18-Jan-2022

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On behalf of the Journal of Science and Technology Editorial Board, we appreciate your time and effort in reviewing the article. To acknowledge your valued contribution, we will be publishing your name as our valuable reviewer in our journal.

We thank you for your participation in the online review process and hope that we may call upon you again to review future manuscripts.

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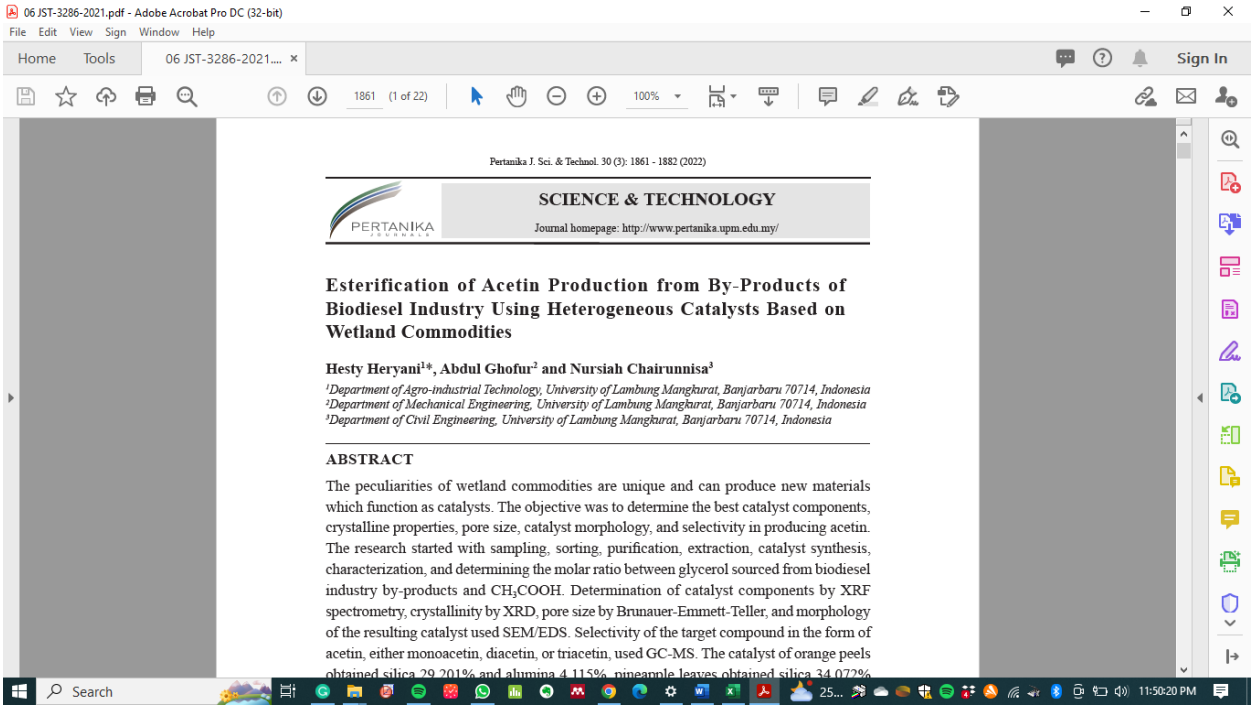
Chief Executive Editor, Journal of Science and Technology



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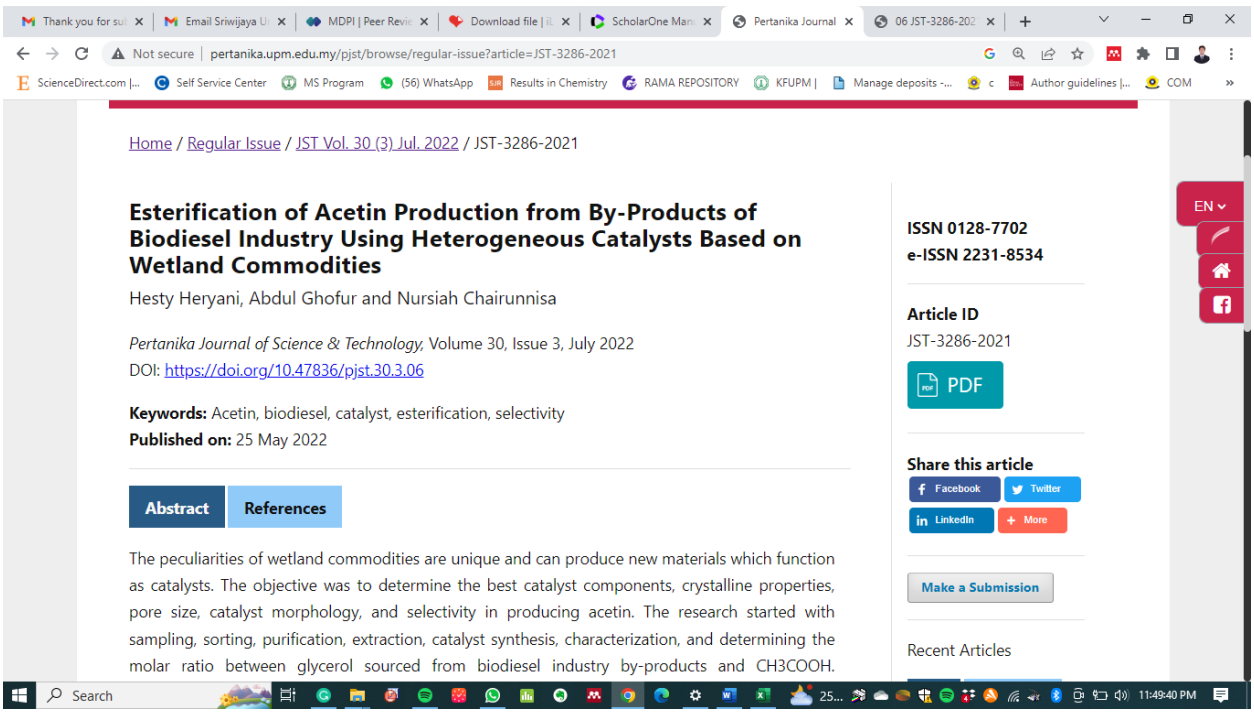
Esterification of Acetin Production from By-Products of Biodiesel Industry Using Heterogeneous Catalysts Based on Wetland Commodities

Hesty Heryani[1]*, Abdul Ghofur[2] and Nursiah Chairunnisa[3]

[1]Department of Agro-industrial Technology, University of Lambung Mangkurat, Banjarbaru 70714, Indonesia
[2]Department of Mechanical Engineering, University of Lambung Mangkurat, Banjarbaru 70714, Indonesia
[3]Department of Civil Engineering, University of Lambung Mangkurat, Banjarbaru 70714, Indonesia

ABSTRACT

The peculiarities of wetland commodities are unique and can produce new materials which function as catalysts. The objective was to determine the best catalyst components, crystalline properties, pore size, catalyst morphology, and selectivity in producing acetin. The research started with sampling, sorting, purification, extraction, catalyst synthesis, characterization, and determining the molar ratio between glycerol sourced from biodiesel industry by-products and CH_3COOH. Determination of catalyst components by XRF spectrometry, crystallinity by XRD, pore size by Brunauer-Emmett-Teller, and morphology of the resulting catalyst used SEM/EDS. Selectivity of the target compound in the form of acetin, either monoacetin, diacetin, or triacetin, used GC-MS. The catalyst of orange peels obtained silica 29.201% and alumina 4.115%, pineapple leaves obtained silica 34.072%



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Esterification of Acetin Production from By-Products of Biodiesel Industry Using Heterogeneous Catalysts Based on Wetland Commodities

Hesty Heryani, Abdul Ghofur and Nursiah Chairunnisa

Pertanika Journal of Science & Technology, Volume 30, Issue 3, July 2022
DOI: https://doi.org/10.47836/pjst.30.3.06

Keywords: Acetin, biodiesel, catalyst, esterification, selectivity
Published on: 25 May 2022

ISSN 0128-7702
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Abstract References

The peculiarities of wetland commodities are unique and can produce new materials which function as catalysts. The objective was to determine the best catalyst components, crystalline properties, pore size, catalyst morphology, and selectivity in producing acetin. The research started with sampling, sorting, purification, extraction, catalyst synthesis, characterization, and determining the molar ratio between glycerol sourced from biodiesel industry by-products and CH3COOH.