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Updated on 2021-06-18

Version 1 ▾

# Design and Synthesis of Conducting Polymer Based on Polyurethane produced from Palm Kernel Oil

VIEWING AN OLDER VERSION

ID 6815187

Muhammad Abdurrahman Munir <sup>SA</sup><sup>1</sup>,  
Khairiah Haji Badri <sup>CA</sup><sup>1</sup>, Lee Yook Heng<sup>1</sup>  
[+ Show Affiliations](#)

## Article Type

Research Article

## Journal

International Journal of  
Polymer Science

Rydz Joanna

Submitted on 2021-06-14 (2 years ago)

[> Abstract](#)[> Author Declaration](#)[> Files](#) 2

## — Editorial Comments

**Peter Foot**

18.06.2021

**Decision**

Revision requested

**Message for Author**

The topic of this manuscript is suitable for Int. J. Polym. Sci. but it must be revised before it can be sent for peer-review. The grammar and typing are very poor, and there are many incorrectly-used words. Reviewers would not properly understand the authors' meaning in many parts of the text. The authors should also emphasize the novel aspects of their research, since there is an abundance of published work on PUs made from vegetable oil derivatives.

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Updated on 2021-09-02

Version 2 ▼

# Design and Synthesis of Conducting Polymer Based on Polyurethane produced from Palm Kernel Oil

VIEWING AN OLDER VERSION

ID 6815187

Muhammad Abdurrahman Munir <sup>SA CA</sup> <sup>1</sup>,  
Khairiah Haji Badri<sup>1</sup>, Lee Yook Heng<sup>1</sup>  
[+ Show Affiliations](#)

**Article Type**

Research Article



Hindawi

Muhammad Abdurrahman ▼

Rydz Joanna

Submitted on 2021-06-14 (2 years ago)

[> Abstract](#)[> Author Declaration](#)[> Files](#) 2[- Editorial Comments](#)

**Peter Foot**

02.09.2021

**Decision**

Major Revision Requested

**Message for Author**

This manuscript is interesting and has sufficient merits to be considered further for publication after due amendments to address the reviewers' comments. The English is quite understandable, but it requires revision to improve the clarity sufficiently for publication.

**— Response to Revision Request****Muhammad Abdurrahman Munir**

22.07.2021

**Your Reply**

Dear Editor, Thank you for your comments to this manuscript. Here I attached the revised manuscript and I have highlighted several sentences as to response your comments before. Kind Regards.

**File**

Manuscript - Munir.docx 909 kB

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Updated on 2021-11-15

Version 3 ▾

# Design and Synthesis of Conducting Polymer Based on Polyurethane produced from Palm Kernel Oil

VIEWING AN OLDER VERSION

ID 6815187

Muhammad Abdurrahman Munir <sup>SA CA</sup> <sup>1</sup>,  
Khairiah Haji Badri<sup>1</sup>, Lee Yook Heng<sup>1</sup>  
[+ Show Affiliations](#)

## Article Type

Research Article

## Journal

International Journal of  
Polymer Science

Rydz Joanna

Submitted on 2021-06-14 (2 years ago)

[> Abstract](#)[> Author Declaration](#)[> Files](#) 3[- Editorial Comments](#)

Peter Foot

15.11.2021

**Decision**

Major Revision Requested

**Message for Author**

\* The synthetic chemistry and general polymer characterization are fine.  
\* I am satisfied with the revisions made by the authors, but I agree with the following comments of Reviewer #3:

1. The reported electrical properties are misleading and incorrect. A current of 53 microamps signifies nothing on its own, and it cannot be used as the basis of a comparison of the authors' polymer with other polymers. The mentions of "conductivity" in the following sentences should be corrected or preferably the sentences should be deleted completely:

Lines 432-435: "Nevertheless, the electroconductivity of PU in this study shows better conductivity several times compared to Bahrami et al. (2019) that reported the conductivity of PU as  $1.26 \times 10^{-6}$  A, whereas Li et al. (2019) reported the PU conductivity in their study was even very low, namely  $10^{-14}$  A. "

and in lines 438-440: "The application of PEG as polyol has been studied by Porcarelli et al. (2017), that reported that the conductivity of PU based on PEG – polyol was  $9.2 \times 10^{-8}$ ." (This sentence doesn't even mention the units of the reported conductivity.)

2. The English is still poor and hard to follow in some places. This includes missing verbs, e.g. line 420 "Polyurethane film deposited" should be "Polyurethane film was deposited"; orthographic errors e.g. lines 123-125 "SPE becomes the best solution owing to its frugal manufacture, tiny size, able to produce on large-scale and can be applied for on-site detection".

Typographic errors should be corrected e.g. line 89: change Pus to PUs; and lines 138-139 "Polyurethane is possible to become an advanced frontier material is chemically modified electrodes.."

As noted by the reviewer, in line 299 "spectrums" is an incorrect word, which should change to "spectra".

Also repetitious or awkward sentences should be rewritten or deleted, e.g. line 53 "The application of petroleum as polyol in order to produce polyurethane has been applied." or lines 56-57 "These reasons have been considered and finding utilizing plants that can be used as alternative polyols should be done immediately."

The sentence in lines 37-38 must be deleted; readers of IJPS don't need to be told what a polymer is!

The authors are strongly advised to seek the help of a fluent English speaker when they revise their manuscript, or to use a professional scientific editing service.

**— Response to Revision Request**

Muhammad Abdurrahman Munir

01.10.2021

**Your Reply**

Greetings, Dear Editor, Hope you are doing well. I have attached several documents such as the manuscript edited and the comments for reviewers. Best regards

**File**

Comments for Reviewers.docx 16 kB

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Updated on 2022-02-02

Version 4 ▾

# Design and Synthesis of Conducting Polymer Based on Polyurethane produced from Palm Kernel Oil

VIEWING AN OLDER VERSION

ID 6815187

Muhammad Abdurrahman Munir <sup>SA CA</sup> <sup>1</sup>,  
Khairiah Haji Badri<sup>1</sup>, Lee Yook Heng<sup>1</sup>  
[+ Show Affiliations](#)

## Article Type

Research Article

## Journal

International Journal of  
Polymer Science

Rydz Joanna

Submitted on 2021-06-14 (2 years ago)

[> Abstract](#)[> Author Declaration](#)[> Files](#) 3[- Editorial Comments](#)

Joanna Rydz

02.02.2022

**Decision**

Major Revision Requested

**Message for Author**

Dear Authors,

The reviewers have raised points that were not fully taken into consideration and revision of the manuscript before it is suitable for publication is still required.

The journal should follow certain standards, such as compliance with general recommendations (IUPAC, SI, manual for authors), so please review and correct manuscript again.

Comments have been entered into the manuscript as a track changes with comments and will be sent additionally.

We look forward to receiving your revised manuscript.

**— Response to Revision Request**

Muhammad Abdurrahman Munir

02.12.2021

**Your Reply**

Greetings, Dear Dr. Peter Foot, Thank you so much for your suggestions to the manuscript. For your information, we have followed your suggestion and ensured the manuscript has been followed the journal regulation. The file contains the revised manuscript and the answer for the reviewer. Please check the manuscript and inform us if there is any revision that should be made. We hope this study can be published in this journal. Best Regards.

**File**

Manuscript - Munir.docx 873 kB



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Updated on 2022-02-10

Version 5

# Design and Synthesis of Conducting Polymer Based on Polyurethane produced from Palm Kernel Oil

VIEWING AN OLDER VERSION

ID 6815187

Muhammad Abdurrahman Munir <sup>SA CA</sup> <sup>1</sup>,  
Khairiah Haji Badri<sup>2</sup>, Lee Yook Heng<sup>2</sup>  
[+ Show Affiliations](#)

## Article Type

Research Article

## Journal

International Journal of  
Polymer Science

Rydz Joanna

Submitted on 2021-06-14 (2 years ago)

[> Abstract](#)[> Author Declaration](#)[> Files](#) 2[- Editorial Comments](#)

Joanna Rydz

10.02.2022

**Decision**

Minor Revision Requested

**Message for Author**

Dear authors,

The text still needs to be improved.

1. Please properly describe the results from FTIR throughout the text also in Conclusion.

"N=C=O is not a peak. Functional groups give characteristic signals in a spectrum. Please use scientific language throughout your text and please describe the FTIR spectra properly"

"Thank you for your suggestion. Nevertheless, the reading of this spectrum based on Spectroscopy book 4th Edition by Lampman et al. It is written on Page 29, 77 and 78 (Figure 2.64) about the spectrum of N=C=O. According to their research, the isocyanates have sp-hybridized carbon atoms similar to the C≡C bond. The absorption occurs in 2100-2270 cm<sup>-1</sup>"

Exactly, then why do you write "N=C=O peak"? It is a scientific work and that is the language it should use.

"and confirmed by the absence of peak at 2241 cm<sup>-1</sup> attributed to the sp-hybridized carbon atoms of ....."/or "absorption bands at 2241 cm<sup>-1</sup> associated with N=C=O bond stretching...." Please correct.

2. "bio based" is one word and should be spelled the same way throughout the text, see lines 21 and 75 (correct). Please correct throughout the text (It is best to use the find options throughout the text).

3. Line 150-152: The reagent purity record was perfectly correct and please restore it. The note was about DMSO, which was 2 times.

4. Line 220: the parenthesis is missing.

5. Line 369, 507, 513: "bio polyurethane". Should be bio-based polyurethane. A single comment applies to the entire text!

6. Table 2: Please explain variables such as Tmax, etc. under the table.

The table has not been corrected and is still incomprehensible. It not only shows the "weight loss percentage" as its caption suggests, but also other parameters. Please properly title it. Right now, the table shows that the weight loss percentage of sample Tmax has changed by 240!

The first row should be discarded. The table shows the TGA parameters of one sample, so there is no need to put it in the table. Please correct.

**— Response to Revision Request**

Muhammad Abdurrahman Munir

10.02.2022

**Your Reply**

Greetings, Dear Dr. Joanna Rydz We would like to inform you that the manuscript has been revised according to the reviewer's comments. Journal: International

Journal of Polymer Science Manuscript ID: 6815187 Title: "Design and Synthesis of Conducting Polymer Based on Polyurethane produced from Palm Kernel Oil"  
Comments and track changes are attached. We look forward to receiving your revision if any. Best Regards.

**File**

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Updated on 2022-02-15

Version 6 ▼

# Design and Synthesis of Conducting Polymer Bio-Based Polyurethane Produced from Palm Kernel Oil

VIEWING AN OLDER VERSION

ID 6815187

Muhammad Abdurrahman Munir <sup>SA CA</sup> <sup>1</sup>,  
Khairiah Haji Badri<sup>2</sup>, Lee Yook Heng<sup>2</sup>  
[+ Show Affiliations](#)

## Article Type

Research Article

## Journal

International Journal of  
Polymer Science

Rydz Joanna

Submitted on 2021-06-14 (2 years ago)

[> Abstract](#)[> Author Declaration](#)[> Files](#) 2[- Editorial Comments](#)



## Decision

Minor Revision Requested

### Message for Author

1. "bio based" is one word and should be spelled the same way throughout the text. Please correct throughout the text.

"Please correct throughout the text" means using the search option to find "bio based" throughout the text. The reviewer only has to point out what is wrong. Please correct in lines 77 and 518.

2. Conclusion: "and the presence of N-H peak at 3300 cm<sup>-1</sup>"

N-H is also not a peak. Neither linkage is a peak.

Please correct on: "and the presence of absorption bands associated with N-H at 3300 cm<sup>-1</sup>"

Please also correct throughout the text!

3. Table 2.

The table shows the "Thermal degradation parameters determined by TGA".

Please remove "% Weight loss (wt%) and thermal degradation (Td)" from the table and leave only two rows with variables (first) and data (second).

Thermogravimetric analysis is measurement of thermal stability of materials. In this method, changes in the weight of a specimen are measured while its temperature is increased. It does not need to be written in the row of table.

In this section (d. The thermal analysis), the authors write both mass and weight.

Please change everything to mass.

Line 369 "Tmax: The temperature of polyurethane started to degrade"

Tmax represents the temperature at the maximum mass-loss rate. "The temperature of material started to degrade" is onset temperature usually given for 5% (T5%) because it is difficult to accurately determine the beginning (Tonset). What temperature did the authors mean?

The authors rightly speak of "individual mass steps"

Td1 is probably temperature at the first onset or at the first Tmax (at the first mass loss step).

Please use the IUPAC nomenclature and correctly present and describe the TGA variables (<https://www.degruyter.com/database/iupac/html>).

## — Response to Revision Request

Muhammad Abdurrahman Munir

13.02.2022

### Your Reply

Dear Dr. Joanna, Thank you for your comments and we have done revisions based on your comments above. Nevertheless, for the comment no. 6, we want to elaborate about the Tmax, where according to Figure 7. DTG thermogram of PU film, Page 19. The temperature was started to degrade at 240 C, that's why we called it as Tmax. So, the Td1, Td2 and Td3 in this manuscript are the thermal degradation

that we have plotted based on the specific region. However, if the revisions we have made are not sufficient, please guide us to improve this manuscript so it can be published to this Journal. We are looking forward to hear from you. Best Regards.

**File**

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Updated on 2022-03-24

Version 7 ▾

# Design and Synthesis of Conducting Polymer Bio-Based Polyurethane Produced from Palm Kernel Oil

VIEWING AN OLDER VERSION

ID 6815187

Muhammad Abdurrahman Munir <sup>SA CA</sup> <sup>1</sup>,  
Khairiah Haji Badri<sup>2</sup>, Lee Yook Heng<sup>2</sup>  
[+ Show Affiliations](#)

## Article Type

Research Article

## Journal

International Journal of  
Polymer Science

Rydz Joanna

Submitted on 2021-06-14 (2 years ago)

[> Abstract](#)[> Author Declaration](#)[> Files](#) 2

## — Editorial Comments

Joanna Rydz

22.03.2022

Decision

Publish

## — Response to Revision Request

Muhammad Abdurrahman Munir

18.02.2022

**Your Reply**

Dear Dr. Joanna, We are thank you so much for you suggestion to this manuscript. We have followed your revisions and looking forward to hear from you. We apologize for the inconvenience during the revision process. Please check the revision and inform us if there is any revision. Best Regards.

**File**Manuscript - Munir.docx 902 kB [+ Reviewer Reports](#)

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# Design and Synthesis of Conducting Polymer Bio-Based Polyurethane Produced from Palm Kernel Oil

PUBLISHED

ID 6815187

Muhammad Abdurrahman Munir <sup>SA CA</sup> <sup>1</sup>,  
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Ahlam Inayatullah<sup>3</sup>, Hamid Alkhair Badrul<sup>3</sup>,  
Emelda Emelda<sup>4</sup>, Eliza Dwinta<sup>4</sup>,  
Nurul Kusumawardani<sup>4</sup>,  
Ari Susiana Wulandari<sup>4</sup>, Veriani Aprilia<sup>4</sup>,  
Rachmad Bagas Yahya Supriyono<sup>4</sup>  
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## Article Type

Research Article

## Journal

International Journal of  
Polymer Science

Rydz Joanna  
Submitted on 2021-06-14 (2 years ago)

[> Abstract](#)[∨ Author Declaration](#)**Conflict of interest:** *Not declared***Data availability statement:** All data experiments can be found in the manuscript.**Funding statement:** This research was funded by Universiti Kebangsaan Malaysia, through its internal grant number GGP-2019-021. The APC was funded by Faculty of Science and Technology, Universiti Kebangsaan Malaysia.[> Files](#) 2



Greetings,

Dear Prof. Torsi

First of all, we would like to thank the editor owing to accept our manuscript with several revisions considered. Thus, we provide the answers for the reviewers below:

**Reviewer 1**

1. Figure 8--there is no chemical basis for drawing specific structures for the oxidation products of histamine. If such detailed chemical transformations are being proposed, then the mechanism needs to be backed up with any kind of chemical characterization, such as IR spectroscopy (I think that's the most useful, as the authors are proposing the evolution of aldehydes, ketones and nitroso compounds, all of which have unmistakable IR signatures). I also think this figure is unnecessary and is better omitted.

**Answer:**

Figure 8 has been omitted based on the reviewer's suggestion.

Nevertheless, the characterization of polyurethane and lithium perchlorate ( $\text{LiClO}_4$ ) have been studied and analyzed using several instruments such as FTIR and NMR to analyze the structure of PU- $\text{LiClO}_4$ , meanwhile the TGA, and DSC to study the thermal properties of PU- $\text{LiClO}_4$  and FESEM was applied to study the surface of the polymer.

However, for your information, these investigations have been submitted to another journal namely "International Journal of Polymer Science" entitled Design and Synthesis of Conduction Polymer Based on Polyurethane produced from Palm Kernel Oil. The manuscript has been accepted with several revisions (minor revision). Because of that, we did not put the data into this manuscript.

2. While extensive electrochemical characterization of the modified electrodes are presented, no surface chemical characterization is provided. For example, what is the surface roughness (AFM), or coating morphology/phase separation (SEM, EDS)? what is the surface composition and the uniformity of this composition (SEM+EDS, XPS)? Are there particular functional groups that are found in the casting solution that are also preserved in the modified electrodes (IR, DSC)?

**Answer:**

We respond to this comment similar to the first comment.

3. The interferents chosen to prove selectivity are confusing. Yes, they are all amines, but other interferents could also lead to an observed oxidation signal from the reported electrode. For example, sugars, tyrosine, and dissolved NO<sub>x</sub> species will also be oxidized on the surface of the reported working electrode and may cause false positives. Also, what is the error in the sensing signal obtained for histamine vs the other amines/anilines reported here?

**Answer:**

We comprehend that the interferents may lead to a similar oxidation signal with histamine. Nevertheless, we focused on other amines such as cadaverine and putrescine because if they are found inside the foods, they can increase the toxicity of histamine. This is very dangerous, maybe for the next study, we will add several compounds in order to study the interference and the selectivity of the sensor.

The error in the sensing signal of histamine compared to others is the potential applied, where the histamine signal gives the difference of potential applied compared to other amines.

**Reviewer 2**

1. I suggest the following keywords: screen printed electrode; histamine; polyurethane; mackerel.

**Answer:**

Done.

2. Page 5: Please add in the experimental section sources/brands of all reagents.

**Answer:**

Done. All sources and brands have been written in this manuscript.

3. Please, add all experimental details as such as solvent of solutions, concentrations and amounts in the manuscript.

**Answer:**

Done. The details such as solvent of solutions, concentrations, and amounts have been written in this manuscript.

4. Figure 1 was not cited or mentioned in the manuscript. The answer should be added in the manuscript.

**Answer:**

Done. Figure 1 is mentioned on Page 6, in Part 2.2.

5. Lines 149-162: The results discussed between lines 149 and 162 were not showed. All results of manuscript should be showed and discussed. If necessary, the results can be added in a supporting information file.

**Answer:**

Done. Almost all important data have been put in this manuscript.

6. Line 168: how polymer film thickness ( $l$ ) was estimated?

**Answer:**

The thickness was measured using Thickness Gauge Calipers and has been written on Page 9.

7. Figure 2: What solution was used? What concentration? What equivalent circuit model was used to fit the EIS results? Please add all details in the manuscript. Figure caption should be completed also.

**Answer:**

Done. The corrections have been written on Page 9.

8. Figure 3: What solution was used? What concentration? Please add all details in the manuscript. Figure caption should be completed also.

**Answer:**

Done. The corrections have been written on Page 10.

9. “with various of lithium perchlorate amount in 0.1 mmol·L<sup>-1</sup> KCl” lithium perchlorate is dissolved in KCl solution or on SPE surface? Please add in the manuscript.

**Answer:**

The correction has been mentioned in the manuscript on Page 8.

10. “the anodic peaks that approximately at +0.5 V represent the oxidation process of unmodified SPE and modified SPE” oxidation process of what? Lithium perchlorate has an oxidation process? Please add in the manuscript.

**Answer:**

The correction has been made on Page 11.

11. The sentences from lines 183-188 are repetitive, please review.

**Answer:**

Done. The sentences have been rephrased.

12. What is the geometric area of working electrodes? Please add in the manuscript.

**Answer:**

The geometric area has been mentioned on Page 11.

13. Figure 5 is not a calibration curve. Calibration curve is commonly used to concentration vs. signal. Please revise the manuscript and figure captions.

**Answer:**

The calibration curve is commonly used for concentration vs. signal, however in this study, the calibration of scan rate vs. current and potential applied vs. current are imperative in order to get the  $y = mx + c$ , and the value can be used to the specific equation as mentioned on Page 13.



14. Line 221: what is “ $\ln v w$ ”?

**Answer:**

$\ln$  is inverse and has been revised and mentioned on Page 13.

15. Figure 6: there is not legend for potential (y axis). Please add in the manuscript.

**Answer:**

Figure 6 has been revised. This figure was established in order to study the influence of pH that can influence the current ( $I_p$ ) and potential applied ( $E$ ).

16. Why the histamine peak current increased with pH ranged at 6.0 – 7.5 and then decreased at higher values? Please add in the manuscript.

**Answer:**

The explanation has been done on Page 15. It can be concluded that histamine can

17. How and why no cathodic peak was found in Figure 7 if in Figure 3 there is a cathodic peak? Please add in the manuscript.

**Answer:**

This is because many reports of histamine detection was focusing on anodic peak or oxidative peak. There are no studies or reports of histamine detection related to cathodic or reductive peaks. Thus, histamine is easily oxidized using this approach.

18. The results of the amount of polyurethane should be added and discussed in the manuscript.

**Answer:**

Done. The results of the specific amount of PU have been discussed and mentioned on Page 17.

19. Repeatability and reproducibility study should be added in the manuscript.

**Answer:**

Done. This study has been done and shown in Table 2, Page 20.

20. The manuscript should be professionally corrected.

**Answer:**

Done.

21. The literature citation needs more updates. Following references must be included in the manuscript to make it better: Pen sensor made with silver nanoparticles decorating graphite-polyurethane electrodes to detect bisphenol-A in tap and river water samples (<https://doi.org/10.1016/j.msec.2020.110989>); Simultaneous Detection of Quercetin and Carbendazim in Wine Samples Using Disposable Electrochemical Sensors (<https://doi.org/10.1002/celc.202000788>); Selective and sensitive multiplexed detection of pesticides in food samples using wearable, flexible glove-embedded non-enzymatic sensors (<https://doi.org/10.1016/j.cej.2020.127279>) and Simultaneous, ultrasensitive detection of hydroquinone, paracetamol and estradiol for quality control of tap water with a simple electrochemical method (<https://doi.org/10.1016/j.jelechem.2019.113319>).

**Answer:**

Thank you and we have put several papers mentioned by the reviewer to include those papers in this manuscript.

### **Reviewer 3**

1. What is the reason for using Lithium perchlorate since lithium can show toxic behavior.

**Answer:**

In this study, we used lithium in order to modify the conductivity of polyurethane. Thus, this modified electrode can be applied better from an electrochemical perspective. We also used lithium, because we wanted to find better materials in terms of price compared to platinum, gold, carbon nanotube, and graphene.

2. Authors have to brief further on what kind of SPE they have used and how they are pretreating them.

**Answer:**

The kind of SPE has been shown on Page 2 & 7.

3. Why authors have chosen final potential as 1V, histamine showing voltammetric behavior around 0.2-0.3 V

**Answer:**

The oxidative peak of histamine in this study appeared at +0.31 V as we mentioned on Page 15.

4. Authors has to calculate the active surface area of the electrode after modifications

**Answer:**

The calculation has been put on Page 11.

5. 0.13 mmol 0.063 mmol are showing same current authors need to explain it

**Answer:**

Based on this data, it can be concluded that 0.063 can be rounded to 0.01 and 0.13 mmol can be rounded to 0.01. Nevertheless, this data is important to reveal the selectivity and the sensitivity of the DPV method to detect histamine using SPE-PU-LiClO<sub>4</sub>.

6. Why is square wave voltammetry not used for quantifications which is much more sensitive?

**Answer:**

Some studies reported the sensitivity of square wave voltammetry. Nevertheless, this study has reported that the differential pulse voltammetry (DPV) technique has better sensitivity compared to SWV as can be seen in Table 1, Page 19.