

---

**MEMORANDUM**

---

**Rujukan** : UNIMAS/TNC(PI)-04.01/09-08/FRGS/2003 (29)

**Kepada** : Timbalan Ketua Pustakawan  
Pusat Khidmat Maklumat Akademik

**Daripada** : Timbalan Pengarah  
Pusat Penyelidikan, Inovasi dan Enterprise

**Tarikh** : 29 Julai 2021

**Perkara** : **Bahan-Bahan Rujukan**  
**Kod iRIS UNIMAS: C09/FRGS/2003/2020**  
**Kod Pemberi Dana: FRGS/1/2020/STG04/UNIMAS/02/1**

Dengan segala hormatnya perkara di atas dirujuk

Bersama ini dimajukan *Book of Abstracts* menghadiri persidangan untuk simpanan pihak puan.

1. Dr Melody Anak Kimi – *7<sup>th</sup> International Conference on Recent Advances in Materials, Minerals & Environment (RAMM 2022) pada 19-20 Julai 2022*  
**Tajuk** : *Direct Extraction of Chitosan from Snails Shells by Natural Deep Eutectic Solvent*

Sekian, terima kasih.



Dr Abang Azlan Mohamad  
**b.p Pengarah Kanan**

# ABSTRACT BOOK

---

'ADVANCES IN MATERIALS,  
MINERALS & ENVIRONMENT  
RESEARCH:

PROVIDING THE PATH  
FOR SUSTAINABLE DEVELOPMENT'

---



7<sup>TH</sup> INTERNATIONAL  
CONFERENCE ON  
RECENT ADVANCES IN  
MATERIALS, MINERALS  
& ENVIRONMENT  
2022



**RAMM**  
2022

19 - 20  
JULY  
2022

---

ONLINE CONFERENCE

---

<b>RAMM-2022-0049</b>	<b>43</b>
Evaluation of Rock Mass Rating in Underground Mine Bukit Kachi using UAV photogrammetry method Nur Hidayah Ahmad Nizar, Muhammad Akmal Arifin, Khong Lin Xin, and Hareyani Zabidi	
<b>RAMM-2022-0050</b>	<b>44</b>
Modelling of PH/Conductivity in the Transportation of Solute Contaminants in Surface Water through the Life of a Mine K.C. Aluwong, M.H.M. Hashim, and S. Ismail	
<b>RAMM-2022-0051</b>	<b>45</b>
Investigating the Impact of Burden and Spacing on Blasting Output in Zeberced Quarry M.B. Saka, S.O. Ayoola, and M.H.M. Hashim	
<b>RAMM-2022-0055</b>	<b>46</b>
A sustainable approach for oil-polluted water remediation by earth-abundant materials R. Rahimi and M.H.M. Hashim	
<b>RAMM-2022-0056</b>	<b>47</b>
Assessing the groundwater quality and hydrogeochemical characteristics of karst aquifers in Kinta Valley, Perak Ling Xin Khong, Nur Hidayah Ahmad Nizar, Suhaina Ismail, Noor Aida Saad, Mohammad Azfar Kamaruddin, and Hareyani Zabidi	
<b>RAMM-2022-0057</b>	<b>48</b>
Characterisation Of Waste Cooking Oil for Flotation of Waste Printed Circuit Board (Wpcb) Fines Richard Mazunzo Dikamdima, Suhaina Ismail, Ku Esyra Hani Ku Ishak, Syed Fuad Saiyid Hashim	
<b>RAMM-2022-0058</b>	<b>49</b>
Additive Manufacturing of Halochromic Polylactic Acid (PLA) Q.H. Chan, M.Z. Zamri, A. Rusli, Z.A.A. Hamid, M.K. Abdullah, M.D. Syafiq, K.I Ku Marsilla	
<b>RAMM-2022-0059</b>	<b>50</b>
Effect of Fiber Orientation and Temperature on the Mechanical Properties of Unidirectional Continuous Kenaf Reinforced PLA Composites I. Tharazi, A. B. Sulong, C.H.C. Haron, and N. Muhamad	
<b>RAMM-2022-0060</b>	<b>51</b>
Direct Extraction of Chitosan from Snail Shells by Natural Deep Eutectic Solvent Kimi, M., Hamdi, M.H	

3.15-3.45 pm	<b>Vendor 1: Dr. Tadashi Arie (RGS)</b> Title of the talk: Introduction to the Latest Thermal Analyzers and Software Chairperson: Prof. Ir. Dr. Zuhailawati Hussain <a href="http://tiny.cc/Keynote2">http://tiny.cc/Keynote2</a>					
<b>Break Out Session</b>	<b>Parallel Session: Properties of Advanced Materials</b> Chairperson: Dr. Shah Rizal Kassim <a href="http://tiny.cc/Parallel4">http://tiny.cc/Parallel4</a>		<b>Parallel Session: Polymer and Composites</b> Chairperson: Ir. Dr. Muhammad Khalil Abdullah <a href="http://tiny.cc/Parallel5">http://tiny.cc/Parallel5</a>		<b>Parallel Session: Mining Environments</b> Chairperson: Assoc. Prof. Dr. Hareyani Zabidi <a href="http://tiny.cc/Parallel06">http://tiny.cc/Parallel06</a>	
	<b>Time</b>	<b>Presenter</b>	<b>Time</b>	<b>Presenter</b>	<b>Time</b>	<b>Presenter</b>
3.45 - 5.15 pm	3.45-4.15	Invited 4: AP Dr. Abdul Rahim Othman Universiti Teknologi Petronas	3.45-4.15	Invited 5: Prof. Dr. Hazleen Anuar Deputy Director (Grant Initiative Unit) Research Management Centre, IIUM	3.45-4.15	Invited 6: Ts. Dr. Emeem Marina Salleh, Research Officer, Mineral Research Centre, Department of Mineral and Geoscience Malaysia
	4.00-4.15	Oral 12: RAMM 2022-0011 Ku Nooryasmin Binti Ku Wadzer, Universiti Sains Malaysia	4.00-4.15	Oral 17: RAMM 2022-0083 Mariz Gabrielle Domingo University of Philippines	4.00-4.15	Oral 21: RAMM 2022-0017 Abdul Bin Saleman Universiti Teknikal Malaysia Melaka
	4.15-4.30	Oral 13: RAMM 2022-0060 Melody Kimi, Unimas	4.15-4.30	Oral 18: RAMM 2022-0058 Qi-Hua Chan Universiti Sains Malaysia	4.15-4.30	Oral 22: RAMM 2022-0050 Kushai Caleb Aluwong University of Jos, Plateau, Nigeria
	4.30-4.45	Oral 14: RAMM 2022-0086 Christine Ann Macababba University of Philippines	4.30-4.45	Oral 19: RAMM 2022-0082 Mrs. Nurul Nazmin binti Zulkarnain Universiti Teknologi Petronas	4.30-4.45	Oral 23: RAMM 2022-0034 Allene Albania Linus Universiti Malaysia Sarawak
	4.45-5.00	Oral 15: RAMM 2022-0066 Dr. Nurul Affiqah Arzaee			4.45-5.00	Oral 24: RAMM 2022-0055 Rezvan Rahimi

## Direct Extraction of Chitosan from Snail Shells by Natural Deep Eutectic Solvent

**Kimi, M.<sup>1\*</sup>, Hamdi, M.H.<sup>1,2</sup>**

<sup>1</sup> Centre for Pre-University Studies, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

<sup>2</sup> Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300, Kota Samarahan, Sarawak, Malaysia

\*kmelody@unimas.my

**Keywords:** Chitosan, natural deep eutectic solvent, acetogenin

Chitosan are biopolymers that have diverse biocompatibility to be used in medicine, agriculture, food and cosmetics applications. However, the processes involved to extract chitosan from natural resources often employs hazardous chemicals and long processing time. This work provides sustainable direct extraction method of chitosan from snail shells. Previous attempt had proven that acetogenin in graviola extracts succeeded in the extraction of chitosan from solid marine shells. However, the slow reaction has prompt the improvement of graviola extract by adding another solution which can act as hydrogen bond acceptor into the graviola extract. Choline chloride is an excellent hydrogen bond acceptor (HBA) is mixed with acetogenin as hydrogen bond donor (HBD). This mixture at 2:1 ratio and 80°C forms a natural deep eutectic solvent (NADES) for the direct extraction of chitosan. Chitosan obtained from this method has a degree of deacetylation (DDA) of 91%, crystallinity index (CI) of 13% and a molecular weight of 236 Da. From the Scanning Electron Microscope images, the chitosan has fiber-like morphology. The direct extraction of chitosan from the combination of choline chloride and acetogenin NADES has proven to extract chitosan with comparable properties to commercial chitosan.

**Acknowledgement:** The authors would like to thank Kementerian Pengajian Tinggi Malaysia, Fundamental Research Grant Scheme, FRGS/1/2020/STG04/UNIMAS/02/1

