JOURNAL WRITING SKILLS: A GUIDE

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BIBLIOGRAPHY

Dr. Rahizana, a lecturer at the Petrochemical Engineering Department, Politeknik Tun Syed Nasir Syed Ismail in Pagoh, Johor. She holds a Bachelor's degree in Chemical Engineering from USM (1999), a Master's degree in Technical and Vocational Education from KUiTHHO (2002), and recently earned her Doctorate in Chemical Engineering and Process from UKM (2022). With 20 years of teaching experience, she has gained extensive expertise in the field of Chemical Engineering. Beyond her role as an educator, Dr. Rahizana actively engages as a journal author, paper reviewer, and referee for student projects and conferences. Her involvement contributes to the advancement of academic research and the dissemination of knowledge

Rozieana, an esteemed lecturer at the Petrochemical Engineering Department of Politeknik Tun Syed Nasir Syed Ismail in Pagoh, Johor, has a noteworthy academic history. She holds a Bachelor's degree in Technology with Education (Electrical and Electronics Engineering) from UTM (2002), a Master's degree in Science from UTM (2014), and in pursue of her Doctorate in Chemical Engineering from UTM (2018-2023). With a teaching experience of 20 years, she has accumulated substantial expertise in the field of Electrical Engineering with considerable exposure to Chemical engineering. Alongside her role as an educator, Rozieana actively participates as a journal author, trainer, and referee for student projects, making valuable contributions to the advancement of academic research and the dissemination of knowledge.

Kamal Firdausi is a lecturer in Electrical and Instrumentation Programme at Politeknik Tun Syed Nasir Syed Ismail with 20 years of teaching experience in Electrical and Electronic Engineering. He holds a degree in Electrical Engineering from Universiti Teknologi Mara and a Master's in Technical and Vocational Education from Kolej Universiti Tun Hussein Onn. He actively engages in research, publications, and professional collaborations, staying updated with the latest advancements.

PREFACE

The purpose of creating the e-module is to offer the lecturer a comprehensive understanding of the fundamental principles, concepts, and clear guidelines for writing technical papers that meet the standards required for publication in reputable research journals. This e-module serves as a valuable resource, providing a step-by-step guide for initiating an academic paper journal based on the findings of your project. Moreover, it can also serve as a helpful tool for lecturers to assist their students in commencing their research and understanding the essential components necessary for a successful research publication.

With these responsibilities in mind, the primary objective of this e-module is to enhance the lecturer's ability to identify the fundamental knowledge required for producing a technical paper journal. To facilitate the lecturer's comprehension, we have included a sufficient number of examples that will strengthen their knowledge and understanding.

Dr. Rahizana Mohd Ibrahim

Rozieana Abu

Kamal Firdausi bin Abd Razak

ACKNOWLEDGEMENT

CONTENTS

TITLE	Research Topic	Web tools
	1. Find your research topic related to your research paper. 2. Choose the most related paper. 3. Open the related paper using google scholar. 4. Create a library using mendeley. Create library step by step ➢ https://sites.google.com/a/mendeley.com/mendeley-training/home/learn/build-your-library	Explore connected papers in a visual graph https://www.connectedpapers.com 1. Attachment 1 (spider web) 2. Attachment 2. (similarity comparison) https://scholar.google.com 3. Attachment 3. (http://www.mendeley.com)
	Segregation of Data 1. Download articles into different folders based on type of data 2. Upload all the papers into Mendeley library. 3. Read the papers through Mendeley. 4. Cite the papers through Mendeley. 5. Update the articles through mendeley library. 6. Built the systematic literature review table. (Attachment 1) (limit at least 20 paper according to 5 years back).	1. Attachment 4 (literature Review)

ABSTRACT	The Abstract should be no more than 300 words and should be direct and concise. Include the purpose, a brief synopsis of the research, and any relevant results or conclusions.	
	Example 1: Nanocellulose prepared from the natural material has a promising wide range of opportunities to obtain the superior material properties towards various end-products.	**Purpose** 25% of your space on the purpose and importance of the research (Introduction/Purpose)
	Example 2: Natural fiber-reinforced polymer composites (NRPCs) are replacing many synthetic fibers because of their cheap availability and their hygienic, ecological, biodegradable, and sustainable properties	
	Example 3: $Zn_{1-x}Y_xS$ (x = 0.00, 0.02, 0.04, 0.06, 0.08, and 0.10) was prepared by reverse micelle method using sodium bis(2-ethylhexyl)sulfosuccinate (AOT) as surfactant; Y refers to Ni^{2+}, Co^{2+}, and Mn^{2+} ions. ➢ This paper analyses how …..	

	Example 1: In this research, commercially available natural cotton was treated with aqueous sodium hydroxide solution to eliminate the hemicellulose and lignin, then cellulose was collected Example 2: This work involved extraction of new cellulosic fibers from red banana peduncle (RBP) plant and investigated its chemical composition, physical, structural, thermal, and tensile properties. ➢ To answer this question, we compared the performance of	**Method** 25% of your space on what you did (Methods)
	Example 1: FT-IR and EDAX results confirmed the incorporation of ion dopants into ZnS crystal structure, and XRD results showed that ZnS:Y nanoparticles crystallized in a zinc blende structure without any impurity. The particle size of all of samples ranged from 2 nm to 4 nm, as calculated by the Debye–Scherrer formula and Brus equation. Ion doping shifted the absorption edge to lower wavelengths, as shown in the obtained UV-vis spectra of samples.	**Results** 35% of their space on what you found (Results)

	Bandgap energy values ranged from 4.1 eV to 4.9 eV. PL characteristics of the doped ZnS were compared, and ZnS:Mn^{2+} was found to have the highest PL intensity ratio (33.86%). Example 2: RBP fibers (RBPFs) have high specific strength and good binding properties due to their light weight andpresence of high cellulose (72.9 wt%), low lignin (10.01 wt%), and wax (0.32 wt%). X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FTIR) determined that RBPFs are rich in cellulose content with a crystallinity index (CI) of 72.3%. The density and diameter of the fibers were found to be about 0.896 g/cm3 and 15–250 μm, respectively. The fiber was thermally stable up to 230°C ➤ Our results showed a trivial effect of expertise …..Results also revealed that ….. However, the..	
	Example 1: The increased PL intensity ratio indicated increased homogeneous nanoparticle growth with decreased surface defects.	**Implication** 15% of their space on the implications of the research

	Example 2:
	Based on the results of this work, it seems that the properties of the fiber are a suitable candidate as a natural reinforcing material for the development of the biocomposite for potential application.
	➤ From a safety perspective, In conclusion this study emphasizes the need to take into account the impact of these …..

INTRODUCTION	This portion constitutes approximately 10% of the overall word count in the main body of a standard research paper, equivalent to approximately 400 words distributed across three paragraphs in a research paper with a total length of 4000 words..
	FIRST PARAGHRAPH
	Give the Introduction data and set the setting.
	The Introduction sentence **MUST NOT BE TOO BROAD:**

	Examples 1:	Note that in the examples 1, the
	A paper that discusses the nanosized semiconductors unique characterization can begin as follows:	Introduction did not begin by talking about nanoparticles, semiconductor in general but by mentioning the nanosized semiconductor characteristic.
	Nanosized semiconductors are extensively studied because of their unique characteristics caused by their quantum-size and surface effects that differ from bulk material characteristics.	

	Example 2 Energy storage devices are the most significant parts for the practical application of the renewable energy and electric vehicles (EVs), which promote the replacement of conventional power resources by renewable energy. (Li et al. 2020)	In example 2, the introduction of renewable energy begin with the singnificant of energy storage device and not general statement of renewable energy.
	Example 1 Zinc sulfate (ZnS) is a nontoxic II–VI semiconductor material with direct and large bandgap that is widely studied because of its numerous potential applications, including solar cells, bio-imaging, wavelength-tunable lasers, and electronic and optoelectronic nanodevices. (Rahizana et al. 2015) Example 2 As the most promising energy storage systems, lithium batteries show several advantages, such as high operating voltage, high energy density, low self-discharge rate, and long cycle life. (Li et al. 2020)	**The second sentence** can refer to a specific area within the broad field that was introduced in the first sentence.

SECOND PARAGRAPH

Introduce the specific topic of your research and discuss its significance.

As the author, you should move on to presenting the particular subject of your research. In order to demonstrate the significance of the subject or the important of the issue, you can now include some data in the following section.

Example 1	The second paragraph should refer to the objective of your main research.
Considerable attention has been given to different approaches to controlling nanoparticle size and morphology. Among the various techniques for producing nanoparticles, reverse micelle method is considered a promising technique to prepare less agglomerated and more monodispersed nanoparticles. (Rahizana et al. 2015).	
Example 2	
NC can be obtained from any natural cellulosic source materials, such as wood pulp, which consists of a tightly packed array of a needle-like structure called 'nanofibril'. The preparation strategy is systematic and obtained by top-down and bottom-up approaches. (T. Theivasanthi et al. 2018)	

SECOND PARAGRPH

Another way to emphasize the importance of your research topic is to highlight the potential benefits of solving problems or finding answers to questions. Possible savings, higher productivity, longer lasting devices, and more. This approach emphasizes the positive.

Examples:

1. Instead of saying that X liters of water are wasted through irrigation, say that X liters of water can be conserved by adopting water-efficient practices.

2. Instead of saying that X amount of food is wasted each year, say that by reducing food waste, X tons of food can be saved and redirected to feed those in need.

3. Instead of saying that X liter of fuel are consumed by inefficient vehicles, say that by embracing fuel-efficient transportation options, X liter of fuel can be saved, leading to reduced carbon emissions and a cleaner environment.

4. Instead of saying that X amount of plastic ends up in landfills each year, say that by promoting recycling and using eco-friendly alternatives, X tons of plastic waste can be diverted from landfills and contribute to a more sustainable future.

Remember, framing the potential benefits and positive impacts of preventive actions can often be more persuasive and motivating than focusing solely on the negative consequences.

THIRD PARAGRPH

Include previous effort aimed at addressing the research problem or answering the research question.

Although conducting an extensive literature review is not suitable for the Introduction section of a research paper, it is essential to acknowledge any prior related research and clarify the distinctions between your study and previous research. These differences can be straightforward, such as replicating similar experiments with a different substance , expanding the study by employing more sophisticated analytical instruments or a larger and more diverse sample, or conducting the research in a distinct geographical context.

Example1 : One of the most important methods of fabricating nanoparticles is through synthesis. A large variety of procedures have been developed for the synthesis of nanoparticles, such as co-precipitation, soft chemical method, sol-gel and solver thermal (Rahizana et al. 2017). Example 2 For example, the research reported by Sankar et al. (2017) revealed that flexural strength and strain of geopolymer have been improved with 5 wt. % natural bamboo fiber reinforcement. Ribeiro et al. [22] evaluated the influence of alkali and water treatment of the bamboo fibers	State the relevant studies to strengthen the reason why the study was conducted

	on the mechanical properties of the geopolymer composites. They found the compressive strength of bamboo reinforced geopolymer was lower than that of pure geopolymer. (Zhang et al. 2022)	

FOURTH PARAGRAPH

Wrap up the Introduction section by outlining the main goals and objectives of your research.

The sentences that came before them must have resulted in a logical development that led to the particular goals of your research. It is significant to observe that the introduction successfully achieves this by emphasising factual data. The Materials and Methods part of the work is a better place for such things; therefore, it's important to find a balance and refrain from over-explaining.

Example 1	
Therefore, this study will examine the synthesis of Co^{2+} doped ZnS as a prospective doping material in ZnS nanoparticles. Specifically, this study investigated the luminescence characteristic of nanoparticles $Zn_{1-x}Co_xS$ (x: 0-10%) using the reverse micelle method. (Rahizana et al. 2015)	For example 1, your research was about finding the right proportions of ion dopan in ZnS and you tested ten different proportions, you do not have to list all the ten proportions: it is enough to say that the proportions varied from 0% to 10%.
Example 2	
Acid hydrolysis is the common method used for the preparation of NC . Acid hydrolysis of cotton produces the	For example 2, you narrow down your objective by highlighting the synthesis

	hydrocellulose, which is not affected by cold weak acids. In acid hydrolysis, the most important considered point is cellulose acid ratio. The present research uses sulphuric acid-mediated synthesis and characterized the NC after acid hydrolysis method. Their physiochemical, structural and cellulose crystallinity index analyses were carried out by FTIR and XRD analysis. (T. Theivasanthi et al. 2018)	method you have chosen and the corresponding analysis.
MEDTHODOLOGY	1. Please detail your experiments procedure in section Materials and Method or 2. You can also arrange Material, method and Synthesis separately. ➢ *While recognizing the limitations of the chosen approach, we show that this choice was appropriate.* ➢ *Give the reader enough information to understand the experiment, ideally including measurements.* 3. Introduction Provides relevant and comprehensive information about the experiment's environment.	

	2.1 Material and Method	Simple Introductions of Material
	<u>Example 1</u>	
	2.1 Material	
	All reagents procured were of analytical grade and used without additional purification steps. Commercially available Cotton was used as the source material. Sodium hydroxide pellets (NaOH) and sulphuric acid were received from Sigma-Aldrich. All experimental solutions were prepared using de-ionized (DI) water. (T. Theivasanthi et al. 2018)	
	2.2 Extraction of Garlic	
	Garlic extract (GAE) was prepared by using ethanol maceration technique. First, the garlic skin was peeled and separated from the cloves. Peeled garlic was washed with distilled water to remove the remaining dirt. Then, following the garlic extraction method demonstrated by Fujisawa et al. (2008), as much as 30 grams of garlic were crushed using a blender for 10 minutes. The crushed garlic was macerated for one to three nights at room temperature with 30 grams of ethanol 20% (w/w).	Explain in detail the experiment method, including the paper where the method has been implemented.

Example 2

2.1 Material and Method

Zn1−xYxS (x = 0.00, 0.02, 0.04, 0.06, 0.08, and 0.10; where Y refers to Ni^{2+}, Co^{2+}, and Mn^{2+}) was prepared in H_2O/AOT/n-heptane reverse micelle method using precipitation technique. The selected W [(H_2O)/(AOT)] molar ratio was 7 in all prepared solutions……ect..

Example 3

Sample characterizations were performed with a NICOLET 6700 Fourier transform infrared (FT-IR) spectrometer. X-ray diffraction (XRD) patterns of the powdered samples were obtained using a D8 advance diffractometer from 20◦ to 80◦. Crystal size was calculated using Scherrer equation $(0.9λ)/(βcosθ)$ at full width at half-maximum (FWHM) of the XRD peaks. Nanoparticle morphology and size particles were determined using a field-emission scanning electron microscopy (FESEM) system (SUPRA 55 VP) and transition electron microscopy (TEM) system (CM 12). Fluorescence measurements were performed with a PL SP920 spectrophotometer for

You can also directly approach the arrangement of the experiment from the start.

The last sentence should describe the tools used to measure the data include the brand.

optical characterization. (Rahizana et al. 2015)	
<u>Data analysis.</u> The crystalline phases of the obtained nanopowders were identified by X-ray diffraction (XRD) using a Bruker D5005 powder X-ray diffractometer using a CuKα source. Crystallite sizes (D, in Å) were estimated from the Scherrer's equation $$D = \frac{0.9\lambda}{B\cos\theta_B}$$ (K. Omri et al. 2014)	Provides mathematical formulas used for analysis. (if necessary) Provides apparent improvements on these standards while referencing earlier research in the subject to place the methodology in the context of accepted practises.

RESULTS AND DISCUSSION	1. Generally, the discussion section aims to show the advantages and merits of your research to the readers.
	2. The "Discussion" section should not exceed the sum of other sections (ıntroduction, material and methods, and results), and it should be completed within 6–7 paragraphs. Each paragraph should not contain more than 200 words, and hence words should be counted repeatedly.
	3. The discussion section is organised according to the results of the experiments conducted.

Example 1:	**Main Findings**
Optical properties.— The highest absorption intensity was selected as the optimal value from each ion dopant, as shown in Figure 1. The characteristic absorption edges for undoped ZnS and doped ZnS were at 290, 250, 245, and 240 nm for undoped ZnS, $ZnS:Ni^{2+}$, $ZnS:Co^{2+}$, and $ZnS:Mn^{2+}$, respectively, resulting from the quantum confinement effects of particles	The most significant results of your research should be listed directly, declaratively, and without any supporting evidence at the start of the discussion.
Example 2:	
The main finding of the synthesis of bamboo fiber using alkali treatment was that the alkali treatment effectively removed lignin and hemicellulose from the bamboo fibers, resulting in enhanced fiber strength, improved flexibility, and increased fiber surface	

	area, thereby making them more suitable for various applications in textiles and composites.	
	Example 1 Our results show that the doping of Manganese ions had no significant effect on the structural, optical, or electrical properties of ZnS. The presence of Manganese did not lead to any noticeable changes or enhancements in the desired characteristics of the synthesized ZnS material. Example 2 Our results show that alkali treatment successfully removed impurities and lignin from the banana fibers, resulting in improved fiber strength, increased fiber surface area, and enhanced moisture absorption properties. These treated banana fibers showed potential for use in various applications such as textiles, paper, and biocomposites.	**Meaning and Importance of Your Finding** You should convey the significance of your findings and their implications. You should make it simple for the reader to understand the outcomes of your research. Because most readers do not like to read the results more than once, your work would be forgotten and ignored in this circumstance.
	Example 1: The chemical compositions of RBPF as compared with other natural cellulosic fibers to the available data from several articles are tabulated in Table 1. The	**Relationships with Other Studies** All studies are based on questions raised by other studies. These questions motivate new research. On

properties of natural fibers are based on their chemical composition. The chemical compositions of the natural fibers were strongly influenced by the region, plant maturity, soil characteristics, and extraction methods (El Oudiani et al. 2009; Ramanaiah, Ratna Prasad, and Hema Chandra Reddy 2011; Satyanarayana, Guimarães, and Wypych 2007) .

the other hand, other research results may support your research.

Example:

Ramasamy et al.(2012) reported that all Ni-doped samples exhibited two emission peaks; one peak at the blue region (472 nm), and another peak at the green emission region (498 nm). The presence of the two peaks was due to shallow donor level recombination (sulfur vacancy) and $^3T_2$–$^3A_2$ transition of Ni^{2+} ions, respectively. Poornaprakash et al.(2014) reported that Ni^{2+}-doped ZnS nanoparticles exhibited an emission peak at 507 nm with enhanced fluorescence efficiencies that were 10 times higher than those of undoped ZnS nanoparticles. Our results showed the appearance of an emission peak at longer wavelength, which provided a new finding for the luminescence centre of Ni^{2+}-doped ZnS. (Rahizana et al.2015)

Different Explanations

Instead of coming up with an explanation that fits your viewpoints, consider all possible explanations. It helps you find the truth, not just get stuck in a particular design. Don't jump to conclusions based on your perception. Therefore, try to discover, not just prove, your own finding.

	Example 1:	Limitations and Suggestions:
	This finding revealed that particle growth was controlled by the entire reverse micelle system. Comparison of the emission spectra of transition metal ion-doped ZnS showed that ions were doped to the ZnS host lattice either inside or outside the ZnS structure. PL spectra provided an excellent and precise representation of a growing ion dopant in the host of ZnS nanoparticle formation. Thus, reverse micelle synthesis provided an excellence method of studying the formation of doped ZnS nanoparticles during chemical synthesis (Rahizana et al. 2015) Example 2: On the basis of the results of strength as tested above, it can be concluded that mechanical properties of geopolymer are closely related to the micro cracks development and the interfacial adhesion between BS and geopolymer matrix. (Zhang et al 2022).	All research can face limitations, so it's a good idea to discuss limitations in your research rather than waiting to be discovered by other researchers in the future. Based on these limitations and remaining questions, we can also make some suggestions in the discussion area.

CONCLUSION	At the end of your research paper, summarize your ideas and leave a strong final impression on your readers.	
	Example 1: Research question (at the end of Introduction sections) This study investigated the formation of monodispersed nanoparticles in transition metal ion (Ni^{2+}, Co^{2+}, Mn^{2+})-doped ZnS using reverse micelle method. *Conclusion* Transition metal ion (Ni^{2+}, Co^{2+}, Mn^{2+})-doped ZnS were successfully synthesized using reverse micelle method. Example 2: This work involved extraction of a new natural fiber from a red banana plant and study of its properties using chemical analysis (at the end of Introduction sections) *Conclusion* This study presents the extraction process and characterization of new cellulosic fibers from red banana peduncle to evaluate their potential use	**Restate the problems.** The first task of the conclusion is to remind the reader of the research question

	as reinforcement in composite products. The results obtained indicate that RBPF possess high cellulose content (72.9 wt. %) and the lower density (990 kg/m3). (Theivasanthi et al 2018)	
	Example 1: The average size of the ion-doped ZnS ranged from 2.0 nm to 3.5 nm, which indicated strong quantum-size effect. The PL spectra of samples showed that the transition ion metals (Ni^{2+}, Co^{2+}, and Mn^{2+}) exhibited different degrees of incorporation into the ZnS host structure, reduced particle size, reduced surface defects and enhanced optical properties. Among the three ions used in this study, Mn^{2+} ion exhibited the highest potential as a good PL material. (Rahizana et al. 2015). Example 2: Utilization of sodium hydroxide concentration promoted the preservation of the structure of cellulose and favoured the hydrolysis of the components with the amorphous state and the cost-efficient products from cotton. The result proves that cotton can be used to produce NC which	**Sum up the paper** ➤ Depending on the nature of the research, this may mean restating the paper or discussion, or summarizing the overall findings. ➤ Don't go into the details of the evidence or come up with new ideas. Concentrate on summarizing your argument. ➤ Describe your main results and explain the overall conclusions you draw from them, even if they weren't exactly what you expected.

	in turn can be utilized for downstream applications. (Theivasanthi et al 2018)	
	Example: The future need for new natural fibers of all kinds is projected to increase both in significant uses and in new applications. It may be suggested to use fibers in fiber composites in various applications such as roofing sheets, bricks, door panels, furniture panels, interior panelling, storage tanks, pipelines, etc. They may also be suited in other applications such as bath units, chairs, lampshades, partitions, roof, suitcases, trays, tables, and manufacturing of car doors, car interiors, dash boards, headliners, decking, parcel shelves, pallets, spare tyre covers, spare-wheel pan, seat backs, etc (Manimaran et al. 2018).	Conclude the study with a forward-looking note by proposing how you and other researchers might structure this topic in the future and addressing the limitations of current research.

REFERENCES

Before submitting your work, make sure to review the specific guidelines of each journal regarding the content and format of references, as well as their placement in your submission. It is important to double-check these requirements.

Typically, a reference should contain the authors' names and initials, the article title, journal name, volume and issue numbers, publication date, page numbers, and DOI. When using ScienceDirect, articles are connected to their original source or Scopus record, so including the DOI can ensure accurate linking to the correct article.

Example of References (https://www.scribbr.com/citing-sources/citation-styles/)

AAA

The American Anthropological Association (AAA) recommends citing your sources using Chicago author-date style

AAA reference entry	Clarke, Kamari M. 2013. "Notes on Cultural Citizenship in the Black Atlantic World." Cultural Anthropology 28, no. 3 (August): 464–474. https://www.jstor.org/stable/43898483.
AAA in-text citation	(Clarke 2013)

APA

APA Style is defined by the 7th edition of the Publication Manual of the American Psychological Association.

APA reference entry	Wagemann, J. & Weger, U. (2021). Perceiving the other self: An experimental first-person account of nonverbal social interaction. *The American Journal of Psychology*, *134*(4), 441–461. https://doi.org/10.5406/amerjpsyc.134.4.0441.
APA in-text citation	(Wagemann & Weger, 2021)

IEEE

The Institute of Electrical and Electronics Engineers (IEEE) provides guidelines for citing your sources with IEEE in-text citations that consist of numbers enclosed in brackets, corresponding to entries in a numbered reference list.

IEEE reference entry	1. J. Ive, A. Max, and F. Yvon, "Reassessing the proper place of man and machine in translation: A pre-translation scenario," Mach. Transl., vol. 32, no. 4, pp. 279–308, Dec. 2018, doi: 10.1007/s10590-018-9223-9.
IEE in-text citation	[1]

Abstrak (Abstract)	Sub-bahagian (Sub-part)	Ayat anda (Your sentences)
100-300 patah perkataan yang paling ideal 100 to 300 words are most ideal	Pengenalan Introduction	Anaerobic digestion (AD) is especially useful in the treatment of organic waste sources, such as food waste (FW) since AD can support the generation of clean energy while preventing the hazards of uncontrolled GHG pollution originating from landfills.
	Penyataan masalah Problem statement	However, the potential environmental impacts of dry AD and integrated wet AD treatment are largely unknown, particularly in Malaysia.
	Objektif kajian Research objective	Thus, this study aimed to compare the potential environmental impacts of four FW treatment technologies in Malaysia: landfill (Sc0), dry anaerobic digestion (Sc1), wet anaerobic digestion combined with windrow composting (Sc2), and wet anaerobic digestion combined with windrow composting and landfill (Sc3) using life cycle assessment method.
	Metodologi Methodology	The scenario modelling was performed via GaBi v6.0 software using 1 ton of pre-treated FW as a functional unit, with the analysis of environmental impact scores being based on the ReCiPe (H) v1.07 characterization method.

	Hasil kajian utama Main findings/Results	At the midpoint assessment, the Sc1 produced extensive improvements in 12 mid-point impact categories, being the most environmentally favoured FW treatment method compared to the other options in critical categories such as global warming, depletion of fossils and agricultural land occupation. The Sc1 mesophilic conducting reactor in this study used less energy for heating, without generating waste water while requiring a small operating area. Sc3 had the lowest environmental performance since the emissions into the air from windrow composting and landfill were discharged completely without any form of treatment like capturing or flaring. Finally, through the single score analysis, Sc1 was regarded as an appropriate FW treatment technology with the least damaging impact on resource depletion, human health, and ecosystems in comparison to all scenarios. This was accomplished through relatively low power demands for the operation, shorter road transport distances, and a substantial reduction in the amount of waste and electricity generation.

	Cadangan kajian Recommendations	As a recommendation, the technological decisions related to technological readiness level and performance, safety, financial feasibility, also society involvement in the FW segregation program at source must be made.
Pengenalan **(Introduction)**	Sub-bahagian (Sub-part)	Ayat anda (Your sentences)
	Pengenalan kepada isu yang dikaji Pengenalan umum - secara umumnya, di bahagian ini anda menceritakan tentang apa atau siapa (atau keduanya sekali) yang anda ingin sertakan dalam kajian. Introduction to the issues studied General introduction - in general, in this section, inform on what or who (or both) you would like to include in the research.	e.g., Intro storyline: 1. Overview of waste management 2. Overview of food waste management 3. Waste management method in FW management *……refer article* *e.g., (2)* Food waste (FW) currently represents a major component of municipal solid waste (MSW)[1],[2]. Rapid urbanization and the increasing population worldwide have led to the creation of a massive amount of organic waste annually [3]. The current practice of shifting municipal solid organic content, such as food, harvested crops, agricultural waste, and animal waste, from landfills to more sustainable biological technology management, such as composting and anaerobic digestion (AD), has a variety of ecological

benefits. These include reducing the environmental impacts caused by biodegradable waste landfilling, particularly methane and carbon dioxide gas emissions.

There are two classifications of composting techniques: open and closed systems. Open systems utilize natural aerobic processes in the presence of oxygen to convert waste into compost, which is used to restore soil fertility and provide nutrients to vegetation. Closed systems use anaerobic composting to degrade waste into biofertilizers and biogas by products without the presence of oxygen, and are often found in commercial, pilot, or lab/benchtop sizes [3]. It might be illustrated here as two-steps approach similar to Bokashi composting [4].

Generally, the four most well-known modes of composting are windrows, aerated static piles, covered channels, and in-vessel systems, with hyper thermophilic composting being a fifth, less common technique [3].

	Pengenalan – keperluan untuk melakukan research Pengenalan ringkas – maklumkan kepada pembaca anda tentang apa itu bidang kajian anda? *Introduction - the need for research in related field Simple introduction – inform your readers about what is your research?*	Waste treatment systems involve complex biological, chemical, and physical processes, making their performance analysis challenging. Moreover, these systems can vary significantly in terms of their costing for operational parameters, further complicating the analysis [5]. Given that composting and AD in plants differ widely, the variation on process status whether performed under aerobic or anaerobic or combining both conditions does not reflect directly environmental, and economic impacts [2], [6].
	Penyataan masalah Penekanan tentang gap kajian. adakah ia dari segi empirikal? Metodologi? atau teori? Mengapa kajian ini perlu dilakukan? Apa lagi yang masih kurang dan perlu diisi?	4. Issues/problems in technology/system selection in FW management 5. Methods in decision making in FW management - LCC, LCA, LCC+LCA etc 6. Highlight the research gap……*refer article* *e.g., (1)* Although the LCA implementation of AD as an alternative treatment method for FW can be seen recently, its condition in Malaysia is unclear. In particular, the dry AD and integrated wet AD treatment's environmental

		impacts are largely unknown due to a variety of reasons, including that the research and development effort in this area has not kept up with the pace of technological advancements (Hanum et al. 2019). Moreover, the management and maintenance of the AD plant would necessitate highly skilled engineers and technicians, which might be inadequate in Malaysia since AD is still not an acknowledged practice in this country (Ali et al. 2012). Due to the different AD technologies, the damaging emissions related to the AD technologies' treatment vary, bringing a variety of issues and possibilities that have affected the outcomes (Brenes-Peralta et al. 2020).
	Mengapa ia penting, dan apa akan jadi, sekiranya ia tidak dilakukan?	Although dry AD has grown in popularity in recent years, there is scarce information on environmental impact score evaluation as compared to wet AD (Rocamora et al. 2020; Angelo et al. 2017).

	Apa pula akan jadi, sekiranya ia dilakukan	The different facilities selected for each form of treatment system vary from the least desirable to the most desirable FW management alternatives in terms of environmental effectiveness, harmful impact to human health, high energy consumption, depletion of natural resources, and others. In addition, the emissions and energy requirements of different AD systems vary. Choosing the best FW treatment that employs AD technologies might also be challenging.
	Problem statement and study's gap Highlight on the study's gap, is it empirical? Methodology? Or theory? Why this study needs to be done? What else is still missing and need to be filled? Why is it important, and what will happen, if it is not done? What will happen, if it is done?	*e.g., (1)* It is critical to employ LCA as a systematic tool to evaluate and verify the environmental feasibility of FW treatments, especially for regional disparities (Righi et al. 2013) and the LCA methodology is especially beneficial for analysing the possible environmental implications of two or more different solutions (Brenes-Peralta et al. 2020) The findings have the potential to improve the efficiency and sustainability of FW treatment alternatives through AD technologies,

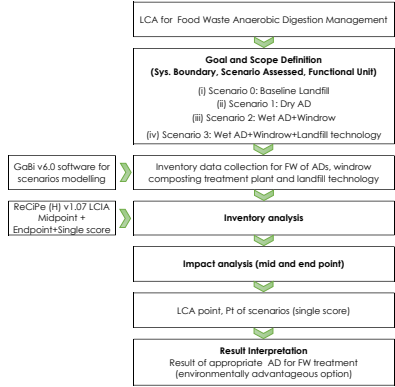|		
		which are being used as a green waste management technique as well as an alternative renewable energy source in Malaysia. *e.g., (2)* The integration of LCA and LCC results through the use of CA can provide multiple advantages. Firstly, it provides a comprehensive overview of FW management processes by assessing severity on environmental impacts through damage-oriented LCA and considering the costs associated with the entire life cycle through LCC. Secondly, it enables a systematic assessment of sustainability, which is important for identifying sustainable alternatives in FW management. Finally, it helps reduce ambiguity in decision-making by providing clear and objective information that decision-makers can use to select sustainable FW management strategies.
	Persoalan kajian Nyatakan persoalan kajian Research Questions	i) In the context of practical applications of the LCA used to examine the damaging impacts of the FW treatment, has the anaerobic dry digesting outperformed the

	State your research questions	anaerobic wet digesting process or other waste disposal?
	Objektif kajian Apa tujuan utama kajian ini dilakukan Research objective State your research objectives	7. Objective of the present research Therefore, this study aimed to make comparisons between dry AD systems, integrated wet ADs, as well as baseline practice-landfill on the environmental sustainability of FW treatment by considering their life cycle's environmental impacts. 8. Methodology This study was comparing the LCA of several real scale AD technologies for FW treatment alternatives; (ii) introducing a real scale dry AD single-stage, continuous-batch process for FW treatment; and (iii) using the comprehensive ReCiPe (H) LCIA method to analyse the full environmental impact scores: 16 midpoints and 15 endpoints and single scores to determine damage to the environment at three higher accumulation levels: (1) impact on human wellbeing, (2) biodiversity, and (3) scarcity of resources. 9. Benefit of the present research to decision makers……*refer article*

		The vision is to evaluate and communicate the most appropriate FW management solution based on the least possible pollutions for Petaling Jaya City Council Malaysia, and potentially generalizing the result of this research to other States as well. The intended audience for this work is AD plant managers, LCA practitioners and researchers, research institutions, solid waste management departments, and the Government of Malaysia.
Metodologi **(Methodology)**	Sub-bahagian (Sub-part)	Ayat anda (Your sentences)
	Pengenalan Sedikit pengenalan dan apa kandungan yang dimasukkan dalam bahagian metodologi Introduction A simple introduction and the contents included in the methodology section	The environmental profiles and the comparative analysis were performed utilizing LCA methodology, standardized by ISO 14040:2006 and ISO 14044:2006.
	Panduan yang digunakan Menyatakan dan menjelaskan tentang methdologi standard yang digunakan. Methdology	LCA is an empirical evaluation of the environmental performance of treatment systems over their entire life cycle, including the consumption of resources, production, usage, and

standard ini adalah guidelines yang dirujuk untuk buat research. Ada beberapa jenis, antara yang paling kerap pengkaji gunakan ialah qualitative, quantitative atau mix modes. Methodology standard ni banyak disediakan untuk bidang Waste Management, jadi kena pandai kaitkan ia dengan bidang kajian.

Research standard used
Declare and explain about the research standard used. It is like guidelines that you are referring to in making research. There are several types; among the most commonly used by researchers are qualitative, quantitative or mix modes. Many of these methodology standards are available for waste management, try to fit it in your study.

disposal. The LCA methodology comprises of four phases: (1) goal and scope definition; (2) inventory analysis; (3) impact assessment; and (4) interpretation (see Figure 4).

	Teknik khusus Terangkan teknik yang digunakan untuk research proses anda – Experimental? Modelling and simulations? Computation? Etc…Terangkan kelebihan yang teknik ini kerana ia akan memberikan justifikasi kukuh mengapa ia dipilih sebagai teknik utama Describe the technique used for your research process – Experimental? Modelling and simulations? Computation? Etc…… Describe the advantages of these techniques as it will provide a firm justification to why you choose them as the primary technique	The scenario modelling was performed via GaBi v6.0 software using 1 ton of pre-treated FW as a functional unit, with the analysis of environmental impact scores being based on the ReCiPe (H) v1.07 characterization method. ReCiPe (H) was constructed with 16 midpoint indicators, 15 endpoints indicators, and a single score of 3 points: (1) impact on human wellbeing, (2) biodiversity, and (3) scarcity of resources. The ReCiPe has been designated as the optimal approach for assessing environmental impacts based on mature characterization models (Cavalett et al. 2013; Poeschl et al. 2012)
	Flow Diagram Masukkan flow diagram selepas bahagian systematic literature review proses bagi memudahkan pembaca memahami proses research anda	RUJUK RAJAH 1 SEBAGAI CONTOH DAN RUJUKAN REFER TO FIGURE 1 FOR EXAMPLE AND REFERENCE

	Include a flow diagram to facilitate the readers' understanding on your reserach process	 FIGURE 4. Flowchart for the steps in the assessment of AD technologies for FW management
	Data analytic strategy Huraikan kaedah analisis yang digunakan. Ada yang menggunakan kaedah kuantitatif dan ada juga yang menggunakan kaedah kualitatif. Explain on the data analysis methods. Some research uses quantitative methods while some uses qualitative methods.	The environmental impact scores for the treatment of 1-ton FW for the four cases have been considered. The interpretation of positive value denotes an additional burden on the environment while negative value reduces environmental pressure or enhances sustainability impacts.
Hasil kajian **(Results)**	Hasil kajian 1 Dalam bahagian ini, anda harus kenalpasti corak dapatan dalam kajian lepas	The results indicated that Sc1 had the greatest potential for environmental improvement in all areas except Human toxicity (HTP), Marine ecotoxicity (METP), Terrestrial

dan bincangkan corak dapatan berikut.

Sebaiknya, bagi meningkatkan lagi pemahaman pembaca, Dalam bahagian ini, selain dalam penulisan pattern dapatan kajian lepas boleh dibentangkan dalam jadual, di mana hanya point penting yang dimasukkan (Rujuk Jadual 3)

Result 1
In this section, you should identify the pattern of findings by previous studies and try to discuss it.

In order to improve readers' understanding, important points from previous studies can be presented in a table, (Refer Table 3)

ecotoxicity (TETP), and Water depletion (WDP). The highest reduction in HTP, METP, TETP, and WDP was found in Sc2. However, Sc3 posed significant negative environmental impacts in the categories of Global Warming (GWP), TAP, Ozone Depletion (ODP), and Primary Energy Demand (PED). It was also found that Sc3, Sc0, Sc2 showed a higher contribution to ionizing radiation (IRP) ……*refer article*

Hasil kajian 2
Result 2

Based on the single score ReCiPe endpoint analysis as shown in Table S1 (supplementary), Sc1 seemed to be the most promising method of FW treatment for long term

		sustainability, particularly for avoiding loss of resources (Resource's Scarcity, 4.44E+01Pt). It also had more positive impacts compared to the other three scenarios, as it caused the least damage to both human health (9.28E-05 Pt) and ecosystems (3.94E-07 Pt) as shown in Figure 7. *…..refer article*
	Hasil kajian 3 Result 3	RESULTS COMPARISON WITH LITERATURE When the results were compared to the literature, there were differences in the order of magnitude in all of the impact categories (Table 6). Variations resulted from the establishment of system boundaries, specification of treatment facilities, efficiency of specific plants, feedstock properties, and allocation or replacement methods. As there was no demand for district heating in Malaysia, the excess heat from the biogas CHP had not been absorbed, resulting in an inadequate discovery of the benefits of biogas (Hanum et al. 2019) *…..refer article*

Perbincangan (Discussion)	Perbincangan 1	Midpoint results
	Perbincangan anda perlu teliti dan mendalam. Sertakan elemen critical review di sini. Reasoning banyak membantu untuk mengilhamkan idea yang kritis kepada penulis.	The GWP category measures emissions of GHGs that warm the earth by energy absorption, adversely affecting environmental, human health, and material well-being. Sc1 (4.94E+01 kg CO_2 eq) outperformed all other alternatives in this category because of the environmental benefits from compost production in addition to biogas and electricity generation. For the Sc1 system and mesophilic operating conditions considered in this study, biogas electricity can help reduce GHG emissions relative to a fossil-intensive electricity mix (Fusi et al. 2016). Sc3 was the most significant contributing factor to the risk of global warming (1.45E+04kg CO_2 eq) in every case. The phases of aerobic windrow composting and landfill activity add the most to the GWP in the Sc2 and Sc3 scenarios as GHGs (mostly CO_2, CH_4, N_2O) are generated and discharged completely with no form of treatment, such as capturing or flaring. Furthermore, the increased resource demand, such as the use of diesel and lube oil by landfill
	Discussion 1 Your discussion needs to be details and in-depth. Include element of critical review. A reasoning helps to generate critical ideas to writers.	

		machines and equipment, is attributed to this high level of emissions. As wet AD dewatered digestate undergoes the open-composting treatment phase, CH4 and CO2 gases are released. As a result, the gas treatment for digestate curing and maturing produced by wet AD (via bio filtration or similar technologies) is frequently proposed as a last resort to reduce gaseous pollution to the atmosphere (Sánchez et al. 2015).
	Perbincangan 2 Discussion 2	Endpoints results Figure 7 also demonstrates fewer damaging impacts of Sc0 on human health (2.29E-04 Pt) and ecosystems (1.15E06 Pt) when compared to both wet ADs (Sc3, 2.37E-02 Pt and Sc2, 2.26E-02 Pt). Sc3 caused the greatest damage to the ecosystem (1.15E-04 Pt) and human wellbeing (2.37E02 Pt). Previous research indicates that aerobic windrow and landfills are a major contributor to global warming (AlRumaihi et al. 2020; Abba, 2014; Cherubini et al. 2009). The emissions of CH4 from landfills followed by windrow composting have the greatest impact on climate change.

		NOx can affect breathing and may increase the risk of respiratory infections..... ......*refer article*
	Perbincangan 3 Discussion 3	Sensitivity analysis Sensitivity analysis (SA) aims to examine how model variables and parameters, assumptions, and input values impact the outputs of the research and its findings. SA is a tool for simplifying data collection and interpretation without negotiating the reliability of a result. The sensitivity study for dry AD was examined in this section. To evaluate the sensitivity of each parameter, 10% of variations in parameter input were used. The sensitivity results for GWP, ODP, POFP, TAP, FEP, PMFP, HTP and TETP from Sc1 plant are depicted in Table 7. As seen in Table 7, four parameters (diesel, electricity, water, and distance) were tested for robustness. The parameter is deemed as sensitive when the percentage of variation is greater than 10%. Electricity or energy used for FW treatment is considered to be the most sensitive

		parameter based on the eight impact groups used for the sensitivity study, with only terrestrial acidification (7.76%) having the lowest percentage of change of less than 10%. The other parameters were less than 10% of each impact category, indicating they were less sensitive to the impact categories. *…..refer article*
Cadangan (Recommendations)	Nyatakan cadangan dari kajian anda Berdasarkan research anda, apa lagi ruang penambahbaikan yang ada. Apa isu yang kajian akan datang harus tumpukan? State your recommendations Based on your research, what else need to be improved? What issues should future studies focus on?	RECOMMENDATIONS It is suggested to enhance the analysis conducted on AD FW treatment plants to provide better outcomes. This could be done by identifying a system with more processes to achieve a more accurate result, thereby requiring additional processes with more stable inputs and outputs. Furthermore, the value chain could be compared with the related studies conducted. LCA practitioners are highly advised to do both the material flow accounting (MFA) and the LCA for a more precise prediction (Seldal 2014). Moreover, appropriate databases could be selected to model the study system, for example by using waste-

|		
		related LCA software technologies for a more accurate simulation of waste systems. In waste treatment schemes, for example, ORWARE (organic waste research), IWM-2 (integrated waste management II), WISARD (waste – integrated systems for assessment of recovery and disposal), WRATE (waste resources assessment tool for the environment), and EASEWASTE (environmental assessment of solid waste systems and technologies) are among the recommended software (Kulczycka et al. 2015)
Limitasi dan cadangan kajian akan datang (Limitation and recommendations for future studies)	Limitasi dan cadangan kajian akan datang 1 Limitation and recommendations for future studies 1	LCA can lead to a better definition of environmental impact categories for AD systems, but it also establishes the possibility of ignoring considerations, such as the inherent conflict of costs and social consequences from the evaluation. Although LCA is helpful, it is inadequate for making sound decisions about design, production, or organizational improvements (Curran et al. 1996). The impact of monetizing on the life cycle is critical to LCA's fullest potential as a decision-making mechanism. The reason is simple, it

		should translate inventory and effect analyses into metrics (dollars and cents) that business organizations would understand. By defining specific method and product change goals, the transition from carbon inventory to forecasts of environmental and health threats offers crucial details. All of these process and product development considerations require the core financial rationale to justify the desired reform.
	Limitasi dan cadangan kajian akan datang 2 Limitation and recommendations for future studies 2	……….but it also establishes the possibility of ignoring considerations, such as the inherent conflict of costs and social consequences from the evaluation. ….The public approval is a qualitative metric that is affected by the region's degree of growth and waste management technology. Technological advancements will find it more difficult to enter a market with certain high levels of confusion and fear of negative effects on humans and the ecosystem. Since public approval is a qualitative quality which cannot be calculated, it is recommended that a 9-level scale (1-

		worst, 9-best) to be used to assess this set of parameters in the multi criteria-analytical hierarchy process (AHP) phase (Brenes-Peralta et al. 2020)
	Limitasi dan cadangan kajian akan datang 3 Limitation and recommendations for future studies 3	Even though there is a similar comparable finding for environmental impact categories using AD as an effective biotechnological method of managing FW, whether dry or wet, more studies are needed to address some of the drawbacks associated with the high overall amount of processed solid material. Optimization of inoculum to substrate ratio, composition and scale of feedstock, liquid recirculation, bed compaction, and usage of bulking agents are some of the parameters that require further study in batch dry AD to minimize localized inhibition effects and prevent process instability. More considerations must be paid to the relationship between feedstock composition, organic loading rate, and mixing regimes for continuous-batch dry AD systems.

Rumusan (Conclusion)	Pengenalan Introduction	The comparison between the environmental impacts of the four FW management strategies in Malaysia has been conducted according to the ReCiPe LCIA method.
	Apa yang telah dicapai? Huraikan Describe on what has been achieved? Explain	The findings of the LCA revealed that the Sc1 scenario produced extensive improvements in the 12 mid-point impact categories and the single score ReCiPe endpoint analysis method of treatment, particularly for avoiding loss of resources, with the least damaging impact on ecosystems and human health relative to all three scenarios. This is made possible by the significant reduction in road transport distances and volumes, comparatively low energy requirements for operation, and preservation of energy as well as resources, mostly from compost produced by the digestible material. Meanwhile, Sc0 is considered the second-best option, and the third is Sc2, and the last option with significant negative environmental impacts for FW treatment alternatives is Sc3.
	Apa yang harus ditumpukan oleh	Besides that, it is important to provide a comprehensive picture of the impacts of FW management by

	penyelidik bagi kajian akan datang? Huraikan What should researchers focus for future studies? Explain	AD treatment, and further assessment of final decision-making factors, such as social (i.e., public acceptance) and economic (i.e., life cycle costing) factors must be addressed.
Rujukan (References)		

Attachment 1

Spider web.
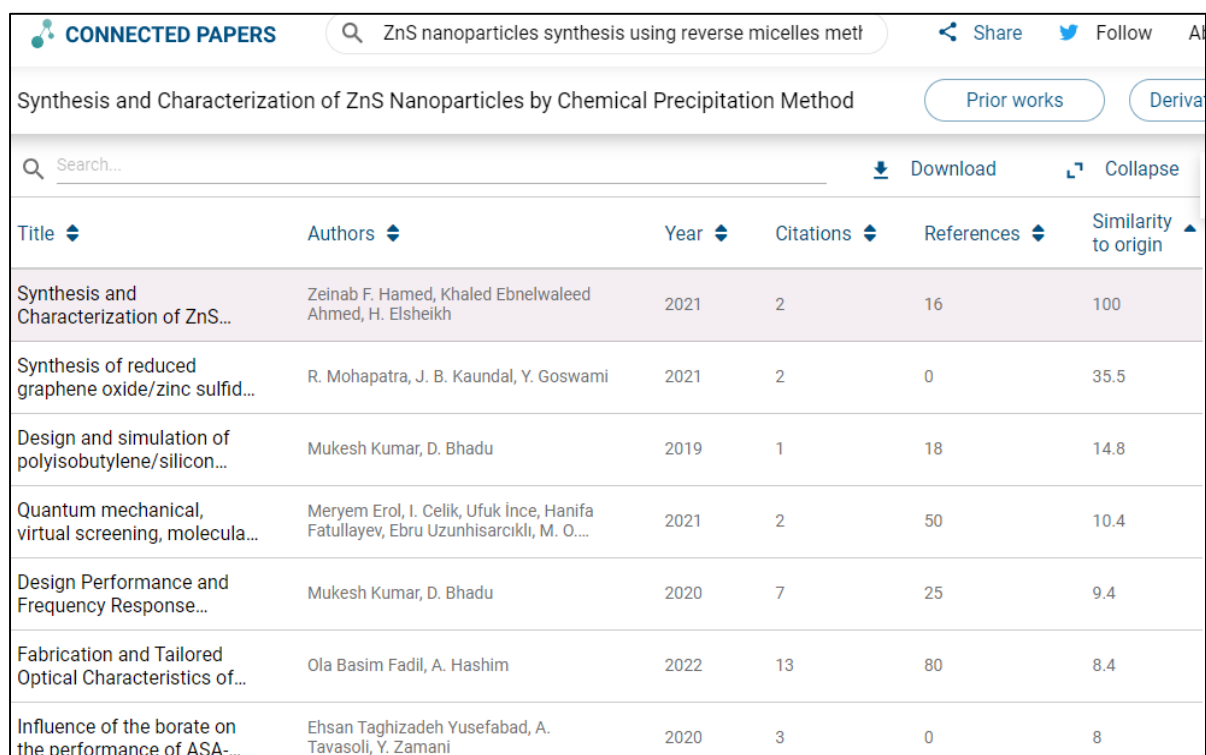
Attachment 2

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Synthesis and Characterization of ZnS Nanoparticles by Chemical Precipitation Method

Zeinab F. Hamed, Khaled Ebnelwaleed Ahmed, H. Elsheikh

2021

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Nanoparticles form a connection between molecular and bulk states of matter, it shows size-dependent physical and chemical properties. In the present work, we aimed to prepare zinc sulfide (ZnS) nanoparticles by chemical precipitation method using Sodium sulfide (Na2S.x H2O) as sulfur source and zinc acetate dihydrate [(CH3COO)2Zn.2H2O] as a

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Synthesis of reduced graphene oxide/zinc sulfide nano composites with sonochemical route

R. Mohapatra, J. B. Kaundal, Y. Goswami · Published 1 May 2021 · Materials Science · Chalcogenide Letters

Zinc sulphides/reduced graphene oxide nanocomposites were prepared through a sonochemical route. As grown zinc sulfide nanoparticles were added with different ratios in ethanolic solution of reduced graphene oxide. The mixture were ultrasonicated for 2h and then kept for aging. The obtained samples were characterized by optical transmission, FTIR, luminescence, structural and morphological characterizations. On addition of ZnS nanoparticles the shift in luminiscence peak is observed towards... Expand

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Quantum mechanical, virtual screening, molecular docking, molecular dynamics, ADME and antimicrobial activity studies of some new indole-hydrazone derivatives ...

M Erol, I Celik, U Ince, H Fatullayev... - Journal of ..., 2022 - Taylor & Francis

In this study, a new series of indole-5-carbaldehyde hydrazone derivative compounds were designed, synthesized, and their antimicrobial activities were determined by the microdilution method, and the in vitro cytotoxic effects on Beas-2b cell lines were investigated by MTT assay. When the activity results were examined, 5i12 showed promising activity against E. faecalis with MIC: 2 µg/mL compared to ampicillin, gentamicin, and vancomycin, although the antimicrobial activities of the indole derivatives were ...

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Attachment 3

https://www.mendeley.com/reference-management/reference-manager

Attachment 4

Systematic Literature Review Table

TYPES OF LITERATURE REVIEW

Argumentative Review	Integrative Review	Historical Review	Systematic Review
It examines prior research to bolster or reinforce existing arguments.	Combine the second piece of information in a way that contributes to the value of your paper.	The researcher investigate about the evaluation of the matter while going to the historical context	Better organized review format that others, it is of two types Meta-analysis and Meta-Synthesis

EXAMPLE

No	Year / Author	Objective of study	Problems Statement	Methodology Used	Finding	Conclusion	Remarks
1	2018/ Foo Sheng Tong	Study, the effect of alkaline treatment on the morphology and physico-chemical properties of Malaysian bamboo fibers	The production process of artificial fiber is adversely affecting the environment by consuming huge amount of fossil fuel as energy,	The bamboo strips were treated with 10% NaOH solution for 24 hours at ambient temperature	Tensile strength and modulus of the alkali-treated fiber were improved by 45.6 and 72%, respectively, compared to the untreated fiber	The tensile strength and modulus of the bamboo fiber were significantly improved after treated with 10%	NaOH – 10%, 24 hour

			releasing enormous carbon dioxide, causing heavy environmental loads, in addition to the high production cost				NaOH treatment for 24 hours.
2	2017/Chen	To study the microstructure and mechanical properties of individual bamboo fibers after alkali treatment	There are a limited number of researches on the bamboo fibers with alkali treatment, especially on the individual bamboo fibers.	Individual bamboo fibers were washed with deionized water to neutrality and then one part was dipped in 6, 8, 10, 15 and 25% NaOH solution at room temperature (23 ± 2 C) for 2 h maintaining fiber weight to alkali volume ratio of 1:100	Microfibril aggregates treated by 15 and 25% NaOH solution changed from a randomly interwoven structure to a granular structure. Cellulose I was transformed to cellulose II after 15 and 25% NaOH solution treatment.	The 15 and 25% NaOH treatment caused the change of the microfibril aggregates from a randomly interwoven structure to a granular structure.	Increasing alkali concentration caused the change of the fibers from brittleness to ductility, indicating that alkali treated bamboo fibers have a promising application in textile.