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Journal Name:	Asian Journal of Chemical Sciences
Manuscript Number:	Ms_AJOCS_130237
Title of the Manuscript:	Comparison of Copper Extraction Methods from Aynak Ore Compatible with the Environment
Type of the Article	

PART 1: Comments

	Reviewer's comment	Author's Feedback <i>(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
Please write a few sentences regarding the importance of this manuscript for the scientific community. A minimum of 3-4 sentences may be required for this part.	This manuscript is of significant importance to the scientific community as it highlights the evolving methods in copper extraction, particularly focusing on more sustainable and environmentally friendly techniques like bioleaching. It provides a comprehensive overview of various copper extraction processes, including thermal, hydrometallurgical, and bioleaching methods, offering insights into their advantages, challenges, and potential for industrial application. The manuscript also emphasizes the integration of modern biotechnology in mining operations, which could pave the way for reducing environmental impacts and improving resource efficiency. By exploring these methods in detail, the manuscript contributes valuable knowledge that could inform future research and development in the mining and metallurgy fields, encouraging the adoption of greener practices in mineral processing.	
Is the title of the article suitable? (If not please suggest an alternative title)	The current title of the article appears to be descriptive and focused, but it could be more concise and directly reflective of the key themes discussed in the manuscript. A more suitable title might be: "Advances in Copper Extraction: Sustainable Approaches and Bioleaching Techniques" This title clearly indicates the focus on modern, environmentally friendly copper extraction methods, with an emphasis on bioleaching as a sustainable alternative. It also maintains a professional tone while capturing the essence of the article's content.	

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<p>Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.</p>	<p>The abstract of the article seems to cover key concepts related to copper extraction methods, particularly focusing on bioleaching and other modern techniques. However, it could be enhanced for better clarity, completeness, and flow. Here are some suggestions for improvement:</p> <p>Suggestions for Addition:</p> <ol style="list-style-type: none"> Clearer Introduction of Key Methods: Briefly introduce the thermal, hydrometallurgical, and bioleaching methods at the start, before diving into details. This gives a more structured overview. Environmental Benefits: Emphasize the environmental benefits and sustainability aspects of bioleaching and other alternative methods more explicitly in the abstract. Given the growing focus on sustainable practices in mining, highlighting these aspects early on can attract more attention. Challenges and Limitations: Briefly mention the challenges associated with each method, especially bioleaching, such as long extraction times and the need for specific environmental conditions. Relevance to Industry Applications: Adding a sentence that ties these methods back to real-world applications, such as in the context of specific copper mines or industries, would make the abstract more impactful and relatable to practitioners. <p>Suggestions for Deletion:</p> <ul style="list-style-type: none"> Excessive Detail: While details are important, some of the finer points (like exact percentages or technicalities of certain processes) might be condensed for a broader audience in the abstract. The abstract should provide a high-level summary, saving more granular information for the main text of the article. <p>Revised Example of Abstract: "The manuscript provides a comprehensive review of modern copper extraction techniques, focusing on thermal, hydrometallurgical, and bioleaching methods. While thermal and hydrometallurgical methods have been widely used, the bioleaching process stands out for its environmental sustainability, allowing for the extraction of copper from low-grade ores using bacteria. This method, combined with solvent extraction and electrowinning, offers a more eco-friendly alternative, although it comes with challenges related to processing time and specific operational conditions. The article also explores potential improvements in bioleaching processes and addresses the challenges of reducing environmental impacts in copper extraction. This review is essential for the scientific community and industry stakeholders seeking sustainable and efficient copper production methods." This version provides a clearer, concise summary while emphasizing the importance of sustainability and practical applications</p>	
<p>Is the manuscript scientifically, correct? Please write here.</p>	<p>Based on the information provided, the manuscript appears to be scientifically sound. It presents a detailed and coherent explanation of various copper extraction methods, including thermal, hydrometallurgical, and bioleaching, which are well-established techniques in mineral processing. The manuscript correctly outlines the processes involved in each method, such as the use of sulfuric acid in hydrometallurgy, the role of bacteria in bioleaching, and the challenges associated with each method (e.g., energy consumption, environmental pollution, and time requirements for bioleaching). Additionally, the mention of specific microorganisms like <i>Thiobacillus ferrooxidans</i> in the bioleaching process, and the importance of conditions such as temperature, nutrients, and oxygen supply for optimal bacterial activity, aligns with current scientific understanding of microbial leaching processes. The manuscript also correctly identifies the environmental challenges, such as sulfur dioxide (SO₂) emissions in thermal processes and the need for effective tailings management. However, it would be beneficial to ensure that references to experimental studies, especially those related to copper recovery rates, are accurate and up-to-date. The manuscript should also clarify certain technical details, such as specific equipment used in the described processes, which could provide more context for readers unfamiliar with the subject.</p> <p>Conclusion: The manuscript is scientifically correct, with a strong foundation in current mineral processing techniques. It could benefit from additional clarification on some details and further integration of recent studies or emerging technologies, but overall, it is an accurate representation of copper extraction methods.</p>	

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<p>Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.</p>	<p>The references provided in the manuscript are generally sufficient and cover a broad range of copper extraction methods, including thermal, hydrometallurgical, and bioleaching techniques. Many of the references are recent (from 2022-2025), which ensures that the manuscript is up to date with the latest research and technological advancements in the field. The inclusion of sources discussing copper extraction processes, bioleaching optimization, and environmental concerns indicates a solid foundation of current knowledge.</p> <p>Suggestions for Improvement:</p> <ol style="list-style-type: none">1. Include more studies on emerging technologies: While the manuscript covers conventional methods well, it could benefit from references to cutting-edge techniques, such as the use of machine learning or artificial intelligence in optimizing leaching processes, or advances in greener, more sustainable methods of copper extraction (e.g., the use of biotechnological or novel hydrometallurgical processes).2. Incorporate more references on environmental impacts: Although some studies on environmental concerns (e.g., SO₂ emissions, waste management) are mentioned, including more specific and recent studies on environmental remediation technologies or practices related to copper mining would further strengthen the manuscript.3. Further exploration of bioleaching: As bioleaching is a key theme, including more references to experimental studies, especially those focused on improving copper recovery rates and bacterial strains used in the process, would add value. <p>Potential Additional References:</p> <ul style="list-style-type: none">• Recent reviews on bioleaching technology: Articles from journals like <i>Minerals Engineering</i> or <i>Hydrometallurgy</i> that focus on new insights into bioleaching and bio-oxidation methods could be helpful.• Environmental sustainability in copper mining: References to recent studies on sustainable mining practices or innovations in waste management during copper processing (such as the use of phytoremediation or other bio-based cleanup methods) could strengthen the manuscript's focus on environmental responsibility. <p>In summary, while the references are generally strong and recent, the manuscript could benefit from additional references that highlight the latest trends in copper extraction technologies, particularly those related to sustainability and bioleaching.</p>	
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<p>Is the language/English quality of the article suitable for scholarly communications?</p>	<p>The language and English quality of the article are generally suitable for scholarly communication, but there are a few areas where improvements could be made for better clarity, conciseness, and flow. The manuscript demonstrates an understanding of technical terms and concepts, which is appropriate for the target audience. However, certain sections may benefit from minor revisions to improve readability and coherence. Here are some specific suggestions:</p> <p>Suggestions for Improvement:</p> <ol style="list-style-type: none"> Sentence Structure: Some sentences are lengthy or complex, which might make them harder to follow. Consider breaking long sentences into smaller, more manageable ones for easier comprehension. Example: <ul style="list-style-type: none"> <i>Original:</i> "The copper-rich solution is then processed using solvent extraction and electrowinning methods to produce copper cathodes." <i>Revised:</i> "The copper-rich solution is processed using solvent extraction. The extracted copper is then further treated through electrowinning to produce copper cathodes." Technical Jargon: While technical terms are necessary for the subject matter, there may be instances where the text uses overly technical language without explanation, potentially making it difficult for readers unfamiliar with the specific processes. Some terms might benefit from a brief definition or clarification. Consistency: Ensure consistency in terminology throughout the manuscript. For instance, the use of terms like "copper concentrate," "copper ore," and "copper sulfide" should be consistent and clearly defined early on to avoid confusion. Transitions and Flow: Some sections may lack smooth transitions between different topics or methods. Providing clearer linking sentences would improve the flow of ideas and guide the reader more effectively through the argument. Example: <ul style="list-style-type: none"> Transition sentences between sections (such as from bioleaching to heap leaching) could better highlight the shifts in methods or approaches. Grammar and Typographical Errors: While there are no major grammatical issues, there are small areas where the sentence structure or word choice could be refined for clarity. For instance, some phrases are redundant or could be simplified. <p>Example Revisions:</p> <ul style="list-style-type: none"> Original: "The sulfur present in the concentrate, which is approximately twice the amount of copper, is converted into sulfur dioxide (SO₂)." Revised: "The sulfur content in the concentrate, typically twice that of copper, is converted into sulfur dioxide (SO₂)." Original: "The solution resulting from the leaching contains 60 to 80 grams per liter of monovalent copper (cuprous) and 10 grams per liter of divalent copper (cupric)." Revised: "The leaching solution contains 60 to 80 grams per liter of monovalent copper (cuprous) and 10 grams per liter of divalent copper (cupric)." <p>Overall Impression: The manuscript is generally written in a clear and technically accurate style, which is suitable for a scholarly audience. With some minor revisions to sentence structure, clarity, and consistency, the manuscript would be even more effective in communicating its ideas</p>	
<p>Optional/General comments</p>	<p>Here are some general comments that may help improve the manuscript:</p> <ol style="list-style-type: none"> Clarity and Conciseness: As mentioned previously, while the manuscript is technically sound, some sentences could benefit from being more concise. Streamlining lengthy passages can help enhance readability without losing important technical details. Visual Aids: Given the technical nature of the subject, including diagrams, flowcharts, or tables could be very helpful. For instance, a diagram illustrating the different stages of copper extraction (thermal method, hydrometallurgical method, bioleaching, etc.) or the chemical processes involved would help readers visualize complex processes. Visual aids can often clarify points that are more challenging to understand through text alone. Introduction of New Methods: When introducing newer or less conventional methods (e.g., bioleaching, Hydro Copper method), it may be helpful to include a brief historical context or explain the advantages over traditional methods in more detail. This would provide the reader with a clearer understanding of why these methods are being investigated and what sets them apart from more widely used techniques. 	

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4. **Conclusion Section:** The manuscript touches upon various methods of copper extraction, but the conclusion could benefit from a clearer synthesis of the main findings. It would be helpful to summarize the relative advantages and challenges of the different methods discussed (thermal, hydrometallurgical, bioleaching, etc.), and perhaps make recommendations for future research directions or applications in the industry.
5. **Environmental and Economic Aspects:** While environmental issues are mentioned in the manuscript, it could be beneficial to delve a little deeper into the economic considerations of these copper extraction methods. How do the costs compare between traditional methods and newer, more environmentally friendly methods like bioleaching? Highlighting both the environmental and economic implications would strengthen the argument for these newer methods.
6. **Acknowledgments:** If applicable, consider including an acknowledgment section to recognize any funding sources, collaborators, or institutions that supported the work. This can add credibility and acknowledge the contributions of others.
7. **References to Industry Reports:** It may also be valuable to include references to industry reports or case studies from actual copper extraction plants, particularly for newer methods like bioleaching. This could provide real-world examples of the practical applications and outcomes of these methods, enriching the scientific discussion with empirical data.
8. **Proofreading:** A final round of proofreading would help catch minor typographical or grammatical errors that can occasionally distract from the overall quality of the manuscript.

Overall, the manuscript presents a comprehensive and technically solid exploration of copper extraction methods, and with a few revisions, it will be well-suited for scholarly publication.

- **Strengths:**

- The manuscript provides valuable insights into copper extraction methods, including thermal, hydrometallurgical, and bioleaching techniques, all of which are crucial to advancing the field.
- The language and scientific approach are generally sound, and the content is relevant to current industry challenges.
- The manuscript presents a good balance of detail while explaining complex processes clearly.

- **Areas for improvement:**

- Some sections could benefit from additional clarity and simplification to improve readability for a broader audience.
- Additional references to more recent studies would strengthen the manuscript.
- There is room for enhancing the conclusion to clearly underline the study's contribution to the field and its practical implications.

With minor revisions, especially in the clarity of certain sections and the inclusion of recent references, this manuscript has the potential to make a significant contribution to the scientific community.

1. **Clarity and Organization:** The manuscript generally presents valuable insights into copper extraction methods. However, some sections could benefit from clearer subheadings and a more streamlined presentation to improve readability. It would be helpful to refine the flow between different extraction methods to make comparisons more apparent.
2. **Figures and Tables:** Ensure that the figures and tables referenced in the manuscript are clear and well-labeled, especially in sections involving complex chemical reactions or process diagrams. Visual aids can significantly enhance comprehension for the readers.
3. **References:** There is a notable reliance on studies up to the early 2020s. A more comprehensive review of recent literature would strengthen the manuscript. Particularly, studies from the past two to three years could offer a more up-to-date perspective on developments in copper extraction methods, particularly bioleaching and hydrometallurgical methods.
4. **Conclusion:** The conclusion section could be expanded slightly to emphasize the broader implications of the findings and how they may affect future research or industrial practices. Highlighting the environmental impacts and energy consumption associated with different methods might resonate with current global sustainability trends.
5. **Minor Typos/Language:** While the manuscript's language is generally good, some minor grammatical adjustments would improve its flow. A final proofread for consistency and clarity is

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	<p>recommended, particularly in scientific terminology usage.</p> <p>6. Supplementary Information: If available, supplementary information such as detailed process diagrams, experimental data, or case studies (e.g., the Aynak Copper Mine) might add additional value and context to the paper.</p> <p>Once these points are addressed, the manuscript should be well-suited for publication in this journal.</p>	
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PART 2:

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Are there ethical issues in this manuscript?	<i>(If yes, Kindly please write down the ethical issues here in details)</i>	

Reviewer Details:

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