Review Form 3

Journal Name:	**Asian Journal of Advanced Research and Reports**
Manuscript Number:	**Ms_AJARR_127169**
Title of the Manuscript:	**THERMODYNAMIC ANALYSIS OF SINGLE-STAGE VAPOUR COMPRESSION REFRIGERANTION SYSTEM USING NATURAL REFRIGERANTS**
Type of the Article	**Original Research Article**

General guidelines for the Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty'**, provided the manuscript is scientifically robust and technically sound.
To know the complete guidelines for the Peer Review process, reviewers are requested to visit this link:

https://r1.reviewerhub.org/general-editorial-policy/

Important Policies Regarding Peer Review

Peer review Comments Approval Policy: https://r1.reviewerhub.org/peer-review-comments-approval-policy/
Benefits for Reviewers: https://r1.reviewerhub.org/benefits-for-reviewers

PART 1: Review Comments

Compulsory REVISION comments	**Reviewer's comment**	**Author's Feedback** *(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimum of 3-4 sentences may be required for this part.	The manuscript, Thermodynamic Analysis of Single-Stage Vapour Compression Refrigeration System Using Natural Refrigerants, is significant for the scientific community as it addresses pressing environmental and efficiency issues in refrigeration systems, particularly within the Nigerian context. By exploring natural refrigerants as alternatives to synthetic options, the research offers eco-friendly solutions that align with global environmental protocols and local climate considerations. This study stands out for its relevance in addressing high global warming potential (GWP) refrigerants' impact on climate change and provides valuable insights into optimizing refrigeration systems in hot climates. I appreciate this manuscript for its commitment to bridging scientific understanding and practical applications, supporting both environmental sustainability and local industry needs.	
Is the title of the article suitable? **(If not please suggest an alternative title)**	The title, Thermodynamic Analysis of Single-Stage Vapour Compression Refrigeration System Using Natural Refrigerants, is suitable as it clearly conveys the study's focus and primary technical approach. It specifies that the analysis pertains to a single-stage vapor compression refrigeration system and emphasizes the use of natural refrigerants, which is central to the paper's contribution. However, adding a geographical context (e.g., in Nigeria or under Nigerian Climatic Conditions) could enhance specificity, making it more immediately relevant to readers interested in region-specific studies, particularly those concerned with high-temperature environments like Nigeria.	
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.	The abstract of the article is generally comprehensive, as it provides a clear overview of the research purpose, methodology, and key findings related to the performance of natural refrigerants in a single-stage vapor compression refrigeration system. However, a few adjustments could enhance its clarity and focus: Suggestions for Improvement: 1. Clarify the Objective and Relevance: While the abstract mentions the purpose, it could be strengthened by explicitly stating the goal to identify eco-friendly refrigerant alternatives for Nigeria's climate, highlighting the relevance for environmental sustainability and policy support. 2. Include Specific Findings: Although some results are briefly mentioned, adding a specific comparison (e.g., that R-717 outperformed the other refrigerants) and contextualizing why this is important for energy efficiency and environmental impact would make the abstract more impactful. 3. Limit Methodological Details: The abstract currently includes a fair amount of methodological detail (e.g., variation of operating parameters), which may be too specific. Instead, consider summarizing that various parameters were analyzed to determine optimal refrigerant performance without listing each parameter, which could be detailed in the main text. 4. Add a Concluding Statement: Including a brief concluding sentence that reinforces the potential impact of these findings on industry practices and environmental policies would provide a stronger closing to the abstract. Revised Abstract Suggestion:	

Review Form 3

	The abstract could be streamlined as follows: This study conducts a thermodynamic analysis of single-stage vapor compression refrigeration systems in Nigeria, evaluating natural refrigerants—ammonia (R-717), propane (R-290), and isobutane (R-600a)—as alternatives to synthetic refrigerants that contribute to global warming and ozone depletion. Using Engineering Equation Solver (EES) software, the study assesses the impact of varying operational conditions on the coefficient of performance (COP) for each refrigerant. Findings reveal that R-717 yields the highest COP under Nigerian climatic conditions, positioning it as a promising, eco-friendly replacement. This research supports efforts to adopt sustainable refrigerants in Nigeria, contributing to climate goals and guiding policy and industry stakeholders in selecting efficient refrigerants for high-temperature regions. This approach keeps the focus on key elements while ensuring the abstract remains concise and accessible.	
Are subsections and structure of the manuscript appropriate?	The manuscript's structure is generally appropriate for a technical study, with clear sections covering the introduction, methodology, results, and conclusions. The introduction provides relevant background, though a summary of objectives at the end would improve clarity. The methodology is detailed, and adding a brief explanation of the Engineering Equation Solver (EES) tool used could aid comprehension. The results and discussion are well-organized, but leading each subsection with main findings would enhance readability. The conclusion effectively summarizes key points, and a brief mention of study limitations and future research directions would strengthen it. Overall, the structure is sound but could benefit from small adjustments to improve clarity and depth.	
Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimum of 3-4 sentences may be required for this part.	This manuscript demonstrates scientific robustness and technical soundness by providing a detailed thermodynamic analysis grounded in established engineering principles. It systematically explores the performance of natural refrigerants under varying operating parameters, utilizing validated software (Engineering Equation Solver) for accurate calculations. The study's methodology is thorough, addressing key parameters such as condensing and evaporating temperatures, subcooling, and superheating, which are critical to assessing refrigeration efficiency. By presenting specific performance data and clear comparisons, especially under high-temperature conditions relevant to Nigeria, the manuscript offers scientifically credible insights that are both applicable and beneficial for sustainable refrigeration practices.	
Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form. **-**	The references in the manuscript are relevant but somewhat outdated. Adding recent studies, such as those from 2021 and 2022 on low GWP refrigerants and advancements in vapor compression cycles, would improve the manuscript's relevance and scientific depth.	
Minor REVISION comments **Is the language/English quality of the article suitable for scholarly communications?**	Yes, the language quality of the article is generally suitable for scholarly communication, as it maintains a formal and technical tone appropriate for academic audiences. However, there are minor grammatical errors and occasional awkward phrasing that could be refined for clarity and precision. A careful proofreading or a language review would further enhance readability and ensure that complex technical details are conveyed effectively.	
Optional/General comments	The manuscript addresses an important topic by evaluating natural refrigerants as eco-friendly alternatives to synthetic options in vapor compression refrigeration systems, with a focus on Nigerian climatic conditions. The study is well-structured and scientifically robust, providing thorough thermodynamic analysis and valuable findings relevant to both environmental policy and industry. However, the manuscript could benefit from minor adjustments in organization, such as a clearer presentation of objectives in the introduction, and a few recent references to align with the latest advancements in refrigeration technology. Additionally, minor language improvements would enhance readability. Overall, this research is a strong contribution to sustainable refrigeration practices and offers useful insights for regions with similar climatic challenges.	

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?	*(If yes, Kindly please write down the ethical issues here in details)*	

Reviewer Details:

Name:	**Agung Nugroho**
Department, University & Country	**Universitas Wahid Hasyim, Indonesia**