Review Form 3

Journal Name:	**South Asian Journal of Research in Microbiology**
Manuscript Number:	**Ms_SAJRM_127952**
Title of the Manuscript:	**Bioremediation of Degreaser Contaminated Soil Using Bacteria Grown in Bioreactor**
Type of the Article	**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:

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PART 1: 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. A minimum of 3-4 sentences may be required for this part.	This manuscript holds significant importance for the scientific community as it addresses the pressing need for sustainable and cost-effective solutions to remediate hydrocarbon-contaminated soils, particularly in industrially impacted regions. By exploring the synergistic effects of bioaugmentation with Bacillus and Pseudomonas species alongside fish pond effluent as a biostimulant, it provides novel insights into enhancing bioremediation efficiency. The study's findings highlight the potential for organic nutrient amendments to boost microbial activity and degradation capabilities, offering practical applications for managing environmental pollution. Moreover, the research underscores the scalability of bioreactor-based strategies, contributing to the growing body of knowledge on eco-friendly and resource-efficient remediation technologies.	
Is the title of the article suitable? **(If not please suggest an alternative title)**	The current title, **"Bioremediation of Degreaser Contaminated Soil Using Bacteria Grown in Bioreactor,"** is clear and descriptive but could be more engaging and specific. It focuses on the general methodology but does not emphasize the novel aspects of the study, such as the role of fish pond effluent or the synergistic use of Bacillus and Pseudomonas species. **Suggested Alternative Titles:** 1. **"Enhanced Bioremediation of Degreaser-Contaminated Soil Using Bioaugmented Bacteria and Organic Nutrient Amendments"** 2. **"Synergistic Bioremediation of Hydrocarbon-Contaminated Soils: Role of Bioreactors and Fish Pond Effluent"** 3. **"Bioreactor-Based Bioremediation of Degreaser-Contaminated Soil: A Study on Microbial Synergy and Nutrient Amendments"** These titles highlight the novel contributions and make the study's significance more apparent to potential readers.	
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 is comprehensive and provides a good overview of the study's objectives, methods, and results. However, it could be improved for conciseness, clarity, and focus. Here are specific suggestions for revision:** **Suggestions:** **1. Clarity and Conciseness:** • **Simplify the description of the methodology to avoid excessive detail. For instance, instead of listing all treatment setups in the abstract, focus on the key comparative treatments.** • **Highlight the most significant findings and implications without delving into granular data (e.g., avoid including precise numerical ranges).** **2. Emphasize Novelty:** • **Clearly state the novel aspects of the study, such as the use of fish pond effluent and the demonstrated synergy between Bacillus and Pseudomonas species.** **3. Practical Implications:** • **Briefly mention how this research can be applied in real-world settings, such as its potential scalability or cost-effectiveness.** **4. Streamline Conclusion:** • **Remove redundant statements about the general benefits of bioremediation, as they are better suited for**	

	the introduction or conclusion sections of the manuscript. **Suggested Revised Abstract:** ***Aim: This study investigates the enhanced bioremediation of degreaser-contaminated soil using bioaugmented bacteria (Bacillus and Pseudomonas species) and organic nutrient amendments, specifically fish pond effluent.*** ***Methodology: A randomized experimental setup was employed with nine treatment combinations, including controls, bioaugmentation with bacterial strains, and biostimulation using fish pond effluent. Bioreactors were utilized to cultivate the microbial strains, and bioremediation efficiency was monitored through microbiological and physicochemical parameters over 56 days.*** ***Results: The combination of fish pond effluent with Bacillus and Pseudomonas demonstrated the highest hydrocarbon degradation efficiency (76.6%), outperforming other treatments. The synergistic effects of bioaugmentation and biostimulation significantly enhanced microbial activity and hydrocarbon reduction.*** ***Conclusion: This study highlights the potential of combining organic nutrients and microbial consortia for cost-effective, scalable bioremediation of hydrocarbon-contaminated soils, providing a sustainable solution for environmental pollution management.*** **This revision keeps the abstract focused and impactful while maintaining its comprehensiveness.**	
Is the manuscript scientifically, correct? Please write here.	The manuscript is scientifically sound and methodologically rigorous, but a few points could be clarified or improved to ensure robustness and clarity. Below is an assessment of its scientific correctness: **Strengths:** 1. **Well-Defined Objective**: The study aims to investigate bioremediation using Bacillus and Pseudomonas species combined with fish pond effluent, a novel approach with clear ecological significance. 2. **Methodological Detail**: The manuscript provides detailed procedures for experimental setup, bioreactor construction, and monitoring, ensuring reproducibility. 3. **Comprehensive Analysis**: Both microbiological (e.g., THB, DUB) and physicochemical (e.g., THC, nitrogen) parameters are well-documented, supporting the validity of the findings. 4. **Logical Conclusions**: The results align with the data, demonstrating the effectiveness of bioaugmentation and biostimulation. **Areas for Improvement:** 1. **Experimental Design**: • While the study includes multiple treatment setups, the rationale for selecting specific combinations (e.g., Bacillus + fish pond effluent) could be better explained. • The manuscript does not address potential limitations, such as the variability in nutrient content of fish pond effluent or external environmental factors. 2. **Statistical Analysis**: • Although some statistical data (e.g., significance levels) are mentioned, a detailed explanation of the statistical methods used (e.g., ANOVA, post-hoc tests) is missing. • The manuscript should explicitly state whether observed differences between treatments were statistically significant. 3. **Data Interpretation**: • The discussion could delve deeper into the mechanisms driving the superior performance of fish pond effluent in enhancing bioremediation. • Some claims, such as the economic feasibility of fish pond effluent, would benefit from additional quantitative evidence (e.g., cost analysis). 4. **Microbial Dynamics**: • The manuscript mentions microbial counts but could discuss the interplay between indigenous and bioaugmented microbes, particularly the role of competition or synergy in hydrocarbon degradation. 5. **Environmental Implications**: • The manuscript does not address potential environmental risks, such as the introduction of exogenous bacteria or the long-term effects of fish pond effluent on soil health. **Overall Assessment:** The manuscript is scientifically correct and makes a valuable contribution to the field of bioremediation. However, addressing the areas above would enhance its rigor and impact. Including additional statistical analysis, elaborating on microbial dynamics, and discussing environmental implications would strengthen the study's scientific foundation. 4o	
Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.	The manuscript's references are pertinent to the study's focus on bioremediation of hydrocarbon-contaminated soils using bacterial consortia and organic nutrient amendments. However, to enhance the manuscript's depth and ensure it reflects the latest advancements in the field, incorporating more recent studies is advisable. **Suggested Additional References:** 1. **Bioremediation of Petroleum Hydrocarbon-Contaminated Soil: A Comprehensive Review** (2024)	

	• *Source*: Frontiers in Environmental Science • *Summary*: This review delves into the principles and mechanisms of petroleum hydrocarbon (PHC) bioremediation, highlighting the efficacy of microbial consortia, particularly species like *Bacillus* and *Pseudomonas*, in degrading PHCs. Frontiers 2. **Scale-up Treatment of Petroleum Hydrocarbon-Contaminated Soil Using a Defined Microbial Consortium** (2021) • *Source*: International Journal of Environmental Science and Technology • *Summary*: This study evaluates the effectiveness of a microbial consortium, including *Pseudomonas mendocina* and *Bacillus cereus*, in the bioremediation of oil-contaminated soils, providing insights into large-scale applications. Springer Link 3. **Bioremediation and Its Application in Aquaculture** (2023) • *Source*: SpringerLink • *Summary*: This chapter discusses the utilization of bioremediation techniques in aquaculture, focusing on the treatment of organic waste using beneficial bacteria, which is relevant to the manuscript's exploration of fish pond effluent as a biostimulant. Springer Link 4. **Bioremediation of Aquatic Environment** (2021) • *Source*: SpringerLink • *Summary*: This chapter explores eco-friendly bioremediation techniques for aquatic environments, emphasizing the role of indigenous microorganisms in detoxifying pollutants, aligning with the manuscript's themes. Springer Link 5. **Bacillus Species and Their Invaluable Roles in Petroleum Hydrocarbon Bioremediation** (2021) • *Source*: SpringerLink • *Summary*: This chapter highlights the significant contributions of *Bacillus* species in the degradation of petroleum hydrocarbons, providing context to their use in the manuscript's study. Springer Link Incorporating these recent studies will not only update the manuscript's literature review but also provide a broader context for the research findings, thereby enhancing its relevance and impact within the scientific community.	
Is the language/English quality of the article suitable for scholarly communications?	The language quality of the manuscript is generally adequate for scholarly communication, but there are areas where improvements can enhance readability, precision, and professionalism. Here's an assessment: **Strengths:** 1. **Technical Terminology**: The manuscript effectively uses domain-specific terms like "bioaugmentation," "biostimulation," and "hydrocarbon degradation," appropriate for a scholarly audience. 2. **Detailed Descriptions**: Experimental methods and results are explained in a way that facilitates understanding for readers familiar with the field. 3. **Logical Structure**: The content follows a structured flow, which helps convey the research clearly. **Areas for Improvement:** 1. **Grammar and Syntax**: • Some sentences are overly complex and could benefit from simplification for clarity. • Occasional typographical errors (e.g., inconsistent use of tenses, missing articles like "a" or "the"). Example: • Original: "The study showed that bioreactor was effective in multiplying the microbial isolates used in the various treatment plots." • Revised: "The study demonstrated that the bioreactor effectively multiplied microbial isolates in the treatment plots." 2. **Conciseness**: • Certain sections (e.g., abstract and discussion) include redundant phrases that can be streamlined. • Example: Instead of "Natural bioremediation of degreaser pollutants by activation of naturally occurring microorganisms will be cost effective in cleaning up and protecting the environment," use: "Activating naturally occurring microorganisms for bioremediation is a cost-effective approach to environmental cleanup." 3. **Vocabulary Choice**: • The language could be more scholarly in tone. For instance, instead of "degreaser polluted soils," use "soils contaminated with degreaser hydrocarbons." 4. **Clarity in Results and Discussion**: • Some results are presented without sufficient interpretation. Providing a clearer explanation of trends and mechanisms can improve reader engagement. • Example: "The superior performance of fish pond effluent can be attributed to its high nutrient content, particularly	

	nitrogen and phosphorus, which support microbial growth." 5. **Consistency**: • Ensure uniformity in formatting (e.g., scientific names like *Bacillus* and *Pseudomonas* should always be italicized). **Suggestions for Improvement**: Professional Editing: Consider having the manuscript professionally proofread to refine grammar, punctuation, and sentence structure. Simplify Complex Sentences: Break long sentences into shorter, more digestible ones while maintaining the scientific meaning. Focus on Active Voice: Using active voice where appropriate can make the writing more direct and engaging. Scholarly Vocabulary: Replace conversational terms with academic equivalents to align with the expected standard of scholarly communication. **Overall Assessment:** The manuscript is suitable for scholarly communication but would benefit from moderate editing to improve language precision, grammar, and conciseness. Addressing these areas will enhance its readability and impact in academic settings.	
Optional/General comments	Here are some optional/general comments for the manuscript: 1. **Visual Representation**: While the tables and figures provide valuable data, a schematic diagram or flowchart summarizing the experimental design or key findings would enhance the manuscript's visual appeal and accessibility. 2. **Environmental Impact Discussion**: Including a brief discussion on the broader implications of this bioremediation approach, such as scalability to other pollutants or long-term soil health, would add depth to the conclusions. 3. **Comparative Studies**: Consider including a brief comparison of the results with similar studies in the field. This would highlight the novelty and practical relevance of the findings. 4. **Cost Analysis**: If feasible, a simple cost-benefit analysis of using fish pond effluent and bioreactors versus conventional methods would add a practical dimension to the study. 5. **Limitations and Future Work**: A dedicated section on the limitations of the current study (e.g., potential variability in nutrient content of fish pond effluent or scalability challenges) and suggestions for future research could strengthen the manuscript's credibility. 6. **Grammatical Consistency**: Ensure consistent use of terms and scientific notation throughout, such as italicizing microbial species names and maintaining uniform phrasing in tables and text. These additional enhancements are not critical but would add to the manuscript's overall quality and scholarly value. This manuscript addresses an important environmental challenge, exploring the bioremediation of degreaser-contaminated soil using Bacillus and Pseudomonas species in combination with fish pond effluent. The study is methodologically sound, and the results demonstrate significant potential for improving hydrocarbon degradation efficiency through bioaugmentation and biostimulation. However, the following areas need improvement: 1. **Abstract and Introduction**: • The abstract is detailed but could be more concise, focusing on key results and their implications. 2. **Methodology**: • The experimental design is thorough but would benefit from a schematic diagram for clarity. • Include a detailed explanation of the statistical analysis methods used to validate the findings. 3. **Results and Discussion**: • While data presentation is comprehensive, deeper insights into the mechanisms behind fish pond effluent's superior performance are needed. • Reference figures and tables explicitly in the discussion to strengthen the interpretation of results. 4. **Language and Grammar**: • Moderate editing is required to address grammatical inconsistencies, simplify overly complex sentences, and maintain scholarly tone throughout. 5. **References**: • While the references are relevant, updating with recent studies from the past 3–5 years would enhance the manuscript's contemporary relevance. **General Recommendation:** The manuscript makes a valuable contribution to the field of bioremediation. Addressing the above comments will significantly improve the readability, depth, and scholarly quality of the article, making it suitable for publication.	

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

Reviewer Details:

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