Review of: "Assessment of Quality, Bacterial Population and Diversity of Irrigation Water in Selected Areas of Minna, Niger State, Nigeria"

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As a reviewer, here are some observations and suggestions:

Abstract

It's noted that the study was conducted in 2016, and there's concern about why it has not been published yet. It's important for the authors to address any potential concerns regarding the timeliness of the research.

The abstract should provide more specific details about the methods used for determining the physical, chemical, and biological properties of the irrigation water. Readers may want to know the exact standard methods used for analysis.

The findings regarding the bacterial populations and diversity should be presented more clearly. It's important to specify whether the differences in bacterial population and diversity among locations are statistically significant. Additionally, providing more context on the implications of these findings for irrigation water quality would enhance the significance of the study.

The study should acknowledge any limitations that may have influenced the results or interpretations. For example, limitations related to sample collection, analysis methods, or environmental factors could impact the generalisability of the findings.

The abstract should be carefully reviewed for language clarity and consistency. It's important for the authors to use clear and concise language to communicate their research findings effectively. Additionally, the abstract should follow a logical and organised structure to facilitate understanding for readers.

Introduction

The introduction lacks a coherent flow and organisation. There is a need to provide a logical progression of ideas to enhance clarity and understanding for the readers. Additionally, it is crucial to clearly state the aim of the study at the end of the introduction to provide a clear direction for the research.

Aim and objective

The initial lines of this subtitle already encapsulate the aim of the study, making the separate mention of objectives redundant. Consolidating these elements at the end of the introduction would streamline the presentation and provide a

cohesive narrative for the readers.

The author opted to utilise the FAO guidelines, but it remains unclear why alternative guidelines, such as those referenced in the study "DOI: 10.1007/s13201-012-0053-2," were not considered. Clarification on the rationale behind the choice of guidelines would strengthen the study's methodological justification.

Study area and Soil, Water, and Vegetation Description

The geographical location of the study area should be provided for context. Additionally, it would be beneficial to organise the information under a single subtitle titled "Study Area," with the two sub-sections detailing the geographical location and relevant characteristics of the study area. This approach would enhance the clarity and organisation of the manuscript.

Treatment and Experimental Design

The term "treatments" used in the study requires clarification. It's unclear whether it refers to treated sewage water or sewage collected before processing in a sewage treatment plant. And were these sewage samples analysed in this study? Elaborating on this aspect would help readers understand the specific conditions or interventions applied in the study.

Sampling

The workflow of the study should be structured logically, starting with sampling, followed by bacteria isolation, diversification, and then physiochemical analysis. Additionally, instead of explaining the biochemical tests in detail within the main text, it would be more appropriate to reference the specific tests used. If necessary, supplementary material can be provided for detailed descriptions of the biochemical tests. Since these tests are well-established and commonly found in standard laboratory manuals, there's no need to rewrite them in the main text.

Statistical Analysis

The experimental design and statistical analysis should be consolidated under a single subtitle titled "Experimental Design and Statistical Analysis." This would provide a clear and organised structure for presenting the methodology and analytical approach used in the study.

Results and Discussion

The results section should precede the discussion to maintain a logical flow in the manuscript. It's essential to first mention the bacteria isolated and identified based on biochemical tests before discussing their relevance in irrigation waters. While providing details about the colonies may be informative, it would be more appropriate to reference this information and include detailed descriptions in the supplementary material to streamline the main text.

The results section includes bacterial counts, as shown in Table 3. However, it's noted that the method used for bacterial counting is not specified in the materials and methods section. Providing details about the bacterial counting method used in the study would enhance the transparency and reproducibility of the research findings.

On page 9, it's mentioned that Salmonella spp. had a count of 2.1×10^7 CFU/ml in the water obtained from Mechanic Village (Table 3). However, no specific count for Escherichia coli (E. coli) is provided. Additionally, the statement suggests that the water from Mechanic Village contained more fecal contaminants than water from other locations based on the presence of Salmonella spp. It's important to ascertain whether this conclusion was statistically significant. Clarifying the statistical significance of this observation would strengthen the interpretation of the results.

On page 10, the statement suggests that when the biochemical oxygen demand (BOD) value exceeds the chemical oxygen demand (COD) value, it indicates a high concentration of ammonia and a low concentration of nitrate in the water. However, it is crucial to provide a reference to support this assertion for scientific credibility. Adding a citation to a reputable source would strengthen the validity of this interpretation.

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Clarify the Statistical Significance: It would be helpful to provide information on the statistical significance of the correlations mentioned. Were these correlations statistically significant? If so, it should be explicitly stated to reinforce the validity of the findings.

Strengthen References: While referencing the study by Hamza et al. (2009) supports the assertion about Bacillus subtilis's potential for reducing COD, consider providing more recent or additional references to strengthen the argument further.

Address Speculative Statements: While speculation is sometimes necessary in scientific discussions, it's essential to clearly distinguish between established findings and speculative interpretations. In the case of Escherichia coli's potential for bioremediation, consider toning down the language to reflect the speculative nature of the statement.

Provide Context: Explain the broader implications of the correlations observed. How do these findings contribute to our understanding of water quality and microbial dynamics in irrigation systems? Providing context can help readers better grasp the significance of the results.

In a nutshell, the whole manuscript, especially the results and discussion sections, exhibits a disjointed structure, with abrupt transitions between different aspects of the study. The flow of information appears scattered, making it challenging for readers to follow the logical progression of the findings. Reorganising these sections to ensure a smoother transition between topics and providing clear signposts for readers would greatly improve the overall coherence and readability of the manuscript.