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

Akshay Kumar Chaudhry[1]

1 Chitkara University

Potential competing interests: No potential competing interests to declare.

The research, conducted during the cropping season of 2016, aimed to evaluate the quality, bacterial population, and diversity of irrigation water in specific areas of Minna, Niger state. Employing a systematic approach, water samples were gathered from four distinct locations where irrigation agriculture is prevalent in Minna. However, the data, being over 5 years old, suggests that incorporating more recent data could have provided stakeholders with up-to-date insights to better integrate management solutions.

The findings revealed considerable differences in bacterial population and diversity across the sampled locations. Notably, Fadikpe exhibited the highest bacterial population but the lowest diversity. While this information sheds light on the microbial dynamics within these areas, expanding the study to include more locations could have enhanced its comprehensiveness and utility for stakeholders.

Furthermore, the study revealed that the physical and chemical properties of irrigation water were significantly influenced by location, except for chemical oxygen demand. Notably, despite some physicochemical properties exceeding recommended values by the Food and Agriculture Organization standard, water from Chanchaga exhibited the best quality for irrigation.

However, the study suggested that the bacterial population found in the irrigation water of Minna might not be effectively biodegrading. Even Bacillus subtilis, known for its biodegradation potential, was unable to reduce the biochemical oxygen demand. Interestingly, Escherichia coli showed negative correlations with various water quality parameters, suggesting a potential for biodegradation that could be explored in further studies.

While the research provides valuable insights into the quality of irrigation water in Minna and highlights areas for potential improvement, there are several aspects that could be enhanced:

1. Sampling Methodology: The study collected water samples from only four locations. Expanding the sampling locations could provide a more comprehensive understanding of water quality across Minna.

2. Experimental Design: Although the study utilized a Completely Randomized Design (CRD), incorporating additional experimental controls or designs could strengthen the validity of the findings.

3. Microbial Analysis: While the study assessed bacterial populations and diversity, a more in-depth analysis of microbial communities, including the presence of pathogens or indicator organisms, could provide a clearer picture of water safety for irrigation.

4. Bioremediation Potential: Further investigation into the biodegradation potential of bacterial strains, such as Bacillus subtilis and Escherichia coli, under controlled conditions could help elucidate their effectiveness in improving water quality for irrigation purposes.

5. Long-term Monitoring: Implement a long-term monitoring program to track seasonal variations in water quality parameters and microbial populations at the study sites. This would help in understanding the temporal dynamics of water quality and identifying trends or recurring patterns that may influence management strategies.

Overall, by addressing these areas for improvement, the research could contribute to better understanding and managing irrigation water quality in Minna, ultimately supporting more efficient and sustainable agricultural practices.