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Assessment of Water Quality in Selected Fish Farms in Uasin Gishu County

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Abstract

This study evaluated water quality across five farms to assess their suitability for fish farming. Efforts to promote fish farming in Uasin Gishu County persist, but research on enhancing fisheries productivity through better pond management remains limited. Most studies focus on production techniques or market development, neglecting the importance of effective pond management for sustainable growth. Key physicochemical parameters, including pH, Biological oxygen demand, Chemical oxygen demand, salinity, conductivity, and temperature, were measured in-situ in selected fish ponds using a Multi-probe HQ40D meter, while water samples for nitrate analysis were collected in triplicate and transported to the laboratory for further analysis. Data analysis involved ANOVA and Kruskal-Wallis tests, with Tukey's and Dunn's tests identifying variations and Fisher's exact test assessing associations between water quality parameters and farm, pond, type, and measurement date ($P \leq 0.05$).Most farms maintained suitable water temperatures (25–30℃), with salinity, pH, and TDS within acceptable limits. However, dissolved oxygen levels often fell below the recommended range (60–100% or 0.1–0.2 mmol/L), which could negatively impact aquatic life.Conductivity showed slight variations, while high COD and BOD levels (exceeding 50 mg/L and 20 mg/L, respectively) indicated organic pollution. Although nitrate levels remained stable, microbial contamination was a significant concern, with coliform and bacterial counts frequently surpassing 10,000 CFU. These findings highlight the need for improved water management to control pollution and ensure sustainable aquaculture. This study found most water quality parameters suitable for aquaculture, but low dissolved oxygen, high BOD and COD, and microbial contamination in some farms could harm fish health and productivity. To enhance water quality, regular pond cleaning, controlled feeding, and monitoring should be prioritized to reduce organic pollution, maintain optimal BOD and COD levels, and control microbial contamination.

Keywords: Water quality, Aquaculture, coliforms, Nitrates.

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