SUMMARY

The crocodile captivity facility in Dawuhan Kulon Village, Kedungbanteng The crocodile captivity in Dawuhan Kulon Village, Kedungbanteng District, Banyumas Regency generates wastewater that has the potential to pollute the surrounding environment. Although the facility is managed in accordance with existing regulations, untreated domestic wastewater discharged into water bodies can decrease water quality due to high organic content, coliform bacteria, and dissolved solids. This condition poses risks to public health, aquatic ecosystems, and conservation sustainability. To mitigate these impacts, a biofilter-based Wastewater Treatment Plant (WWTP) was constructed as a pollution control system.

The aim of this study was to assess the quality of wastewater after biofilter treatment and to analyze the effectiveness of the system in reducing key pollutants. The research was conducted using a survey method with purposive sampling at the inlet and outlet of the WWTP, resulting in 24 water samples of 1 liter each. The main parameters measured were Biochemical Oxygen Demand (BOD_5), Total Dissolved Solids (TDS), and Most Probable Number (MPN) of coliforms, while pH, temperature, and Total Plate Count (TPC) were analyzed as supporting parameters. Data analysis included calculating mean values, inlet–outlet differences, and treatment efficiency, which were then compared with the environmental quality standards. The effectiveness of the biofilter was further tested using IBM SPSS with ANOVA (paired t-test), supported by the interpretation of secondary parameters.

The results showed that the biofilter system reduced MPN by 30.2%, indicating moderate effectiveness in lowering pathogenic microorganisms. In contrast, BOD_5 increased from 2.2 to 2.4 mg/L with a negative efficiency of -9.1%, and TDS rose from 67.6 to 70.3 mg/L with a negative efficiency of -3.9%. These findings confirm that the system was less effective for organic matter and dissolved solids, and further improvements with advanced technologies such as reverse osmosis, nanofiltration, or membrane bioreactors are required. In addition, supporting parameters supported these results. The pH shifted slightly toward neutrality (7.82 to 7.96) and temperature remained stable (25.96 °C to 25.79 °C), both favorable for microbial activity. Most notably, the Total Plate Count (TPC) decreased substantially from 150.2×10^4 to 38.1×10^4 CFU/mL, reinforcing the system's capacity to reduce microbial contamination. Overall, while the biofilter showed promise in lowering microbial loads, further optimization is necessary to improve its performance in reducing organic matter and dissolved solids.

Keywords: *BOD, Biofilter, Bioremediation, Crocodile Captivity, MPN.*