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Comparative Study between Two Wastewater Treatment Systems: a Wastewater Treatment Plant (WWTP) and a Lagoon Station

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Abstract

Water resource pollution is a major global issue primarily caused by human activities. To mitigate this pollution and preserve our water resources, purification systems have been developed. This study compares the efficiency of biological treatment of wastewater between a Wastewater treatment plant (WWTP) in Sidi Marouane and a lagoon station in Boughrara Saoudi. The aim is to analyze the performance of both systems for various physicochemical parameters (temperature, pH, BOD5, COD, nitrate, nitrite, phosphorus, etc.) and microbiological parameters (fecal coliforms, total coliforms, fecal streptococci, etc.). The results demonstrate that biological treatment at the outlet of the WWTP is more effective than that of the lagoon station in reducing pollutant levels. However, some parameters do not comply with reuse and environmental preservation standards. DBO5 and COD values exceed Algerian standards, as does the microbiological load. It is concluded that the natural lagoon system alone is insufficient to produce purified water suitable for agricultural reuse or environmental preservation. The addition of planted filter beds or sand and gravel beds downstream of the natural lagoon is recommended to improve water purification. Despite these challenges, both biological treatment systems remain effective solutions for pollution control, although the WWWTP is generally more satisfactory and cost-effective than the lagoon station. In conclusion, this study emphasizes the importance of selecting appropriate purification technologies to ensure compliance with environmental standards and the reuse of wastewater.

Key Words: *Biological treatment, wastewater, wastewater treatment plant (WWTP), Lagoon station, Algeria*