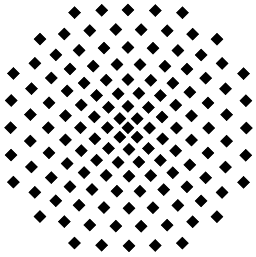

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Master Thesis

Investigation of conventional parameters in LFKW Wastewater Treatment Plant during dry and wet weather conditions

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Abstract

The performance of wastewater treatment plants (WWTPs) can vary greatly depending on the weather, and their ability to remove pollutants may be considerably impacted. In order to evaluate the plant's treatment efficacy and the effect of precipitation, this study looks at the Lehr- und Forschungsklärwerk (LFKW) WWTP's selected conventional wastewater quality parameters in both dry and wet weather scenarios. Correlations between the conventional parameters are analyzed. On separate dates (three dry and wet days each), data was gathered from two important stations (inflow following the primary clarifier and outflow following microfiltration) and evaluated. In addition to flow rates recorded at a computed average of two-hour intervals, Significant weather-related variations in turbidity, conductivity, pH, phosphate, chemical oxygen demand (COD), total organic carbon (TOC), dissolved organic carbon (DOC), spectral absorption coefficient (SAC) at 254nm are highlighted in the study using sophisticated statistical analyses, such as t-tests and correlation matrices.

It's observed that, as a result of diluting effects due to rainy weather, it significantly reduces turbidity, COD, TOC, and conductivity. On the other hand, pH levels show slight variations, indicating that the treatment procedures have good buffering that preserves stability. Phosphate and SAC responses varied, indicating intricate relationships with urban runoff and precipitation inflow and demonstrating the complicated effects of these elements under various weather scenarios. Additionally, the study uses a variety of data visualization tools, such as time series plots and bar graphs, to show make it easier to understand parametric variations and interrelation ships under varied weather at the LFKW WWTP. Thus, offer a thorough grasp of the operational difficulties and possible modifications needed for future resilience in wastewater management, highlighting the necessity of possible adaptive management techniques to maximize treatment effectiveness and preserve compliance under erratic weather conditions.

Keywords:

Lehr- und Forschungsklärwerk (LFKW), Wastewater treatment plant (WWTP), Conventional pollutants, Precipitation, Chemical Oxygen Demand (COD), Turbidity, Total Organic Carbon (TOC), Dissolved Organic Carbon (DOC), Phosphate, Spectral Absorption Coefficient (SAC), Removal efficiencies, Influent concentrations, Dilution effects, Correlations, Treatment plant operation, Optimization.