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Treatment of Kitechen Waste Water by Phytoremediation Method using Canna Indica Plant and Colocasia Esculenta Plant

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Abstract: *Household wastewater, which comes from activities like washing dishes, cleaning vegetables, and food preparation, is a leading part of household greywater. It generally has high concentrations of organic matter, oils and greases, suspended solids, food solids, detergents, and nutrients like nitrogen and phosphorus. When released without treatment, such wastewater can cause ecological pollution, bad odors, clogged drains, and soil and water body contamination. It also favors the development of pathogenic microorganisms, which is a very dangerous threat to public health. In contrast to sewage, kitchen wastewater tends to be neglected in conventional wastewater treatment systems, particularly in rural and semi-urban communities. Nevertheless, owing to its high pollutant load, it needs to be treated before discharge into the environment or reuse. Proper treatment can ease the load on municipal systems, save water by safe reuse in gardening or irrigation, and ensure the ecological balance of surrounding water bodies This study examines the efficiency of phytoremediation by Canna indica and Colocasia esculenta in the treatment of kitchen wastewater, a major cause of domestic water pollution. The research aims to assess the potential of these plants to lower important water quality indicators like Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), Total Suspended Solids (TSS), and nutrient levels such as nitrates and phosphates. Experimental systems were set up using horizontal subsurface flow constructed wetlands, each of which was planted with Canna indica, Colocasia esculenta, or left unplanted as a control. Kitchen wastewater was continuously fed to each system for a set period, and samples were periodically analyzed to determine the treatment efficiency. The findings proved that both Canna indica and Colocasia esculenta greatly enhanced the quality of kitchen wastewater. Canna indica was more efficient in COD and BOD removal, whereas Colocasia esculenta was more efficient in nutrient removal, especially in phosphate reduction. In general, the planted systems performed better than the unplanted control in all the parameters measured, validating the capability of these plant species in organic and nutrient-rich domestic wastewater treatment. Their strong growth and versatility also point to their viability for application in low-maintenance, sustainable water treatment systems. The research finds that phytoremediation with Canna indica and Colocasia esculenta is an effective, low-cost, and environmentally friendly approach for the treatment of kitchen wastewater. These results recommend the incorporation of constructed wetland systems into domestic and community-level wastewater management schemes. Future research could investigate long-term performance, seasonal fluctuations, and the mixture of these plant species to further improve treatment results.*

Keywords: Colocasia esculenta, Canna indica, Biological Oxygen Demand,), Total Suspended Solids (TSS)

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