

EFFECTIVENESS OF CONSTRUCTED WETLAND IN TREATING LIVESTOCK WASTEWATER

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Livestock wastewater is a type of agricultural wastewater that includes dairy wastes and animal wastes. When it is mismanaged, it directly impacts the environment, including air, soil, surface water, and groundwater. Constructed wetlands are treatment systems that use natural processes involving wetland vegetation, soils, and associated microbial assemblages to improve water quality. The objective of this study is to compare the purification ability of the laboratory scale system, which consists of a sedimentation tank, constructed wetland and a tank with a seeds layer, to reduce pH, nitrate, turbidity, electrical conductivity, ammonia, Total Solids (TS), Total Suspended Solids (TSS) and Total Dissolved Solids (TDS). The ability of five macrophytes to survive in livestock wastewater for nine days was tested. Based on the results, *Commelina diffusa* was selected as the best macrophyte. The efficiency of *Strychnos potatorum* seeds in treating livestock wastewater was investigated separately. Then, a purification system was constructed, and 15 L of the diluted livestock wastewater was flown through the system, measuring the parameters after each step. The total purification efficiencies of the system were around 10% for pH, 25% for turbidity, 55% for TS, 80% for TSS, 90% for nitrate and 50% for ammonia. Furthermore, the treated water had better colour and odour than the raw livestock wastewater. The cycling of nutrients and other materials of wastewater by macrophytes may affect this result. Treated water can be utilized for cleaning purposes like washing livestock farm premises. The treatment capacity of the constructed wetland was around 5,500 mL m⁻² h⁻¹. This purification system requires low capital, low energy, and less maintenance to treat the livestock wastewater. Therefore, this purification system can be introduced to manage wastewaters of local livestock farms.

Keywords: *Commelina diffusa*, Constructed wetlands, Livestock wastewater, *Strychnos potatorum*