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Addressing issues in Hospital Wastewater using Algal bacterial consortium

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Abstract: The significant sources of wastewater are domestic households, industries and hospitals. This paper would cater to resolving critical issues arising due to the latter i.e., hospital wastewater. The onset of COVID-19 and its escalation to a global pandemic is reason enough to surveil hospital wastewater (HWW) owing to its epidemiology and ecotoxic nature and impact. The wastewater from hospitals is a hotbed of emerging contaminants like pharmaceutically active compounds (PhACs), heavy metals, surfactants, radioisotopes and other hazardous substances. Hospital effluent is characterized by a high chemical oxygen demand (COD) ranging between 120 – 500 mg/L and an average Biochemical Oxygen demand (BOD) is around 200 mg/L along with the presence of Nitrogenous compounds, total organic carbon, suspended solids, epidemic vectors and other emerging contaminants. A Core HWW has a very low biodegradability index along with having a low BOD: COD ratio ranging between 0.29 to 0.34, which is indicative of the 'difficulty' in treatment via the most economical treatment method i.e., biological pathway. The volume of wastewater generated from hospitals depends on its size and type, patient intake capacity, technical facilities and miscellaneous services provided to patients. The purpose of this paper would be to solely target the "ABC (Algal-Bacterial Consortia)-based MBBR as an onsite decentralized treatment system for hospital wastewater using microbial intelligence" such that any epidemiological or ecotoxicological risks are prevented, if not eliminated. The introduction of algal biomass along with "fragile" bacterial consortium may circumvent the above-presented challenges by prominently addressing a) PhAC shock load; b) sustainable pollutant removal requiring less oxygen support; c) Surfactant-Antibiotic removal without causing ecotoxicological and epidemiological by-product vectors. Hence, the basic intent of this research would be to hybridize MBBR technology by using algal bacterial consortium (ABC) and target the 'FES (feasible, effective and sustainable' onsite treatment facility of hospital wastewater.

Keywords: Algal-bacterial consortia, Microbial intelligence, Persistent Organic Pollutants.