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RESEARCH ARTICLE

Incorporation of Paddy Husk Biochar and the Effectiveness of *Colocasia esculenta* Usage in Vertical Flow Constructed Wetlands for Treatment of Synthetic Wastewater Having "Rhodamine B"

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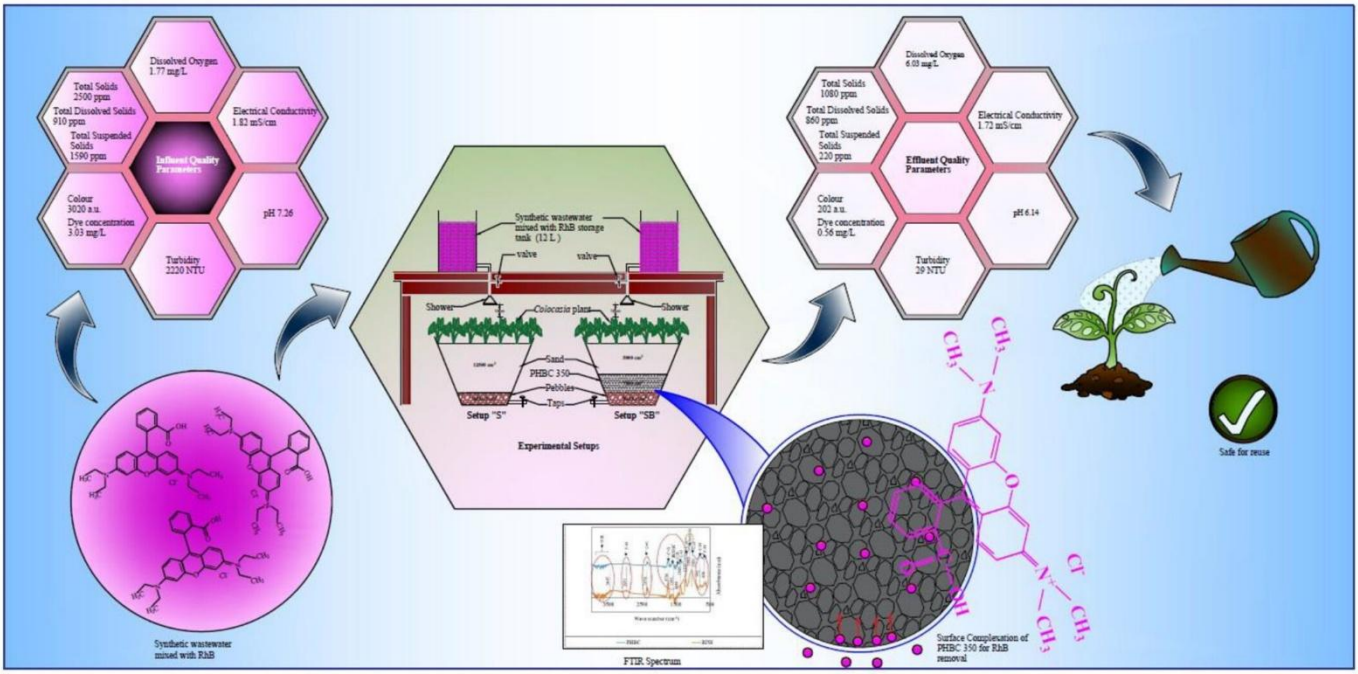
Graphical abstract



Abstract

Incorporation of paddy husk biochar (PHBC 350) and *Colocasia esculenta* (*C. esculenta*) usage in vertical flow constructed wetlands (VFCWs) for treatment of synthetic wastewater mixed with rhodamine B (RhB) was the focus. To increase the removal efficiency of VFCW, pebbles (0.0125 m^3), sand (0.005 m^3), and PHBC 350 (0.0075 m^3) were used. Setups of VFCWs, S (sand) and SB (sand + biochar [30% v/v]), were established. DO, pH, TS, TDS, TSS, EC, color, turbidity, dye concentration, and RhB removal percentage were evaluated. The measured values of DO, EC, pH, TS, TDS, and TSS in SB were 6.03 mg/L, 1.72 mS/cm, 6.14, 1080 ppm, 860 ppm, and 220 ppm, respectively, in 10 days. Moreover, SB gave a statistical level of RhB removal of 81.5%. All in all, incorporation of biochar into VFCWs created new knowledge to advance the removal performance for wastewater mixed with organic pollutants by understanding its mechanistic dynamics.