The Greenovation of Low Cost Super-Adsorbent Polymer for Co-Treatment of Industrial Wastewater

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Not only human, but environments also affected as the human is polluted by oil spill, metal ions and dyeing colour.In this study, a new super adsorbent polymer (SAP), fabricated by adding nano-silica (NS) from rice straw into SAP, was synthesized from silk fibroin (SF) extracted from waste silkworms and poly(lactic acid)(PLA) from corn feedstock. The SAP was packed into baskets of the turbine to track water quality by sensors then send messages through LINE application. The result showed that the best ratio of NS:SF:PLA was 6:13:7. After that, BET surface area was 6.00 m^2/g with mean distribution size of 8 nm while the zeta potential was found to increase as the value of pH increased from 4 to 14. The solution that contaminating with oil, metal ions and reactive dyeing colour were used to evaluate the SAP's adsorption capacity. The result showed that the oil adsorption capacity of SAP added NS 8 nm(SAP-NS) can absorb 1,854.6±0.8, 1674.7±0.5 and 1765.4±0.8 percent of body weight for cooking oil, fuel oil and diesel, respectively. Moreover, it was found that the metal ions adsorptions were 127.04±0.21, 149.78±0.42,153.65±0.42 ,189.92±0.21, 156.25±0.25, 149.74±0.27, 132.14±0.21, 142.31±0.21, and 167.26 ±0.86 mg/g for Fe, Mg, Pb, Cd, Hg, Mn, Ni, As, and Zn, respectively. Furthermore, reactive dyeing colour adsorption capacity was 275.76 mg/g. In addition the SAP-NS could be reused to adsorb mixed oil 142 times, mixed metal ions 122 times and reactive dyeing colour 174 times , before it deteriorated. The water turbine with SAP-NS increased DO 87%.

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