REMOVAL OF ORGANIC MATTERS AND PHENOL COMPOUND FROM THE WASTE WATER BY USING GAC–SBR SYSTEM

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The studies were concerned in removal of organic and phenol compounds from the synthetic waste water by using Granular Activated Carbon–Sequencing Batch Reactor System (GAC–SBR). The synthetic waste water, was used in this experiment, had the glucose as main organic matter in term of COD about 3500 mg/l and phenol compound about 1000 mg/l. The experiments were carried out into parts as follows. First, the optimal concentrations of GAC was investigated for observation of the optimum yields for absorption of COD and phenol compounds in the waste water. Second, the various hydraulic retention time (HRT) of GAC–SBR system was also carried out for determination the optimal removal efficiency.

The results shown that the absorption ability of GAC in SBR system was higher than normal condition. The maximal phenol and COD absorption abilities of GAC were 213 and 685.1 mg/g of GAC, respectively. While the maximal phenol and COD absorption abilities of GAC in SBR system were 240 and 761 mg/g of GAC, respectively. The absorption yield of GAC for phenol and COD in the normal conditions was highest (about 60 and 50%, respectively) in the first day of incubation but the absorption ability was absolutely lost after 3 days incubation. The suitable amount of GAC which was supplemented in the SBR system was 1000 mg/l. At the condition of 1 day HRT, the COD and phenol contents in the effluent from GAC–SBR system were 16 and 0.2 mg/l, while the COD and phenol contents in the SBR system were 122 and 3.1 mg/l, respectively. The comparisons of the removal efficiencies between GAC–SBR system and SBR system in various HRT values showed the interested results. In the SBR system, at HRT values as 3, 5 and 10 days, the COD contents of the effluent were 48, 32 and 16 mg/l, respectively, and the phenol contents of effluent were 0.35, 0.18 and 0.018 mg/l, respectively. In the GAC–SBR system, at the HRT as 3, 5 and 10 days, the COD contents of effluents were 16, 14.5 and 8 mg/l, respectively, the phenol contents of effluents were 0.08, 0.023 and 0.018 mg/l, respectively. From all of the results aboved, GAC gave the advantages for removal of the organic matters and toxic substances (phenol compounds) in the SBR system. The mechanisms of the GAC in the SBR were adsorption of the organic matters and phenol compounds, the matrix for
microorganisms to attach for increasing of the mixed liquor suspended solids (MLVSS) in the system and gave the good conditions for microorganism, attached on the GAC to degraded the phenol compounds.