Removal of Cu (II) and Fe (II) from Industrial waste water using orange peel as adsorbent in batch mode operation

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Abstract : The current study focuses on the removal of Copper and Iron from industrial waste water using unconventional adsorbents. Chemically treated orange peel is available abundantly as agricultural based wastes. In this study the modification of the surface of an adsorbent was found to be more effective in the removal of copper and iron from the waste water which leads to achieve the higher adsorption capacity and % removal. This work is considered to be innovative because the economic feasibility of the modifications made is not yet available fully. The work was carried out in batch mode reactor. The influence of process parameters like pH, speed of agitation, adsorbent dosage, metal ion concentration, External temperature and contact time are studied in terms of % removal vs time. The maximum metal ion removal for Cu (II) is 87% at pH 6 and for iron it is 85% at pH 5. At 10 ppm concentration, the maximum removal was obtained as 93% for both metals at the same operating conditions. The maximum removal of metal ions at 1.5 g of adsorbent dosage for Cu (II) and Fe (II) are 96% and 94% respectively. At a temperature of 30°Cthe maximum removal of metal ions was obtained as 89% and 81% respectively for Cu (II) and Fe (II). At 180 rpm of agitation rate, the maximum % removal of metal ions was 89 and 85 for Cu (II) and Fe (II) respectively. At 90 minutes of contact time the maximum % removal achieved was 90 and 87 for Cu (II) and Fe (II) respectively.

Key words : Adsorption, pH, agitation rate, adsorbent dosage, Initial metal ion concentration, Contact time, Temperature.

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