Pb(II) increased with increasing initial concentration. However, the adsorption of Pb(II) is higher than Cu(II) in both single and binary systems. The Langmuir and Freundlich linearized isotherm models were used to describe the adsorption equilibrium of Cu(II) and Pb(II) in both single and binary systems, the Langmuir isotherm model fitted the experimental data. The adsorption of Cu(II) was sensitive to the coexistence of Pb(II) in binary systems, adsorption of Cu(II) increased at higher initial concentration which suggests that adsorption of Cu(II) increases after adsorption of Pb(II) had reached equilibrium. The kinetic model followed pseudo-second order for both systems. The pHpzc of orange peels was determined to be acidic which favors the adsorption of Cu(II) and Pb(II) since the solution pH was higher than the pHpzc. The FT-IR revealed the presence of acid groups (-OH and -COOH) on the surface of orange peels therefore, the surface of the bio-sorbent becomes negatively charged at a solution pH higher than pHpzc. Hence, Cu(II) and Pb(II) in solution are attracted to the bio-sorbent surface by electrostatic interaction. This study showed that orange peels are an effective bio-sorbent for the removal of Cu(II) and Pb(II) in single and binary systems from aqueous solutions, however orange peels has more affinity for Pb(II) than Cu(II).

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