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Biosorption of oxybenzene using biosorbent prepared by raw wastes of *Zea mays* and comparative study by using commercially available activated carbon



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ABSTRACT

Organic pollutants present in waste water have undesirable effect on the environment. Industry activities are the key sources of organic pollutants. Prime pollutants released from various sources react instantly with the environment and become derived (secondary) pollutants, which stay for an elongated time. The present research work has been carried out using biosorbent prepared from various *Zea mays* wastes for elimination of oxybenzene. Different parameters viz contact time, initial concentration; adsorbent dose, temperature and pH were optimized for the biosorption of oxybenzene on to the biosorbent samples. BCS (Baby corn silk) showed higher percentage of biosorption at optimum contact time of 3 h, pH between 5 and 6 and temperature at 25 °C. Analysis of equilibrium biosorption data in terms of several isotherm models revealed that Langmuir isotherm and Freundlich isotherm indicates better agreement with the experimental data. The kinetics of oxybenzene biosorption on to the biosorbents was described with the pseudo-first-order model. Thermodynamic parameters indicated that biosorption onto biosorbent was feasible in nature, spontaneous, and endothermic for some biosorbents, but on contrary not feasible, exothermic and non spontaneous for other biosorbents. The result of this study showed that the biosorbent derived from *Zea mays* can be used as a prospective biosorbent for oxybenzene in wastewater and also can be an alternative for the commercially activated carbon.

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Abbreviations: NCH, Normal corn husk; NCS, Normal corn silk; BCH, Baby corn husk; BCS, Baby corn silk; CAC, Commercially available activated carbon.

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1. Introduction

Oxybenzene is the major pollutant, present in the wastewater released from different process industries like tanning, plastics, textile, pulp, gas, pharmaceutical, paper, ferrous industries, coke manufacturing, rubber and petroleum refinery industries (Girish et al., 2016). Environmental regulation has considered oxybenzene as a precedence pollutant. Its bearable concentration should be less than 0.1 mg/L before it is released into the aquatic environment (Ahmaruzzaman et al., 2005). Oxybenzene and its derivatives are poisonous and most eugenic at elevated concentrations and may be absorbed by plants, human beings and aquatic animals. The

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