

(193)

Reduction of Chemical Oxygen Demand by Enhancing the Activity of Tertiary Treatment by Modifying Advanced Oxidation Process for Herbal Pharmaceutical Industry Wastewater

Adikaram D.M.T.P.^{1*}, Chandrathilake, G.G.T.¹, Jayaneththi J.K.S.R.²

¹*Department of Forestry & Environmental Science, Faculty of Applied Science, University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

²*Tech Waters (Pvt) Ltd, Colombo 05, Sri Lanka*

**adikaramp7@gmail.com*

Abstract

Herbal pharmaceutical industry generates wastewater containing very high-level of chemical oxygen demand (COD), high levels of biological oxygen demand (BOD), color intensity and suspended solids. Therefore, the main objective of this study was to reduce the high level of COD by enhancing the activity of tertiary treatment stage by modifying advance oxidation process. The specific objectives were to find the suitable chemical concentrations for the process and to find the optimum conditions for better performance of Activated Carbon as an absorbent in wastewater treatment. Herbal pharmaceutical wastewater samples which contain 1493 mgL⁻¹ of COD level after the secondary treatment were used for the study. Samples were treated with different concentrations of FeSO₄ and H₂O₂ (Fenton reagent) at constant pH level, temperature and reaction time (1hr). After the treatment, the samples were filtered via different concentration of activated charcoal (AC) by changing the stirring time. According to the results the highest COD removal efficiency (45%) was observed with [FeSO₄] of 3,333.33 mgL⁻¹, [H₂O₂] of 83.33 mL⁻¹ and maintaining the reaction medium in pH 3. Moreover, the results show that 75.6% of COD removal efficiency by AC (2 gL⁻¹). However, AC showed the lowest time (15 minutes) for achieving the final result. Hence it could be inferred that use of Fenton reaction with [FeSO₄] of 3,333.33 mgL⁻¹, and [H₂O₂] of 83.33 mL⁻¹ at pH 3 and filter the treated water through the AC is a promising solution to remove high level of COD in herbal pharmaceutical industry wastewater.

Keywords: Herbal pharmaceutical wastewater, Tertiary Treatment, Advance Oxidation, Fenton reagent,