



Removal efficiency of endocrine disrupting chemicals through chemical coagulation using two different coagulants: AlCl_3 and $\text{Al}_2(\text{SO}_4)_3$

Gita Saini*¹, Shalini Pant², Tanveer Alam³, A. A. Kazmi¹,
Nitin Sharma³ and Nitin Kumar Singh¹

1. Department of Civil Engineering, Indian Institute of Technology, Roorkee 247667, **INDIA**
2. S. S. D. P. C. P. G. College, Roorkee, Uttarakhand-246174, **INDIA**
3. K. L. D. A. V. P. G. College, Roorkee, Uttarakhand-246174, **INDIA**

Email: gitaprvn@gmail.com

Accepted on 6th December 2014

ABSTRACT

Present study reports treatment of wastewater (WW) by two different coagulants, aluminum chloride (AlCl_3) and aluminum sulphate [$\text{Al}_2(\text{SO}_4)_3$]. Batch coagulation experiments were conducted to evaluate the influence of initial pH (4.5-9) and coagulant dose ($500\text{-}3000\text{ mg L}^{-1}$) on chemical oxygen demand (COD), total suspended solids (TSS), ammonical nitrogen ($\text{NH}_3\text{-N}$), dissolved organic carbon (DOC), and turbidity removal from WW. Optimum pH and optimum dose was found to be 7.5 and 2000 mg L^{-1} respectively for both coagulants. Optimum pH was found to give 97 and 90% COD, 89 and 81% TSS 20.8 and 36.9% DOC, 96.5 and 93.4% turbidity and 93.6 and 92.5% $\text{NH}_3\text{-N}$ removal efficiency (RE) by AlCl_3 and [$\text{Al}_2(\text{SO}_4)_3$] respectively from WW. The RE of the selected parameters at optimum dose was found almost similar to RE at optimum pH. Now the sample was treated at optimum pH and dose for 60 minutes and the characterization of sludge generated during coagulation process was done by FTIR analysis. Gas chromatography-mass spectrometry (GC-MS) analysis was also done for WW and treated water by selected coagulants. Selected compounds for this study are testosterone, progesterone, diethyl phthalate (DEP) and di-butyl phthalate (DBP). The RE of $\text{Al}_2(\text{SO}_4)_3$ was found to be good for phthalate compounds while the RE of AlCl_3 was good for all compounds. The average RE of testosterone, progesterone, DEP and DBP was found to be 39.5, 30.1, 64.7 and 57.7% by $\text{Al}_2(\text{SO}_4)_3$ and 59.4, 57.5, 67.2 and 61.3 % by AlCl_3 , respectively in WW.

Keywords: Endocrine disrupting chemicals (EDCs), Removal efficiency (RE), diethyl phthalate (DEP), di-butyl phthalate (DBP), GC-MS analysis.
