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Reduction of total chromium in textile industry effluent

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Waste water released from industries is a major concern for environmentalists these days. Industrial effluents contain various toxic metals, harmful gases and several organic and inorganic compounds. The discharge of these untreated toxic effluents has deteriorated the natural flora and fauna and poses a risk to human health. The long-term consequences of exposure also cause fatal diseases like cancer, delayed nervous responses, mutagenic changes, neurological disorders, etc., in humans. Industrial effluent containing chromium and aromatic compounds like phenol are discharged by the industrial processes of wood preserving, metal finishing, petroleum refining, leather tanning and finishing, paint and ink formulation, pulp and paper industry, textile industry, pharmaceutical industry and automobile parts manufacturing industry. In order to remove these pollutants from the effluent, expensive chemical and physical processes like ionization, adsorption, ion exchange, membrane filtration, chemical oxidation, etc., are used. Most of these processes are highly energy consuming, non-economic and release effluent waste water which is detrimental to the environment. Recently biotechnological processes have been reported as alternative expensive treatment methods. Biological methods are simple as well as eco-friendly and have the potential to completely reduce and degrade the pollutants under aerobic or anaerobic conditions at relatively low capital and operating cost. Textile and Clothing (T&C) is one of the largest and oldest industries present globally. However, the textile industry is considered to be one of the biggest threats to the environment. The various processes carried out in the textile industries produce large amounts of gas, liquid and solid wastes. The removal of Cr from textile industry wastewater by chemical precipitation using ferric chloride was investigated in the present study. The ferric chloride was able to precipitate out Cr as well as coloring matter from the wastewater. The precipitation was found to be highly dependent on both pH and dose of iron salt used. The Cr removal was effective under highly alkaline conditions above pH 10 and the color removal was effective in the pH range of 3.0-6.0. The chemical precipitation performed at pH 12, The experiments showed the Cr reduction from 564 mg/l to a dischargeable level of 2mg/l after treatment with ferric chloride at pH 12. The study claims that the ferric chloride can be used effectively to remove phenols from textile industry.

Biography

Edwin D Thangam is a faculty of Dr MGR Educational and Research Institute University. He is a hardworking academician and researcher with adequate experience in industry, academics and real time construction consultancy projects. He is specialized in Geotechnical Engineering at PG level and is currently pursuing Doctoral Studies in Environmental Engineering. He is involved in real time consultancy projects on constructions, interiors, structure, sustainability, etc.

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