

Assessment of Biosorption Potential of Algae to Adsorb Chromium from Leather Industry Effluent

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Abstract

Chromium (Cr) is a toxic and carcinogenic element. The discharge of Cr into the environment has become a problem of great concern all over the world including Pakistan since few decades. Present research was conducted to study the biosorption of total Cr using two strains of algae *Chlorella* and *Scenedesmus*. Water quality indicators like chemical oxygen demand (COD), biological oxygen demand (BOD), pH, electrical conductance (EC), total dissolved solids (TDS), amount of suspended solids and Cr content were analyzed before and after the algal sorption. All these indicators were found beyond the permissible limits recommended by Punjab Environmental Quality Standard (PEQS) for irrigation, except pH of waste effluent which was 6.8 that is considered safe for disposal. Algal strains *Chlorella* and *Scenedesmus* were multiplied in an aquarium at different pH (6.5, 7, 7.8, and 8) to assess the growth response. After 26 days, growth equilibrium was achieved. After 23 days, maximum number of cells was examined at pH 7.8 using microscope. Cells count was 28X10⁵. While growth of *scenedesmus* attained equilibrium after 26 days at same pH and total number of cell count was 20X10⁵. Carbon activate algae granules (CAAG) was prepared using 0.1 N HCl solution for 24 hour stay in continuous stirring conditions. Effect of sorbent dose (5, 7 and 9 g) and contact time (0, 20, 40, 60, 80, 100, and 120 min.) were evaluated using Atomic Absorption Spectrophotometer (AAS). Results revealed that the maximum adsorption of Cr was after 90 min. using 9.0 g of *Chlorella* biomass. While *Scenedesmus* took 120 min. with same dose of sorbent. Whole experiment was carried out at room temperature. Results revealed that maximum biosorption efficiency of 9.0 g CAAG was found at 90 min. which showed 97 % removal of Cr from leather effluent.

Biography:

Dr. Saima Shahzad Mirza, has completed his PhD in the field of Bioenergy at the age of 33 years from University of the Punjab Lahore, Pakistan. The author published 13 articles in high impacted journals and two book chapters. She is currently managing 03 research projects. She was awarded certificate of appreciation from Washington State University, USA. Later she was bestowed with innovation award in Innovation summit, 2012 held in PU. She joined Energy System Engineering (ESE) in UAF on 15-July-2015 and started work in Punjab Bioenergy Institute (PBI), UAF, Pakistan on 22-July-2015.

Recent Publications:

1. SS Mirza, JI Qazi, Q Zhao, S Chen. Photo-biohydrogen production potential of *Rhodobacter capsulatus*-PK from wheat straw. 2013. 6(1): 144.
2. MRSA Janjua, S Jamil, N Jahan, SR Khan, S Mirza. Morphologically controlled synthesis of ferric oxide nano/micro particles and their catalytic application in dry and wet media: a new approach. 2017. 11: 49.
3. SS Mirza, JI Qazi, Y Liang, S Chen. Growth characteristics and photofermentative biohydrogen production potential of purple non sulfur bacteria from sugar cane bagasse. 2019. 255. 115805

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