



## Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author: Rudi Kartika  
Assignment title: Check01  
Submission title: Biosorption of Hexavalent Chromium Cr(VI) using Microalgae...  
File name: h\_CE\_5188\_Biosorption\_of\_Hexavalent\_Chromium\_CrVI\_using...  
File size: 340.68K  
Page count: 9  
Word count: 4,060  
Character count: 20,520  
Submission date: 28-Jun-2023 05:08PM (UTC+0400)  
Submission ID: 2123933884



International Journal of Technology 14(4) 791-799 (2023)  
Received October 2021 / Revised November 2021 / Accepted March 2022

International Journal of Technology

<http://ijtech.eng.ui.ac.id>

### Biosorption of Hexavalent Chromium Cr(VI) using Microalgae *Scenedesmus* sp as Environmental Bioindicator

Rudi Kartika<sup>1\*</sup>, Ahmad Hafizullah Ritonga<sup>2</sup>, Lilik Sulastri<sup>3</sup>, Siti Nurnila<sup>4</sup>, Dedy Irawan<sup>5</sup>, Partomuan Simanjuntak<sup>6</sup>

<sup>1</sup>Faculty of Mathematics and Natural Science, Mulawarman University, Samarinda-75119, Indonesia

<sup>2</sup>Institut Kesehatan Medisita Lubuk Pakam, Deli Serdang-20512, Indonesia

<sup>3</sup>Sekolah Tinggi Teknologi Industri dan Farmasi, Rago-16151, Indonesia

<sup>4</sup>Balai Riset dan Standardisasi Industri Samarinda, Samarinda-75124, Indonesia

<sup>5</sup>Department of Chemical Engineering, Politeknik Negeri Samarinda, Samarinda-75131, Indonesia

<sup>6</sup>Research Center for Pharmaceutical Ingredient and Traditional Medicine, National Research and Innovation Agency (BRIN), RST Soekarno Cibinong 16911, Indonesia

**Abstract.** *Scenedesmus* sp. is a freshwater green alga that functions as an ionic biosorbent and can also be a bioindicator for water contaminated with hexavalent chromium Cr(VI) ion. This study aimed to observe the growth of *Scenedesmus* sp. exposed to Cr(VI) ion at various concentrations and analyze the remaining Cr(VI) ion that did not undergo biosorption by microalgae. This research was conducted on *Scenedesmus* sp. microalgae growth media using five bioreactors, each with a different Cr(VI) ion exposure concentration. The remaining ion in the growth media was analyzed for its concentration with an ultraviolet-visible spectrophotometer at time variations with an interval of two days. Maximum biosorption with exposure to Cr(VI) occurred at a concentration of 1.0 ppm on day 12 of 99.93%. At concentrations of 5.0 ppm and 7.0 ppm, microalgae growth was very poor, indicating the medium was toxic.

**Keywords:** Biosorption; Hexavalent Chromium; *Scenedesmus* sp; Toxicity

#### 1. Introduction

The microalga *Scenedesmus* sp. is highly competent at binding inorganic ions such as carboxyl, amine, sulfate, and sulfonate, which lends itself viable to treat aquatic waste. Microalgae have the advantage of being environmentally friendly, recyclable, and low maintenance costs (Wilan *et al.*, 2020). *Scenedesmus* sp. is a cosmopolitan microalga that lives in colonies within brackish water and soil with a humid climate. Their cells are cylindrical (8-20  $\mu$ m in length and 3-9  $\mu$ m in width) and are surrounded by three layers consisting of an inner layer (cellulose), a middle layer (membrane structure), and an outer layer net of pectin and fine hairs (Prihastini, Barayanti, and Yuniaty, 2007).

*Scenedesmus* sp. is widely utilized as a supplement, fish feed, pollutant removal agent for wastewater treatment, a source of biofuel, and a bio-indicator of water pollution using herbicides as a determinant (Fodorpataki, Bartha, and Keresztes, 2009; Makareviciene *et al.*, 2011; Sudbandriyo and Putri, 2020).

\*Corresponding author's email: rudi\_biokimia@yahoo.com, Tel./Fax: +62-751-71671  
doi: 10.14716/ijtech.v14i4.5188