

Toxicity and biosorption responses to arsenite (As[III]) were examined in a 96-h exposure study using *Scenedesmus quadricauda*, one of the most popular green algae distributed in freshwaters in China. Results indicated that the pH-dependent distribution of two arsenite species (H_2AsO_3^-) and H_3AsO_3) played an important role in biosorption and toxicity. The undissociated H_3AsO_3 was more toxic than its monoanionic H_2AsO_3^- through comparison of algal cell numbers, chlorophyll-a contents, and algal ultrastructural changes observed with transmission electron microscopy. An effective biosorption of 89.0mgg^{-1} at 100mgL^{-1} As[III] was found in the treatments with an initial pH of 9.3 and $25.2\mu\text{gg}^{-1}$ at 0.03mgL^{-1} As[III] at an initial pH of 8.2 as a result of the predominant species of H_2AsO_3^- under the ambient pH and Eh conditions. Our results imply that *S. quadricauda* may provide a new means for the removal of toxic arsenite species present in contaminated surface water.