



## The effect of initial pH and retention time on boron removal by continuous electrocoagulation process

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### ABSTRACT

This work examined boron removal by applying a lab-scale continuous electrocoagulation process. The impact of influent pH (4, 5, 6, 7.45, and 9) and retention time (10, 25, 50, and 100 min) on the treatment process was examined. Plate-type aluminum electrodes were used. The experiments were conducted in continuous mode, and the electric current was kept constant at 5 A. The initial boron concentration was 1,000 mg L<sup>-1</sup>. The first set of experiments concerning the influence of the influent pH showed that the highest boron removal (67%) was obtained at pH = 6. This pH value was the optimal one for boron precipitation through aluminum borate formation. The increase in the duration of the process from 10 to 100 min resulted in increasing boron removal from 45% to 79%. The longer duration of the electrocoagulation process enabled higher aluminum dissolution, thus allowing the existence of a higher amount of coagulants within the reactor. Moreover, it enhanced boron precipitation because of the longer contact time between the boron ions and the coagulants. By optimizing the key parameters of the process, the continuous electrocoagulation process showed to be an effective alternative for the removal of highly concentrated boron.

*Keywords:* Boron removal; Continuous electrocoagulation process; Aluminum electrodes; Influent pH; Retention time

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