



## Extraction of sulfite for wastewater treatment and for analytical determination

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### ABSTRACT

Due to the international demand for fresh agricultural products, especially fruits, which result in long travel times from the production centers to the final markets, the preservation of these products becomes very important. Within the most common conservation methods, sulfite stands out. However, to preserve the ecosystem and the environment, it is of great interest to remove this substance from residual waters of preservation treatments and to prevent the contamination of layers of water and soils. Due to the great importance of the fruit industry in our country it is necessary to develop techniques that allow treating this kind of wastewater to avoid affecting environmental and human conditions. For that reason, in this work we describe a system specially designed to carry out tests of absorption of sulfite by membranes, using a Celgard Liquicel® module, which puts in contact indirect two solutions, a feeding solution with the sulfite to extract and a solution NaOH receptor. The sulfite transferred from the feeding solution to the NaOH solution in the form of sulfur dioxide reacts with NaOH. Later, sulfite can be sensed via electrochemistry using modified reticular carbon electrodes. The best extraction results were obtained for a sodium hydroxide of 0.2 mol/dm<sup>3</sup> and a concentration of 1,500 mg/dm<sup>3</sup> sodium sulfite for the feeding, obtaining about 78% extraction, at a constant flow rate of 0.0083 dm<sup>3</sup>/s. By varying the flow rates keeping both concentrations constant, in the levels earlier mentioned, an increase in the extraction was observed from the flow of 0.0042 dm<sup>3</sup>/s to 0.0083 dm<sup>3</sup>/s, but no appreciable difference between the maximum of 0.0083 dm<sup>3</sup>/s and 0.0125 dm<sup>3</sup>/s was achieved. In addition, these results can lead to a marketable prototype that includes the separation and removal of sulfite from wastewater from the fruit and agricultural industry quickly and effectively.

*Keywords:* Analytical determination of sulfite; Membrane contactor system; Sulfite removal; Wastewater treatment

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