

## **SHORT-CUT DESIGN OF ION EXCHANGE AND ADSORPTION FIXED BED OPERATIONS FOR WASTEWATER TREATMENT**

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### **EXTENDED ABSTRACT**

Fixed bed is the most frequently used operation for ion exchange and adsorption and although the fact that this mode of operation is highly useful, its analysis is complex. A predictive model for fixed bed systems requires extensive experimental information, complex mathematical tools and in many cases, for complicated wastewater, the full modeling of the process may be extremely difficult. The situation is even more difficult considering the maldistribution, as well as the scale up procedures. It is true that the overall effectiveness of a fixed bed operation depends mainly on its hydraulic performance. Even if the physicochemical phenomena are well understood and their application in practice is simple, the operation will probably fail if the hydraulic behavior of the reactor is inadequate. These effects could be critical not only in full scale but also in pilot or even in lab scale reactors. In the present study a short-cut method is proposed as a first design tool. The method essentially proposes the use of a minimum number of experimental data along with some scale-up and hydraulic-performance considerations, extracted from the related literature.

**Key words:** ion exchange, adsorption, packed beds, scale-up