

Molecularly Imprinted Polymers (MIPs) for recovery of resveratrol from winery effluents

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Abstract

One of the most hot-topics of recent research is the reuse of some compounds existed as pollutants in environment. These compounds (molecules, ions, complexes, etc) are of high-added value and it will be ideal to selectively bind them with any environmental application and reuse them in their initial or modified form. The latter can be achieved using molecular imprinted polymers (MIPs). The whole process is based on adsorption technology, which is already one of the most successful techniques for pollutants removal. In winery effluents, some high-added value compounds as phenolics (resveratrol) exist and it will ideal to selectively separate them. Resveratrol is a natural and low molecular mass product emerged from the biosynthesis of phenylalanine. Moreover it is thought to be an intermediate leading to some of the structurally more complicated polyphenols and flavonoids. The experiments for the pH effect showed that the optimum value was at alkaline conditions (pH=10), while the maximum theoretical adsorption capacity was found to be 85 mg/g at 25 °C. The latter was found after fitting to the combinational isotherm model of Langmuir-Freundlich. The adsorption was reached at equilibrium slowly (~6 h) after testing the optimum adsorption contact time. The selectivity tests with other similar phenolic compounds showed extremely large selectivity to resveratrol molecules, revealing the excellent use of this material as selective adsorbent.

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