A Sustainable Approach for the Separation of Biologically Active Compounds

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Abstract— Reactive extraction of ascorbic acid using Amberlite LA-2 presents a viable and efficient alternative to conventional downstream processing techniques used on an industrial scale. Experimental investigations indicate that the separation mechanism is driven by an interfacial reaction between the solute and the extractant. The extraction process is controlled by the concentration of the extractant in the organic phase and the pH value of the aqueous phase. The extraction mechanism is based on the solubilization of the interfacial complex, either by solvation or by entrapment in the amine micelles formed in the organic phase. Studies on the reactive extraction of vitamin C with Amberlite LA-2 dissolved in butyl acetate indicated that the separation occurs via a first-order interfacial reaction between the two components. For an Amberlite LA-2 concentration of 160 g/L and an acidic pH, the degree of extraction of vitamin C reached 90%, as a result of the solubilization of the interfacial product by solvation or by entrapment in the amine micelles formed in the organic phase. In addition, the incorporation of a phase modifier, such as 2-octanol, improved the separation performance, leading to the conclusion that an increased polarity of the solvent exerts a beneficial influence on the extraction process.