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Determining the Solute-Solid Interactions in Phytoextraction

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Abstract

The phytoextraction is strongly influenced by the solute-solid interactions, which correspond to an adsorption/desorption equilibrium at the surface of the plant material. In this study, two new experimental procedures are presented to measure these solute-solid interactions independently from other overlapping mass transfer phenomena during extraction and, hence, preventing misinterpretation of results. The first experimental procedure presented is used for the determination of adsorption isotherms, while the second one allows the direct measurement of the adsorption kinetics. Both experimental procedures are applied to two different model systems, namely artemisinin from *Artemisia annua* using ethanol, hexane or hexane with 5 mol% of ethyl acetate as extraction solvents and steviol glycosides (rebaudioside A and stevioside) from *Stevia rebaudiana* Bertoni using water.

It was shown that artemisinin in ethanolic extracts did not adsorb onto the plant material, while for hexane and hexane/ethyl acetate linear adsorption isotherms were determined. The measured solute-solid interactions of the steviol glycosides could be described by Langmuir adsorption isotherms. Investigating the kinetics of adsorption by applying the second experi-

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