Factorial Design for Multivariate Optimization of Preconcentration System for Phosphorus Determination by UV-Visible Spectrophotometer

Umit Divrikli¹, Abdullah Akdogan¹, Mustafa Soylak², Latif Elçi¹

¹Pamukkale University, Faculty of Arts and Science, Department of Chemistry, 20020 Denizli, Turkey, udivrikli@pau.edu.tr
²Erciyes University, Faculty of Arts and Science, Department of Chemistry, 38039 Kayseri, Turkey

The present paper proposes a preconcentration procedure for phosphorus determination using UV-visible spectrophotometer. It is based on the formation of phosphomolybdate and its reduction to molybdenum blue. Phosphorus extraction as phosphomolybdenum blue complex and its sorption onto Amberlite XAD 4. The optimization step was carried out using two level full factorial design. Three variables (resin amount, sample volume, flow rate) were regarded as factors in the optimization. In the established experimental conditions, phosphorus can be determinate with a limit of detection of 2.23 µg L⁻¹ (N=15) and a relative standard deviation of 2%. The proposed solid phase extraction procedure were applied to the UV-visible spectrometric determinations of phosphorus in natural waters (tap, Degirmen Farmstead salmon trout) and standard reference material (Apple Leaves SRM 1515).