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# AN APPLICATION OF COMPUTERIZED FACTORIAL DESIGN FOR OPTIMUM SEPARATION OF BIOCHEMICAL COMPOUNDS IN HPLC

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An application of factorial design and computer regression analysis techniques for optimizing separations in reversed-phase liquid chromatography is discussed. The principles of factorial statistical analysis allow the use of regression analysis to optimize experimental contributions of several variables to chromatographic responses. each response function is computed by evaluating individual chromatograms with respect to resolution and retention time.

A personal computer is used for the chromatograph data aquisition, data processing regression analysis, and optimal experimental condition determination. Chromatograph signals are converted by an A/D convertor into digital signals, and are restored in the computer through a RS232 interface. A variety of signal processing techniques are applied to process and to analyze the digital data. Using these techniques, the parameters, such as the height of peak, the half width of peak, the area of peak, and the retention time of peak, are obtained automatically. Based on these parameters, several statistical coefficients are calculated. These coefficients are useful in judging the quality of least-square fits of experimental data and in interpreting least square results.

The procedure for multi-factorial design is as follows:

1. Put forward the general rules for experimental design and make clear the statistical method in dealing with the data of experiment.
2. Design experiments according to various purposes of the experiments.
3. Set up the mathematical models.
4. Determine the optimal experimental conditions based on F-test.
5. Analyze experimental errors.
6. Display results in graphics.

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