

MULTICOMUTATION FLOW SYSTEM FOR SPECTROPHOTOMETRIC TOTAL AMINO ACIDS DETERMINATION IN PLANT MATERIAL

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To identify the nitrogen transportation forms and attain the control mechanism, the amount of free amino acids in different parts of the plant has to be determined. An automatic, fast and reliable procedure multicomutated flow system [1] has been developed for spectrophotometric analysis of total amino acids in plant material. The method is suitable for routine analysis for a large number of samples of plant material. The flow manifold was designed with computer-controlled three-way solenoid valves for independent handling of sample and reagent solutions and a data acquisition system from a spectrophotometer, employed for signal measurements. The software for system control was performed by a program with use of a LabView platform (National Instruments) [2]. The detection reaction was based on the complexation of amino functional groups of amino acids by ninhydrin. It reacts with free α -amino groups, producing the colored ninhydrin chromophore called Ruhemann's purple (RP) ($\lambda_{max} = 570 \text{ nm}$; $\epsilon = 22\,000$) [3]. The proposed detection system shows a linear range concentration up to $2.0 \times 10^{-3} \text{ mol L}^{-1}$ with coefficient of variation of 1.1% ($n = 10$). Detection limits were estimated as $2.8 \times 10^{-3} \text{ mol L}^{-1}$ at 99.7% confidence level for total amino acids, and a mean sampling rate of 30 determinations per hour was achieved.

[1] B.F. Reis, M.F. Guiné, E.A.G. Zagatto, J.L.F. Costa Lima, R.A. Lapa, *Anal. Chim. Acta*, 293 (1994) 129.

[2] <http://www.ni.com/labview/whatis>

[3] M. Friedman, *J. Agric. Food Chem.*, 52 (2004) 385.