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Development: Flow Programming

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# Redesigning Flow Injection after 40 Years of Development: Flow Programming

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## Abstract

Automation of reagent based assays, by means of Flow Injection (FI), is based on sample processing, in which a sample flows continuously towards and through a detector for quantification of the target analyte. The Achilles heel of this methodology, the legacy of Auto Analyzer®, is continuous reagent consumption, and continuous generation of chemical waste. However, flow programming, assisted by recent advances in precise pumping, combined with the lab-on-valve technique, allows the FI manifold to be designed around a single confluence point through which sample and reagents are sequentially directed by means of a series of flow reversals. This approach results in sample/reagent mixing analogous to the traditional FI, reduces sample and reagent consumption, and uses the stop flow technique for enhancement of the yield of chemical reactions. The feasibility of programmable Flow Injection (pFI) is documented by example of commonly used spectrophotometric assays of, phosphate, nitrate, nitrite and glucose. Experimental details and additional information are available in online tutorial <http://www.flowinjectiontutorial.com/>

Graphical abstract

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