

## Abstract

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**Project :** Development of a Single Hydrodynamic Sequential Injection System for the Determination of Various Plant Nutrients in Soil Sample

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In this research, an economic hydrodynamic sequential injection (HSI) setup which low cost, robust, portable, low consumption of chemicals and save space of operation was developed. Based on hydrodynamic injection principle, a solution could be inserted into the well-defined length of conduit with hydrodynamic pressure while the carrier stream was halted. In this work, the fixed-volume conduit used for HSI process was made by drilling the acrylic sheet (i.d. 2.0 mm) replace of the connection between PTFE tubing and 3-way connectors to avoid the leakage problem due to the pressure of injection. The 4-port switching valves were also employed for controlling the direction of flowing. All devices were embedded onto the acrylic sheet (size 20.5 x 33.0 x 1.2 cm) to obtain the portable setup which easily connected to the flow through cell of spectrophotometer. The proposed HSI setup was successfully applied to the determination of various plant nutrients, i.e. phosphorus, calcium, manganese and iron, in soil and fertilizer samples based on spectrophotometric detection without any adjustment of the system. Total consumption of whole chemicals per one cycle of the analysis was not over than 0.50 mL. The system showed high precision with %RSD less than 4.0 from the 11 replicated analysis. From the analysis in real samples, the found results of all analytes were compared to the standard method and had no significant difference by the paired t-test at 95% confidence level.