



lyit

Institiúid Teicneolaíochta
Leitir Ceanainn

Letterkenny Institute
of Technology

Project Title: Development of an automated and portable detection platform for the determination of essential nutrients in soil

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Keywords: Automated platform, Syringe pumps, LEDs, photodetectors, 3D printing

Project Summary:

Phosphorus (P) and potassium (K) are essential nutrients in soils and are required in substantial amounts by crops. Insufficient amounts of these nutrients result in low crop yields, while the application of excess nutrients increases production costs and cause environmental pollution. Laboratory testing is the most cost-effective and environmentally necessary nutrient management tools available to growers and crop advisers.

In the proposed interdisciplinary study, automated, in-situ portable methods will be developed for these essential elements using a combination of colour development chemicals, LEDs, photodetectors, syringe pumps and peristaltic pumps. The necessary reagents standards and samples in microlitre quantities will be pumped through the system at controlled flow rates using syringe and peristaltic pumps. These will be designed, and 3D printed in the Mechanical engineering department at LyIT. The chemical constituents necessary for colour development will be performed in the Science research laboratory. The electronic circuitry and mother boards required for linear motion in the XYZ direction and selective detection using LEDs and photodetectors at selected wavelengths will be made possible by the LyIT Electronic Engineering department.

Candidate Qualifications/Requirements:

B.Sc. Hons 2.1 or higher in Mechanical Engineering or Science.