



# Precise analysis for inorganic fertilizers at the Finnish Food Authority

Evira, the Finnish Food Authority located in Helsinki, Finland is charged with providing effective, efficient, consistent, and risk-based control of the entire food chain. This includes foodstuffs and any products used in primary production or agriculture. Ensuring a high level of hygiene throughout the entire production chain, their control begins with seeds and plants, continues through field inspections, and monitors finished products in the market. Control is specifically targeted at fertilizers, pesticides, animal feeds, genetically modified, and organic products. The quality of operations is assured by the Finnish Accreditation Service (FINAS) and seed analytics are determined by the International Seed Testing Association (ISTA).

The lab at Evira routinely measures potassium (K) and phosphate ( $\text{PO}_4$ ) for approximately 1000 inorganic fertilizer samples per year. In two hours they are able to complete all the required analyses using the Thermo Scientific™ Gallery™ automated discrete analyzer they purchased in 2011. The same analysis used to consume two days with old titration and gravimetric methods.

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For validation, Mrs. Pelkonen compared the  $\text{PO}_4$  test to a titration method. She found it was good for measuring a high concentration of  $\text{PO}_4$  and resulted in an acceptable uncertainty under 8%.

“Phosphate samples are not an issue with the Gallery analyzer and there is no glassware to clean. I hate cleaning glassware,” Mrs. Pelkonen admitted with a smile.



“This is the best method for measuring PO<sub>4</sub> in inorganic fertilizers. It is much more precise since there is no interference from other analytes.”

—Aija Pelkonen,  
Research Chemist, Evira

For the K test, the existing method was modified to accommodate a range of 40–1000 mg/L. If samples contain more than 25% K, a programmable auto-dilution of 1:5 is used. Results are automatically calculated on a point by point calibration curve. Because of non-linearity between the points a correction factor is used; there are defined limits for an acceptable factor. Results are reported as a percentage value of potassium and the method is valid for 1– 52% K.

Samples are prepared by cooking for one hour in 10% sodium hydroxide (NaOH) to remove ammonium, and then left to rest for at least 4 hours. A 20 mL subsample is mixed with 15 mL of 4% EDTA to remove Ca and Mg. Then, 0.5 mL of 10% NaOH is added and the pH is adjusted to 12+. Finally, the sample is filtered before the measurement is taken.

Mrs. Pelkonen has also measured chromium VI (CrVI) from living compounds using the Gallery discrete analyzer, however this is not a routine test for the lab.

Evira acts as the national authority for imported fertilizers. If samples arrive from within the EU, only a few tests are performed, otherwise several more measurements may be required to meet the national requirements. Using

the Gallery discrete analyzer has ensured faster analysis while allowing them to maintain the precision they require for compliance with government regulations.

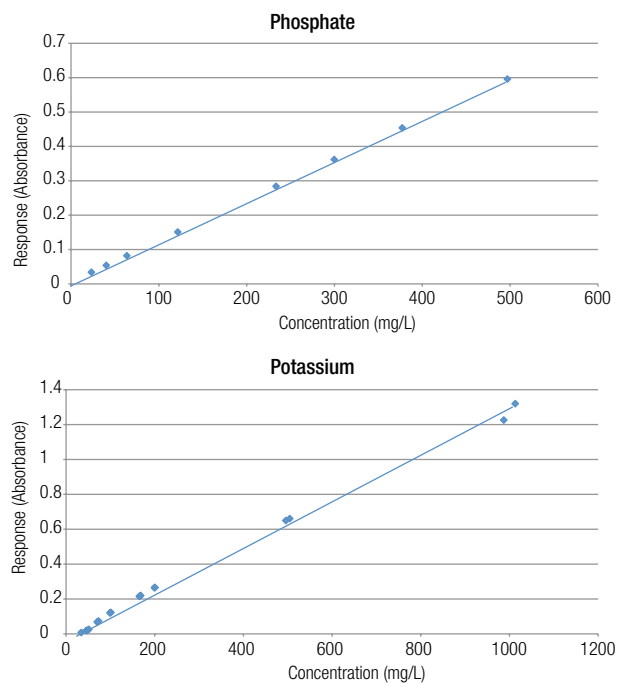


Figure 1. Faster analysis

Find out more at [thermoscientific/discreteanalysis](https://www.thermoscientific.com/discreteanalysis)

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