

Analysis of sodium in soils using portable X-ray Fluorescence (pXRF)

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Excess sodium levels (>5%) in soils can seriously affect plant growth producing poor yields in agriculture. Excess sodium affects the structure of the soil and so the ability of plant roots to access water from the soil and so cause stress to the plant. Excess sodium can also result in a decrease in the availability of cations such as Ca affecting the nutrient uptake by the plants.

Traditional methods of measurement of sodium in soils involve laboratory analysis which is expensive and take up to three weeks to get a result. Alternative real-time cost-effective methods of analysis are potentially invaluable to crop management and optimal growth of plants.

Until recently it was not possible to measure sodium using handheld XRF. With the release of the Tracer 5G with helium flow and graphene detector the ability to measure sodium down to critical levels is now possible.

The objective of this study was to create a soil nutrients calibration including sodium that can be used in situ to give accurate real time results for the user. This will not only reduce the requirement for laboratory analysis but also provide the ability to take more cost effective measurements for making better decisions on plant nutrition.