

Application of continuous flow analyzer San⁺⁺ for exchangeable calcium determination

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Abstract

Calcium – is essential element for crops rise and development. It takes part in molding processes of cell walls, membranes and protoplasm properties. Also this element is of great importance for cell energy exchange and biochemistry transformations. Both lack and excess of available forms of calcium in the soil may result in suppression and even death of grown plants. Hence exchangeable calcium determination in soils has great value. At present, to determine the content of exchangeable calcium in soils there are two methods widely used – chelatometry and atomic absorption spectroscopy according to the standard method GOST 26487-85. By Central Institute of Agrochemical Service a methodical approach of using spectrophotometry for the purpose of this determination was developed. There are automated analytical systems, such as flow analyzer San⁺⁺. The metrological characteristics of these systems are not inferior to the modern analytical instruments, such as atomic absorption and atomic emission spectrometry, without, in most cases, the negative impact of interference cations and anions present in the soil and plant extracts. Thus, the aim of this research was to investigate the opportunity of modification the classical methods for determining soil exchangeable calcium compounds applied to flow analyzer. The results of our research have shown that modification we proposed exceeds the conventional technique, possessing at the same time high potential for automation. The values resulting from the analysis of reference samples were within the error margins of a standardized method (GOST 26487-85).

Thus, the modified method is can be considered as promising in terms of applicability for practice of agrochemical soil analysis in Russia for purposes of exchangeable calcium determination. Capability to apply method to the instrument for continuous flow analysis has significant meaning in relation of the productivity rate rise of soil labs everyday practice.

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