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G.Turayev, S.Sidikov

National University of Uzbekistan (NUUZ),
Tashkent

THE IMPORTANCE OF SOIL SOLUTION IN NUTRITION OF PLANTS, SOIL FERTILITY AND THE METHODS OF ITS SELECTION

Soil solution is the main source of nutrients for plants. In natural soils, the soil solution is under the influence of a solid, gaseous phase and a natural vegetation cover. Whereas in irrigated soils, the natural factors affecting the soil solution include also the techniques of agrotechnics (soil cultivation, application of fertilizers, irrigation, etc.).

The soil solution is a liquid phase of the soil containing dissolved salts, organic and organo-mineral compounds, dissolved gases and the finest colloidal sols. The main chemical and biological processes in the soil can be carried out only in the presence of free water.

When studying the soil solution, we should not confine ourselves to studying only the solid phase of the soil. It should be supplemented with scientific materials on the liquid and gaseous phases of soils. Because all three soil phases are constantly interconnected. Especially from the point of view of agrochemistry and plant nutrition all the properties of the soil solution, such as concentration, chemical composition, osmotic pressure and their changes, must be known.

However, the soil solution and its properties in the soils of Uzbekistan, especially in irrigated soils, have not been studied at all. In this connection, the isolation and study of a soil solution of irrigated soils is an urgent task of modern agriculture.

The importance of studies of soil solution under pressure from natural and anthropogenic factors is that the soil solution can be optimized for plant nutrition. To do this, you need to identify the soil solution, determine its composition and develop special recommendations. Proceeding from this, we made attempts to isolate the soil solution of irrigated automorphic and hydromorphic soils of the serozem belt of Uzbekistan. For this purpose, the results of the study of soil solution in the world practice have been studied and generalized.

To isolate and study soil solutions, depending on the conditions and tasks of the study, various methods are used in world practice.

1- group of methods: isolation and study of soil solution by means of water extracts, i.e. Extraction of the solution by adding water to the soil in an amount significantly higher than the weight of the soil (the often used ratio is soil:water=1:5). The compositions of soil solutions and water extracts are very different. Therefore, at present, aqueous extracts are used mainly to characterize

the content of readily soluble salts and sometimes to determine a number of readily available nutrients.

2- group of methods: isolation of the solution from the soil in a relatively unchanged form. To isolate the soil solution from a sample previously selected from the soil profile, it is necessary to overcome the interaction force between the solid and liquid phases. Therefore, all methods are based on the use of external force: 1) press pressure; 2) pressure of compressed gas; 3) centrifugal force; 4) displacing ability of various liquids. Practically in modern soil research, pressing of a solution or displacement by a replacement liquid is most often used.

3- group of methods: lysimetric, acting on the principle of replacing and displacing soil solutions with thawed and rainwater. To quantify and study the composition of solutions leaking through the soil, lysimeters of a different device are used.

4- group of methods: direct studies of the water phase in soil of natural occurrence in the field. In recent years, the development of potentiometric and, in particular, ionometric methods makes it possible to carry out these studies more widely, to determine a wide range of ions, measuring their activity in the soil.

The replacing liquid method was historically the first in the practice of isolating and studying soil solution. Proposer T. Schlesing used as a displacer water. Insufficient completeness of displacement, shortcomings in the definition of the boundaries of the outflow of soil solution of this variant led to the search for other displacers, in which V.I. Ischekerov selected ethyl alcohol. Later, the technique of displacement of the soil solution was modified by N.A. Komarova, who also used mainly ethyl alcohol as a propellant.

The Ischekerov-Komarova method proved to be very convenient to use (including in the expeditionary version), which led to its widespread use. Therefore, we chose a method for displacing the soil solution with a replacement liquid, in particular technical ethyl alcohol. For this purpose, a device consisting of a plastic tube with an internal diameter of 45 mm and a length of 100 cm was created.

The tube is filled with a mixture of the investigated soil with purified quartz sand: ethanol is poured in portions of 10-20 ml every two hours. The released soil solution is analyzed for the presence of alcohol organoleptically or with the aid of a solution of ammonium hexanitrate citrate $(\text{NH}_4)_2\text{Cit}(\text{NO}_3)_6$, which gives a pink color in the presence of alcohol. The undoubted advantage of this method is the possibility of obtaining a soil solution even at low humidity of the samples.

The method of isolation by liquid does not guarantee the invariability of solutions during the isolation process and characterizes only a certain degree of approximation of their composition to the composition of real soil solutions. Determination of the total composition of soil solutions obtained in one way or another usually does not cause difficulties, since there are colorimetric, atomic absorption, ion-selective and other methods of analysis.

Thus, from the point of view of agrochemistry, the isolation and study of soil solution has an exceptionally important role in the fertility of soils and the creation of an optimal diet for plants.

References

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Аннотация

Г.Тураев, С.Сидиков

ЗНАЧЕНИЕ ПОЧВЕННОГО РАСТВОРА В ПИТАНИЕ РАСТЕНИЙ, ПЛОДОРОДИИ ПОЧВ И МЕТОДЫ ЕГО ВЫДЕЛЕНИЯ

Изучено значение почвенного раствора в питание растений и плодородии почв с точки зрения агрохимии. Учитывая опыт мировой практики выбран способ вытеснение почвенного раствора замещающей жидкостью, в частности техническим этиловым спиртом.

Аннотация

Г.Тураев, С.Сидиков

ТУПРОҚ ЭРИТМАСИНИНГ ЎСИМЛИКЛАР ОЗИҚЛАНИШИ ВА ТУПРОҚ УНУМДОРЛИГИДАГИ АҲАМИЯТИ ВА УНИ АЖРАТИБ ОЛИШ УСЛУБЛАРИ

Тупроқ эритмасининг ўсимликлар озиқланиши ва тупроқ унумдорлигидаги аҳамияти агрокимёвий нуқтаи назардан ўрганилди. Дунё амалиёти тажрибаси асосида тупроқ эритмасини суюқлик, хусусан этил спирти ёрдамида ажратиб олиш услуги танланди.