

THE EFFECT OF LONG-TERM FERTILIZER APPLICATION ON THE HUMIC ACIDS ELEMENTAL COMPOSITION

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Under the conditions of intensive agriculture it is necessary to monitor the humus status of soils in order to predict and control the processes of organic matter transformation. Various physical and chemical methods of analysis are suitable for this purpose, in particular, elemental analysis, which was used in this study. The soil samples were collected at the long-term stationary field experiment of the Field Experimental Station of the Russian State Agrarian University-Moscow Agricultural Academy named after K. A. Timiryazeva. It was found that in the composition of humic acids (HA) of the permanent fallow treatment there was a high proportion of fragments having cyclic structure and these fragments were highly oxidized. The permanent cultivation of rye shifts the organic matter transformation processes in the direction of enhancing the reaction of methylation and hydrogenation, as a result, humic acids become more alkaline. It was established that prolonged application of mineral fertilizers resulted in the development of processes that were reducing the HA oxidation degree 4 times, but at the same time, the organic matter was characterized by the highest value of combustion heat (up to 2520 cal g⁻¹). The treatment with manure was characterized by the highest H/C ratio (1.67) in HA, and the processes of organic matter transformation were shifted towards hydration and hydrogenation.

Key words: elemental analysis, sod-podzolic soil, humic acids, organic matter, transformation processes, degree of oxidation, calorific value.