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Transformations of the structure of inorganic and organic nitrogen-containing compounds of peat, sapropel, brown coal and organic fertilizers on their basis

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Understanding the processes and mechanisms of the material degradation added into the soils is a prerequisite for understanding the availability and cycling in nature of nutrients such as derivatives of carbon, nitrogen, sulfur, and phosphorus. Thus, the studying structure and properties of organic substances of such native products as peat, sapropel and brown coal allows revealing essential differences predetermined by their genesis and also permitting to estimate their potential agroecological efficiency and perspective directions of technological processing and use of these valuable organic materials. In this connection the study of changes in the contents of nitrogen forms in native kaustobioliths as well as in technologically treated ones are of great interest.

Three-stage acidic hydrolysis method was used for the degradation of three organic fertilizers. The fertilizers were prepared on the basis of peat, sapropel and brown coal. This method of the hydrolysis may simulate the processes that occurred in natural environment, influenced by chemical and biological factors with a high degree of reliability. The special mode of hydrolysis allows taking substances from fractions

depending on stability of compounds in investigated organic materials. The investigation of changes in the content of nitrogen in studied fractions allows to judge about the character and the degree of transformation of nitrogen-containing compounds in kaustobioliths organic substances and prepared fertilizers. In these three organic fertilizers the content of easy hydrolysable nitrogen ranged from 49.1 to 58.4%, the content of hard hydrolysable nitrogen ranged from 4.6 to 19.5%, in unhydrolysable rest ranged from 31.6 to 37%. The results showed significant supply of nitrogen included in amino acids structures into soils. Amino acids represent easy hydrolysable by chemicals and enzymes form of organic nitrogen which is available for plants and soil microorganisms. The highest supply was observed for fertilizer prepared on the basis of brown coal. This fertilizer supplied 93.7 % nitrogen higher than reference soil. Two other fertilizes prepared on the basis of peat and sapropel supplied 64.1 % and 56.3 %, respectively more than reference soil. It was found relationship and well correlation between the contents of easy hydrolysable forms of nitrogen and total amount of amino acids and also between the contents of easy hydrolysable forms of nitrogen and concentrations of nitrogen in amino acids structures.