

The dependence of the discharge of nitrous oxide by ordinary chernozem steppe of the Central-Chernozem Region of Russia from the content of humus, nitrogen and enzymatic activity

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Nitrous oxide is emitted by soil as a result of microbiological processes, ranks third in the list of aggressive greenhouse gas after carbon dioxide and methane. Nitrous oxide is formed during nitrification and denitrification of ammonia that enters the soil during microbial decomposition of complex organic compounds. Denitrification can be direct and indirect. In the microbiological process of recovery of nitrates involved of the organic substance. In aerobic conditions microorganisms denitrificator behave like normal saprotrophs and oxidize organic matter in the act of breathing oxygen. Thus, they operate at different times two enzyme systems: the electron transport chain with an oxygen acceptor in aerobic and restoration of nitrates under anaerobic conditions.

Investigation of the emission of nitrous oxide by ordinary Chernozem steppe of the Central-Chernozem Region showed that it depends on the type of cenosis and the content of available forms of nitrogen. Natural ecosystems emit nitrous oxide more than the soil of arable land. The dependence of the emission of nitrous oxide from the humus content shows positive trend, but the aggregation of data, significant differences are not detected.

Research shows that nitrous oxide emissions are seasonal. So the autumn season is characterized by nitrous oxide emissions than spring.

Enzymatic processes are an important link in the biological cycle of elements and, consequently, participate in the process of decomposition of organic matter, nitrification and other processes.

Analysis of the data on enzyme activity of ordinary Chernozem and the intensity of emission of N₂O shows a clear relationship between invertase, urease activity and emission of nitrous oxide, which is confirmed by the correlation coefficient $R=0,78-0,79$.

Analysis of data on physical characteristics of common Chernozem shows that the relationship between nitrous oxide emissions and the density of the solid phase of the soil and the density of the composition of the soil and total porosity is not significant ($R=0.4$) and is not limiting. A limiting factor of N₂O flux from ordinary Chernozem is the presence of available forms of nitrogen.