The effect of organic fertilizers (cattle manure and lupine green manure), as well as microbial preparation Biohran on the dynamics of the activity process of nitrogen fixation and \( \text{N}_2\text{O} \) emissions in the rhizosphere soil of potato plants, crop yield, and product quality have been investigated. The use of manures stimulates activity of nitrogen fixation, but at the same time, accompanied by a significant loss of gaseous nitrogen compounds. The efficiency of Biohran by this agrobackground is largely levelled. Lupine green manure stimulates nitrogenase activity, especially in combination with biopreparation. At the same time, there is a tendency to reduce nitrous oxide emission. Organic fertilizers contributed to a reliable raise of potato yield. Biohran provide productivity gains only on the background of green manure. Microbial preparation contributed to the improvement of quality of production parameters by all studied agrobackgrounds.

Key words: organic agriculture, manure, green manures, microbial preparations, potato.
*brasilense* 410) are immobilized in vermicompost (product of manure worm composting). The preparation stimulates plant growth and development, promotes the activity of nitrogen fixation in the root zone, improves phosphorus nutrition of plants.

Placing of plots in the experiment is randomised. The area of one plot is 86 m². Repeatability – fourfold.

Potential activity of nitrogen fixation and potential emission of N₂O in the rhizospheric soil of plants was studied in the experiment over time, recording of harvest was performed, qualitative parameters of the products were investigated.

The potential nitrogen fixation activity was measured by acetylene method by addition of glucose solution to the sample weight (5 g) [1]. Gas samples were analyzed on a gas chromatograph “Chrom-4” with a flame ionization detector. Steel sorption column were filled with sorbent Paropak Q 60-80 mesh. Incubator temperature is 40 °C. Gas flow rate: hydrogen – 15 cm³/min, nitrogen – 100 cm³/min, air – 500 cm³/min.

Potential denitrification activity in the rhizospheric soil of potato plants was measured by acetylene method by addition of glucose solution and potassium nitrate to the sample weight (5 g) [2]. Samples were analyzed on a gas chromatograph “Tsvet M-500” with a thermal conductivity detector (bridge current of 200 mA) on the column with sorbent Paropak Q 60-80 mesh. Column temperature – 25 °C, detector – 40 °C, gas flow rate (helium) – 20 mL / min.

Registration of harvest was performed manually plot-by-plot.

During the study of quality of the products obtained in the experiment, content of nitrates in the tubers was measured potentiometrically [3], the starch content – by Ewerson method [4], the content of ascorbic acid – by the method based on reducing properties of vitamin C [5].

Statistical processing of experimental data was performed by Dospiekho [6]. For the analysis of variance, computer program Microsoft Office Excel 2003-2007 was utilised.

Thus, the results obtained indicate the need to conduct preliminary manure preparation for application. The use of both studied types of organic fertilizers contributes to a significant growth of potato yield. The use of Biohran in the technologies of potato cultivation helps in improvement of the qualitative parameters of products. Microbial drug, applied by a background of cattle manure application does not provide increase in productivity of culture. The combination Biohran and green manure helps to optimize processes of biological nitrogen transformation in the root zone of plants, provides increase in productivity of potato and improvement of products quality that is extremely important for organic agricultural manufacture.