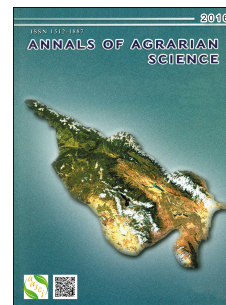


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Nitrogenous zeolite nanomaterial and the possibility of its application in agriculture

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ABSTRACT

New nanotechnological method is proposed to reduce the negative effects of nitrogenous fertilizers and their losses, which involves introduction of nitrogen-containing substance into the structure of natural zeolite. The obtained nanomaterials can be used as a nitrogen fertilizer, which allows the gradual transfer of nitrates into the soil and minimizing fertilization losses. It also significantly reduces groundwater contamination. Also, volatilization as well as drain losses of nitrogen are significantly reduced. Proposed zeolite nanomaterial represents a strong reserve of nitrogen compounds required for feeding the plants. Obtained nanomaterial structure is studied using chemical, X-ray diffractometric and IR spectroscopic methods. Also, nanotechnological process of enrichment and extraction of natural zeolite with ammonium nitrate is established. For proving the effectiveness of proposed nitrogenous fertilizer tests were conducted on corn crop (108 m²) where the average harvest on the recording area amounted 92.6 kg. In addition to the field test, the production test was also conducted on 1 ha where the increased corn crop reached 1.4 t/ha which is equal to 18.9%.

Keywords: Natural zeolites, Soil fertility, Nanomaterials, Nitrogen fertilizer, X-ray diffractometric.

Introduction

Providing the population with environmentally friendly products is one of the greatest challenges of our time. Nowadays, it is impossible to get a high harvest without using mineral fertilizers in agriculture. Although, using increased amount of these fertilizers can negatively affect the quality of nutrients as well as the biochemical area of the environment.

Soil and vegetation is a united, interconnected system. One of the most important features of the soil is the ability to satisfy plant's requirements for food and water. Soil is a source of macro- and microelements required for the plant, which can be absorbed by its roots system and its

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