

Study of the effect of organic dicarboxylic acids on biometric indicators and accumulation of nitrate ions in cucumber fruits

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Abstract

The reducing area of agricultural land and the high rate of urbanization of modern society lead to an intensified introduction of free vegetable growing technologies, one of the main problems of which is the use of excessive amounts of nitrate fertilizers, which negatively affects human health. The task of modern agrochemistry is to develop new ways of treating agricultural plants that will combine traditional types of fertilizers and preparations that stimulate the growth and development of plants and are completely safe for humans.

The task of this work is to study the effect of three representatives of dicarboxylic acids on growth rates and the accumulation of nitrate ions by cucumber plants. For the study, a variety of "Custard" cucumber was selected, the plants of which were treated with aqueous solutions of oxalic, malonic and succinic acids simultaneously with mineral fertilizers with a high nitrogen content in the nitrate form. Concentrations of acids in the solution were chosen from the literature. A solution of mineral fertilizer was prepared according to the proposed recipe.

The influence of oxalic, malonic and succinic acids on the biometric characteristics of cucumber plants at the initial stages of development was studied. The study did not reveal the apparent stimulating effect of the acids studied on plant height.

The effect of these dicarboxylic acids on the dynamics of accumulation of nitrates in various parts of the fruit of cucumbers is also analyzed. The concentration of nitrate ions was fixed by spectrophotometry. Analyzing the content of nitrates in the fruits of cucumbers, it was found that the nitrate index in the skin of the fruit predominates over the flesh in all the samples and oxalic acid has the most active accumulating effect on the accumulation of nitrates. The dynamics of accumulation of nitrate ions in cucumber fruits for 30 days was studied. (From the 60th to the 90th day after sowing). In the sample treated with succinic acid, the level of nitrate ions in the pulp did not change, in the sample with malonic acid, the content of nitrate ions in the pulp decreased by 14.3%, in the sample with oxalic acid – increased by 52%.

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