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QUALITY OF SEED PROCEDURE OF BARLEY PLANTS GROWING ON SOILS CONTAMINATED WITH ZINC NITRATE

Annotation

The analysis of the research results showed that increased Zn concentrations in soils can negatively affect the quality of barley seed progeny and increase the frequency of cytogenetic disorders. Conversely, small concentrations can increase seed germination.

Keywords

cytogenetics, zinc nitrate, barley, seed quality.

Soil pollution with heavy metals, the most toxic chemical elements [1, 2, 3], is one of the main reasons for the decline in the quality of agricultural products. Zinc, as a heavy metal, belongs to hazardous substances of the 1st class [4] and due to its rapid accumulation in the environment it is also considered one of the most important pollutants [1]. Reaching toxic concentrations in plants, zinc negatively affects the growth, development, volume and quality of the crop. At the same time, the lack of zinc as a trace element necessary for plants negatively affects carbohydrate and protein metabolism, oxidative processes, the synthesis of chlorophyll, DNA and RNA, as well as the formation and development of generative organs of plants. [5, 6]. Since a lack or excess of zinc in the soil can become a limiting factor in determining the yield of agricultural plants and the quality of their seed progeny, it is important to determine the optimal and maximum allowable level of zinc in the soil. In this regard, the purpose of the presented work is to assess the effect of different concentrations of zinc in different types of soils on the progeny of barley seeds.

In the course of the study, the cytogenetic effect on the cells of the apical meristem of seedlings and the germination energy of barley seeds (*Hordeum vulgare* L., variety "Zazersky 85") obtained in a vegetation experiment on three types of soils contaminated with zinc nitrate was studied to varying degrees. Statistical analysis was carried out by methods of variation statistics in MS Excel.

In the presented study, it was found that the germination rate of barley seed progeny tends to decrease with an increase in zinc concentrations in soils ($r = 0.51 - 0.59$) for all three studied options, but at low zinc concentrations in the soil (about 25 - 250 mg / kg), an increase in the germination rate is observed in seed offspring. On peat and sod - podzolic soil, this increase is statistically significant. An increase in the germination capacity of barley seeds obtained on soils with a low level of contamination can be explained by the fact that Zn in low concentrations is necessary for plant metabolism and becomes toxic only if its content exceeds the critical level for plants [6]. The use of the method of cytogenetic analysis made it possible to reveal a statistically significant increase in the number of chromosomal aberrations at high concentrations of zinc in the soil. At the same time, a statistically significant increase in the frequency of chromosomal aberrations in seeds grown on sod - podzolic soils begins at significantly lower metal concentrations than in seeds grown on chernozem or peat soil. This is probably due to the fact that the increased acidity characteristic of soddy - podzolic soils, a low content of organic matter and a

low volume of cation exchange in comparison with chernozem and peat soil, contribute to the greater availability of Zn for plants and its subsequent accumulation in toxic concentrations.

In general, the results of the study showed that low concentrations of zinc nitrate in the soil are not toxic to the offspring of barley seeds and can promote their better germination. High concentrations of zinc have a mutagenic effect on barley seedlings. Lower concentrations of Zn nitrate are toxic for barley seeds grown on sod - podzolic soils than for barley grown on chernozem and peat soil.

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THE USE OF WHEAT GRAIN, SUBJECTED TO SELF - HEATING IN THE PROCESS OF BAKING

Annotation

Bread is a very important product in the diet of the population. The quality of bread largely depends on the raw materials used in the production of bread. The main raw material of the baking industry is of course grain. Bread is currently baked mainly from wheat grain. Storage conditions are crucial in assessing the quality of grain that is being processed into flour. The studies have allowed us to evaluate the effect of self - heating on the quality of flour. For this purpose, we carried out test baking in the laboratory from the wheat grain of Vassa. The test baking allowed us to conclude that an increase in temperature during the process of storage dramatically reduces the