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Fungicidal activity of 2-aminophenol and its nitro derivatives

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Abstract

To increase the yield and improve the quality of field and vegetable crops using substances with regulatory properties. To date, it is impossible to obtain a high yield without using growth regulators used to stimulate growth processes, enhance the immune system of plants and increase their stress resistance. In world practice, they are used to combat lodging of grain and industrial crops, to ensure the growth of fruit trees, eliminate the frequency of their fertility, speed up or slow down flowering, fruit ripening, prevent root and tuber germination during prolonged storage, and increase the resistance of crops to adverse environmental factors (frost, drought tolerance), increase productivity, crop quality, etc.

For the experiment were selected compounds: 2-aminophenol, 2-amino-4-nitrophenol, 2-amino-4,6-dinitrophenol. A study was made of the biological activity of nitroaminophenols and the compounds that determine them as growth regulating agents.

The analytes were tested for biological activity against carrot plants. Such indicators of product quality as the content of sugars, β-carotene and ascorbic acid in root crops were studied. In addition, the screening of any new chemical compound includes an assessment of its toxicity, namely, the determination of the effect of treatment of nitroaminophenol compounds on the accumulation of nitrates in carrot roots.

Experimental carrot plants were treated with solutions of 2-aminophenol, 2-amino-4-nitrophenol, 2-amino-4,6-dinitrophenol, control plants were watered with water.

Comparison of the results in the experiment shows that the accumulation of sugars in carrot roots had a positive effect on all the studied compounds, but 2-amino-4-nitrophenol exerts the greatest influence. Nitro derivatives of aminophenol increase the content of ascorbic acid in carrot roots, and 2-aminophenol does not affect the accumulation of vitamin C. It was established that 2-amino-4-nitrophenol had a positive effect on the synthesis of β-carotene, and 2-aminophenol significantly reduced the content of this pigment. 2-Amino-4,6-dinitrophenol had no significant effect on the synthesis of carotene. It was established that 2-amino-4-nitrophenol, the content of nitrates in root crops, the remaining compounds did not affect the accumulation of nitrates.

References

[1] E.V. Zavyalova, E.V. Shumilova, E.N. Malysheva. Synthesis and biotesting of new regulators of plant growth and development. In the collection: *Modern trends in the development of science and education: materials of the international (correspondence) scientific-practical conference.* Scientific Publishing Center "World of Science". **2016**. P.65-74. (russian)
[2] V.V. Vakulenko, O.A. Shapoval. New growth regulators in agricultural production. *Scientific support and improvement of the methodology of agrochemical services for agriculture in Russia*: a collection of articles. Moscow. **2000**. P.71-89. (russian)
[3] S.O. Bondar, M.B. Nikishina, O.I. Boikova, L.L. Kirilova, E.V. Ivanova, O.S. Polovezkaya, Yu.M. Atroshchenko, and K.I. Kobrakov. The effect of organic acids on growth characteristics and accumulation of nitrate ions by plants of lettuce. *Butlerov Communications.* **2017**. Vol.51. No.8. P.33-38. DOI: 10.37952/ROI-jbc-01/17-51-8-33
[4] T.A. Zavershneva, M.B. Nikishina, O.I. Boykova, E.V. Ivanova, O.S. Polovezkaya, Yu.M. Atroshchenko, and K.I. Kobrakov. Study of the effect of organic dicarboxylic acids on biometric indicators and

accumulation of nitrate ions in cucumber fruits. *Butlerov Communications.* **2017**. Vol.51. No.9. P.76-82. DOI: 10.37952/ROI-jbc-01/17-51-9-76

[5] I.I. Surova, E.V. Ivanova, Yu.M. Atroshchenko, G.V. Pestsov, and K.I. Kobrakov. Synthesis and fungicidal activity of 2-methoxy-7-*R*-1,5-dinitro-3,7- diazabicyclo[3.3.1]non-2-ene. *Butlerov Communications.* **2017**. Vol.51. No.8. P.65-70. DOI: 10.37952/ROI-jbc-01/17-51-8-65

[6] L.G. Mukhtorov, G.V. Pestsov, M.B. Nikishina, E.V. Ivanova, Yu.M. Atroshchenko, I.V. Shakhkeldyan, M.B. Karimov. Comparative analysis of the fungicidal activity of o-aminophenol and its nitro derivatives. *Bulletin of the Tajik National University. A series of natural sciences.* **2017**. No.1-4. P.151-154. (russian)