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APPLICATION OF MODIFIED HUMIC MATERIALS FOR GREENING CITIES AKTAU AND ZHANAOPEN

Abstract. Field trials of modified humic preparations at the sites of Expo-Trading LLP, Agrorost LLC (Aktau) and school No. 20 (Zhanaozen) have been shown their high efficiency in growing flower-decorative, deciduous, coniferous, vegetable and fruit-berry crops. It has been established that their application encourages the increase of seed germination (98.27-100.0%) and the survival of seedlings and plants (99.12-100.00%).

Keywords: modifiedhumicmaterials, growth stimulants, greening, open ground, field tests.

At present, the interest in humate-type fertilizers has increased all over the world, and there is extensive experience in the practical application of humic compounds as natural physiologically active substances under different agricultural cultures for different soil-climatic condition. They accumulate elements of nutrition and energy, participate in the migration of cations, reduce the negative effects of toxic substances, affect the development of organisms and the heat balance of the planet. The humic compounds are stable, high-molecular, polydisperse, contain various functional groups, amino acids, polysaccharides, benzoid fragments [1-4].

Climate of Aktau and Zhanaozen is characterized by large amplitude of temperature fluctuations throughout the year, a rapid transition from winter to hot summer. Its feature is the aridity, contrast and high variability over the years of the amount of precipitation and temperatures, a small amount of precipitation. This makes it necessary to use more frequent watering. It should be noted that the state of the ground in the cities of Aktau and Zhanaozen is extremely tense and pollution, degradation and depletion of soil is observed in most of the urban areas. There is also a negative change in the structure of the ground of the city, a decrease in the content of humus in it, which threatens the conservation of the biological diversity of urban plantations, the intensity of their survival and growth. Therefore, it is necessary to carry out a complex of measures to restore technogenic disturbed lands and gardening of Aktau and Zhanaozen. Growth stimulating, fertilizing, meliorative and humectant properties of composite humic materials allow using them to solve above problems.

Agrochemical experiments are laid on the sections of “Expo-Trading” LLP and “Agrorost” LLC (Aktau) and school No. 20 (Zhanaozen). Modified compositional humic materials are used for growing flower, deciduous, ornamental, vegetable and fruit-berry crops.

Composite humic materials have been used for seed treatment, root and foliar treatment of vegetative plants (figure 1).



“Expo-Trading” LLP sections



"Agrorost" LLC sections

Figure 1 – Humic growth-stimulants experiments layout

During the studies it was established that the use of humic growth stimulants promotes better survival, growth and development of test crops as compared to plants in control variants. The phenological observations showed that the degree of seed germination of the tested crops in the experimental version was 98.27-100.0%, and in the control one it was 93.70-94.80%, and the seedling and seedlings survival rate was 99.12-100.00 %, and in the control variant - 94.38-95.10%. Increasing the germination of seeds allows them to save them when planting (up to 15-20%). It should be noted that the application of these prepa-

rations leads to the development of the root system of plants, and the enhanced development of roots certainly increases the supply of water to the leaves and leads to improved water supply of plants.

The application of modified humic preparations promoted intensification of the color intensity of flowers in experimental variants, increase in the size of their leaf surface and the height of the stems, as well as inflorescences. In this case, for flower crops, a significant increase in the length of the stem, the leaf surface and the size of the buds, the color of the leaves and flowers becomes more intensive in comparison with the control variant. In ornamental crops, their application increases the number and size of leaves, the color becomes more vivid. Treatment with the drug also leads to an increase in their disease resistances.

Sites are located along busy urban roads with a large number of exhausts of cars and enterprises, characterized by extreme gas contamination and pollution. The entire vegetation of these areas is subject to severe environmental pressure, therefore, it grows poorly, develops slowly, is prone to disease, etc. The use of modified humic preparations has made it possible to solve these problems, and has helped to significantly save budget for the purchase of expensive plant protection products (fungicides, herbicides, etc.) and a large number of mineral fertilizers. These drugs can be used not only for gardening of Aktau city, but also in other settlements of the country.

In the plots of school No. 20 (Zhanaozen), in conditions of open ground, agrochemical experiments with the application of modified composite humic growth stimulants are laid. Were planted 100 pcs of elm seedlings, 9 pcs of ailanthus, 8 pcs of ash, 15 pcs of thuja, as well as various flower crops and lawn grass. The area of the tested site was 700 m². The carried out researches have shown that under the action of modified composite humic preparations the vegetation period in experimental plants is reduced by 10-15 days, mainly due to the reduction of the period from germination to flowering.

3 years analysis results showed that the application of composite humic preparations leads to an increase in the activity of physiological processes in plants, i.e. promotes better germination and survival of the experimental crops, growth of stem size, trunk and branch of tree cultures, increase in the leaf surface of plants, inflorescences and buds of flower crops (figure 2). Their root system becomes longer and branchy, increases chlorophyll content in leaves. For example, experimental plants were better branched (41-55 pieces), increased by an average of 1.23-3.49 m compared to the control ones, the diameter of the trunk was 19-32 cm. During the observation of plants, the color of leaves and flowers was revealed become more intense in comparison with control variants.

As noted above, meteorological conditions during the agrochemical tests were characterized by a very dry summer and low precipitation. The use of modified composite humic preparations promoted the increase of plant resistance to unfavorable environmental conditions and stressful influences.



Figure 2 – Modified humic preparations influence on plants growth and development
(Sh. No. 20, Zhanaozen)

Conclusions. Field trials of compositional humic compounds have shown their high efficiency in the cultivation of flower-decorative, deciduous, vegetable and fruit-berry crops conducted on the sites of "Expo-Trading" LLP and "Agrorost" LLC and school No. 20 in conditions of open ground in Aktau and Zhanaozen. It has been established that their application contributes to the increase of seed germination and the survival of seedlings and saplings, the growth of flower, ornamental and other crops, the increase in the size of inflorescences, buds and leaves, the intensification of their coloration, and the resistance of test crops to diseases and unfavorable external conditions. Carried out tests have been demonstrated a possible significant savings in the Aktau and Zhanaozen cities budget by using composite humic preparations for gardening.

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Резюме

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**ТҮРЛЕНДІРІЛГЕН ГУМИНДІ МАТЕРИАЛДАРДЫ
АҚТАУ ЖӘНЕ ЖАҢАӨЗЕН ҚАЛАЛАРЫН КӨГАЛДАНДЫРУҒА ҚОЛДАНУ**

Ақтау және Жаңаөзен қалаларының ашық топырақ жағдайларында түрлендірілген гуминді материалдарды әртүрлі өсімдіктерді өсіруге қолдануға болатындығы көрсетілді. Жүргізілген егістік сынақтар кезінде түрлендірілген гуминді материалдарды қолдану өсімдіктердің өсіп-өнуін жылдамдататындығы, олардың вегетация уақытын қысқартатындығы анықталды.

Түйін сөздер: түрлендірілген гуминді материалдар, өсімдіктің өсуін тездеткіштер, көгалдандыру, ашық топырақ, егістік сынақтар.

Резюме

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**ПРИМЕНЕНИЕ МОДИФИЦИРОВАННЫХ ГУМИНОВЫХ МАТЕРИАЛОВ
ДЛЯ ОЗЕЛЕНЕНИЯ ГОРОДОВ АҚТАУ И ЖАНАОЗЕН**

Показана возможность применения модифицированных гуминовых материалов для выращивания различных зеленых насаждений в условиях открытого грунта городов Актау и Жанаозен. Установлено, что использование модифицированных гуминовых материалов ускоряет рост и развития растений, приводит к сокращению сроков их вегетации.

Ключевые слова: модифицированные гуминовые материалы, ростстимуляторы, озеленение, открытый грунт, полевые испытания.