Effect of humic nature preparation on seed quality and growth processes of vegetable crops

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Currently, the world has sharply increased interest in organic fertilizers. This is primarily due to the fact that environmental problems caused by the total agriculture chemicalization have attracted the attention of the world community, which has become increasingly concerned about the harm caused to human health by pesticides, agrochemicals and other products of soil, water and air pollution. Consumers began to pay more and more attention to the quality of food products and their environmental friendliness. The use of environmentally safety products of natural origin is a global trend today. This is due to the fact that more and more data is being accumulated on the positive impact of humic substances on plant growth and development, as well as on the quality of agricultural products and soil fertility. Humates, being physiologically active substances, regulate and intensify metabolic processes in plants and soil, and contribute to the active intake of nutrients in a form that is digestible for plants.

We obtained a universal plant growth and development stimulator "KazGumates" from highly oxidized brown coal by extraction with alkaline reagents with the addition of a complex of amino acids, macro - and microelements, which is intended for all types of agricultural crops for growing environmentally friendly agricultural products in any soil and climatic zones.

"KazGumates" is a new – generation humic-free preparation with a high humification degree. The preparation composition includes easily soluble physiologically active salts of humic and fulvic acids (humates and fulvates), a complex of amino acids, macro - and microelements in an accessible form for plants. Eco-friendly product, completely soluble in water, which is extremely convenient for drip irrigation system. It is intended for all types of agricultural crops in any soil and climatic zones, acts as plant hormones: the optimal drug concentration is 0.0001%. The preparation drug is used for pre-sowing seed treatment, foliar treatment during the growing season as an independent fertilizer and post-harvest soil treatment. Its use does not require changing existing agricultural technologies – it is compatible with any plant protection products and other fertilizers. It is used as a working solution both independently and in tank mixtures with plant protection products and soluble fertilizers as part of planned treatments. Increases the efficiency of mineral fertilizers and pesticides, reducing their use by 20-40%. It is characterized by economical production and use: pre-sowing seed treatment - 200 g/t, spraying of crops: cereals-150 g/ha, post-harvest soil treatment – 400 g/ha.

Laboratory and field tests conducted on potatoes and vegetable crops (tomatoes, cucumbers, cabbage, carrots, onions, beets) have shown high effectiveness of the drug "KazGumates", which significantly improves the sowing quality of vegetable seeds: increased germination and seed germination energy, intensive stimulation of root formation in plants, accelerated growth processes (formation of biomass and food organs), increased fruiting period, reduced maturation, higher yield of potatoes and vegetable crops. The results obtained in laboratory and field experiments on potatoes and main vegetable crops showed high humic growth stimulator efficiency by "KazGumates". This

confirms that the use of humic compounds is the most promising agricultural technology direction. Their use is actively expanding, especially in connection with the desire to make agriculture as eco-friendly, efficient and economical as possible.