

POLYMER GEL-SUBSTRATE AND ITS INFLUENCE ON PLANTS ON EXAMPLE OF LEAF SALAD

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In the process of cryotropic gel formation during the copolymerization of potassium 3-sulfopropyl methacrylate (SPMA) with 2-hydroxyethyl methacrylate (HEMA) (SPMA-co-HEMA), a hydrogel was synthesized. On the basis of this hydrogel, a gel substrate with macro- and microelements necessary for plant growth was created. In a series of laboratory and vegetation experiments conducted under controlled conditions of intensive light culture, it was established that the created hydrogel with or without macro- and microelements, having pronounced sorption properties and high swelling capacity, ensured favorable conditions for seed germination and plant growth in the early stages of their development. The physiological state of plants improved when they were grown on the gel substrates (using the panoponic method) in comparison with the treatments where the gel was not used: there was an increase in the capacity and efficiency of the photosynthetic apparatus; stabilization of the antioxidant systems work; enrichment of leaves with macro- and/or microelements necessary for plant growth. These changes provided significant positive changes in plant growth and productivity, as well as in the quality and safety of crops. In particular there was an increase in the content of sugars, vitamin C, macro- and microelements, and a predominant decrease in the content of nitrates. The most significant changes in the state of lettuce plants were observed when the gel substrate enriched with macro- and microelements was present in the root zone. The high efficiency of the gel substrates emphasizes the prospects for further in-depth studies of the mechanisms of their influence on cultivated plants.

Key words: hydrogel, biological activity, lettuce, chlorophylls, carotenoids, fluorescence, intensity of lipid peroxidation, peroxidase, catalase, growth, chemical composition.