

EFFECT OF PHYTOHORMONES CYTOKININS ON THE GROWTH AND DEVELOPMENT OF PLANTS

Dnipro University of Technology

Sydorchuk Pavlo Serhiyovych

Academic supervisor: Ass. Prof., PhD of the biochemistry Voronkova Yuliia S.

The discovery of cytokinins (American scientists F. Scoot and K. Miller) is associated with research on the cultivation of callus formed from the isolated tissue of the core of a tobacco stem on a nutrient medium. Callus cells in sterile culture have been shown to stop dividing after a certain period. However, when DNA derivatives, which are formed after its autoclaving, are added to the nutrient medium, cell division is restored.

In 1955, an active substance that causes cell division - *6-furfurylaminopurine*, which was called *Kinetin* - was isolated. Kinetin is not found in plants.

Kinetin is a white crystalline substance of the empirical formula $C_{10}N_5O$ with a molecular weight of 215,2. Kinetin is poorly soluble in water and well in ethanol, sulfuric ether, solutions of alkalis and acids. It is resistant to heating, autoclaving, alkalis, and acids.

Similar chemical compounds that regulate the process of cell division - cytokinins - were found in plants. One of the cytokinins isolated from corn was named Zeatin [1, 2].

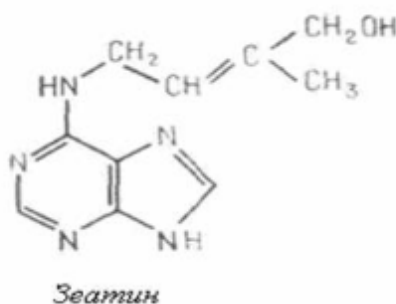


Fig. 1 Zeatin

All known cytokinins are derivatives of purine nitrogenous bases, namely adenine, in which the amino group in the sixth position is replaced by various radicals.

Cytokinin-rich cells of apical meristems and root meristems. Cytokinins are formed mainly in the roots and move to above-ground organs through the xylem.

Cytokinins largely determine the physiological influence of the root system on the metabolism of above-ground organs. However, there are data on the formation of cytokinins in seeds (mature embryos) and developing fruits [4].

Nitrogen nutrition enhances the formation of cytokinins, and for the manifestation of cytokinins action, a sufficient supply of nutrients, especially nitrogen, is necessary for the plant.

What are the physiological effects of cytokinins: are synthesized in the tips of root hairs and move upwards; stimulate the growth of more leaves; cell division is induced in the presence of auxins; activate growth by stretching in dicotyledonous

plants; prevent the decay of chlorophyll and cell organelles; contribute to the formation and functioning of apical meristems and the development of flowers; participate in many physiological processes in the plant, shoot and root morphogenesis, chloroplast maturation, linear cell growth, formation of additional buds, delaying the aging processes of isolated organs [1, 2].

The ability of cytokinins to delay aging is manifested in the leaves. A detached leaf in water quickly ages, which manifests itself in yellowing, loss of protein, DNA, RNA. If you apply a drop of kinetin to such a leaf, the treated area will remain green.

The delay in leaf aging also occurs when roots are formed on the petiole of the leaf. From this it can be concluded that cytokinins, which are formed in the roots, move to the leaves, and support the structural and functional vital activity of the leaves [1-5].

Cytokinins extend the life span (objects retain a good appearance for a long time) of fresh cabbage, lettuce, and other green vegetables, as well as cut flowers, which is used in practice.

The study of the composition and content of cytokinins in plant material includes several stages: extraction, purification, detection of cytokinin activity using one or more bioassays, and quantitative assessment of the content of compounds with cytokinin activity [1-5].

The use of biotests made it possible to establish that the most cytokinins are found in the seeds and fruits of developing plants. In the fruits, a higher amount of cytokinins is in areas where active cell division occurs. In juicy fruits, the content of cytokinins in the seeds is higher than in the pulp.

In other plant organs, significant amounts of cytokinins are found in areas with meristematic activity - in the meristematic zones of the roots and the cambium of the meristem. It is believed that the main site of cytokinin synthesis in a vegetative plant is the apical meristem of the roots. Cytokinins enter the aerial organs as part of the apary [1, 2].

The effect of cytokinins is delayed by hot weather and an excess of carbon dioxide, a violation of the water balance, and a lack of nutrients.

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