SECTION 2. PLANT PROTECTION AND QUARANTINE

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THE USE OF *PENICILLIUM VITALE* FUNGUS FILTRATE *IN VITRO* FOR THE ACTIVITY OF GROWTH PROCESSES

ВИКОРИСТАННЯ ФІЛЬТРАТУ ГРИБА *PENICILLIUM VITALE* В КУЛЬТУРІ *IN VITRO* ДЛЯ АКТИВНОСТІ РОСТОВИХ ПРОЦЕСІВ

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Stress adaptation of agricultural plants has been and is a constant topic of fundamental and applied biology. The interest in this problem is clear. On the one hand, it is aimed at understanding the plant/environment (G/E) interaction; on the other hand, given the constant need of the growing population, efforts are being made to develop plants capable of withstanding abiotic stresses. The main goal of plant breeding is to obtain genotypes that combine high yields with real productivity stability over years and territories. In addition, plant products should be characterised by high

nutritional qualities when used for food and feed and/or have other commercial value [2, P.1-4; 4, P.104].

Wheat is a difficult object for biotechnological manipulations due to the limited or even absent realisation of its morphogenetic potential [1, p. 63–65]. Therefore, the search for new suitable explants and attempts to increase the level of tissue totipotency will always be relevant. Along with this, it is necessary to come up with new ideas and explore new approaches.

The most suitable method for biotechnology experiments is regeneration by direct shoot formation. The process of embryogenesis is less desirable. The most negative (from the point of view of practical biotechnology) is the process of rhizogenesis. Rhizogenesis is a type of organogenesis, and the process of root formation is a positive morphogenesis. Often, this process is even stimulated by exogenous substances to accelerate and improve the survival and cultivation of plants in vitro. However, this is only done when there is a formed shoot. When it comes to root formation only, they try to slow down this event or even eliminate it altogether, since rhizogenesis inhibits not only further organogenesis but also callus proliferation.

Culture environments are balanced trophic systems, and it is difficult to do so. As a result, the overall metabolism of the culture deteriorates, which can lead to death [8, p. 22; 3, p. 1247680].

To influence the rooting process, a combination of cytokinins and auxins is usually used, which is not always effective. We investigated a new substance for the in vitro system – microcide. The active ingredient is a filtrate of the culture fluid of the fungus Penicillium vitale. The active component of the microcide is a product of enzymatic oxidation of glucose, namely δ-lactone gluconic acid. *In vitro* culture, changes in the composition of carbohydrates are often used to control the processes of differentiation/dedifferentiation [5, p. 23; 6, p. 32; 7. p. 50].

Mature wheat grains were germinated under aseptic conditions. The length of seedlings did not exceed 2.0 cm. The plant section containing meristematic cells was divided into 1.5–2.0 mm particles and transferred to 50 ml flasks containing: FS-I liquid culture medium (variant A), FS-I + 1/3 diluted microcide solution (variant B), 1/3 diluted microcide solution (variant C). Wheat explants were subcultured on a shaker with constant shaking for 1 hour and then transferred to Petri dishes for further development. The control was the variant without shaker subcultivation.

On day 3, the explants began to develop. In the control variant and in the case of variant A, the induction of callusogenesis and the beginning of direct regrowth were observed. Subsequently, the process of morphogenesis began in the culture, which lasted for several passages and was then suppressed by active rhizogenesis. In the case of variants B and C, direct regrowth of the explant occurred in the absence of callusogenesis. Callusogenesis was

induced much later, and the regenerative potential of the genotype was maintained for a longer time.

This phenomenon is probably related to the properties of the active ingredient Microcid. Reversible rapid lactonisation of gluconic acid is possible, which may lead to glucose formation/degradation and thereby affect intracellular carbohydrate balance. Another mechanism of action is not excluded. However, it should be noted that it is advisable to continue using the microcide use of the filtrate *in vitro* culture to enhance the growth processes of wheat plants.

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ALFALFA MUSHROOM DISEASES

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Серед багаторічних бобових трав в світовому кормовиробництві люцерна займає провідне місце.

Практична цінність люцерни не обмежується тільки кормовими властивостями, вона виконує важливі господарсько-біологічні функції: збагачує грунт азотом, кращий попередник для багатьох сільськогосподарських культур, позитивно впливає на фізико-хімічні і біологічні властивості ґрунту, гарний сидерат і медонос, підвищує родючість ґрунту.

Під час вегетації люцерна уражувалася збудниками аскохітозу, плямистостями, фузаріозом, бактеріальними, вірусними та