

**INFLUENCE OF GROWTH REGULATOR IN COMBINATION  
WITH COMPOUND TREATMENT PRODUCTS UPON SEED  
GERMINATION OF WINTER WHEAT (*Triticum aestivum* L.).**

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Winter wheat is one of the most important cereals in Ukraine planted on more than a quarter of arable area. At the same time high and qualitative yields of this crop strongly depend on using the optimal plant protection system against pests and diseases. The first and the most significant stage of plant protection is a seed treatment.

In most cases one- or two-component seedcare products as Raxil Ultra (*tebuconazole*- 120 g per l), Lamardor ( *prothioconazole* – 250 g per l, *tebuconazole* – 150 g per l), Gaucho (*imidacloprid* -700 g per kg) and some others are used for a seedcare treatment. But some products act as the stressors and induct the development of pesticide stress, which negative action can be minimized by launching the plant growth regulator (PGR). According to this, the main aim of our researches was to determine how multicomponent seedcare products combined with AKM growth regulator influence upon seed germination and qualities.

For two-factor laboratory experiment the seeds of winter wheat variety Antonivka were taken. The seeds germinated on wet filtering paper in Petri cups placed in thermostat with the temperature  $20 \pm 2$  °C to BBCH 07 phase without light, then with light provided to BBCH 11 phase. Before germination the seeds were treated by working solution of seedcare product and PGR in such proportion as 10 l of working solution per 1 t of seeds with four-time reiteration of variants during this experiment. The seed treatment was applied according to the scheme: 1- control (water), 2- Raxil Ultra (0.25 l per t), 3- Lamardor (0.2 l per t), 4- Lamardor (0.2 l per t) + Gaucho (0.25 kg per t), 5 – AKM ( 0.33 l per t), 6- Raxil Ultra (0.25 l per t) + AKM (0.33 l per t), 7- Lamardor (0.2 l per t) + Gaucho (0.25 kg per t) + AKM (0.33 l per t).

Sufficient water and oxygen uptake, together with conforming temperature of surrounding environment are the best conditions for seedlings emergence. In case of increasing seeds watering the active oxygen consumption is observed that can cause the oxidative damage of tissues. Active forms of oxygen (AFO) are really important in the development of oxidative stress while their accumulation in cells results in breaking the process of germination. The seedcare products combined with PGR influence over the development of oxidative stress that enables to correct seedling emergence.

During the period of heterotrophic nutrition some mixtures of pesticides and PGR do influence on the catabolic processes intensity in a seed. Lamardor plus Gaucho, Lamardor plus Gaucho and AKM stimulate these processes as well as Raxil Ultra and AKM retard them. The solutions of Lamardor with Gaucho and Raxil Ultra with AKM did influence on the metabolic activity in a seed while transiting to autotrophic nutrition.

During the process of germination the seed's dry substance is all spent on shoots and primary roots growth. On the first stage of germination seed treatment stimulates better shoots growth. It can be observed in increasing the quantity of dry substance up to 15 – 23% in ethyl coleoptil compared to the control sample and with the beginning of autotrophic nutrition the dry substance content reduces on the stage of organogenesis (BBCH 11) and appears at 15 - 23% level lower than on the control stage. The AKM plant growth regulator improved shoots growth on all stages, but the highest increase of its dry substance was observed on such stages as 'ethyl coleoptil (BBCH 07) – first leaf appearance (BBCH 10)'. Adding AKM to seedcare products did not remove their negative influence upon shoots growth with the beginning of autotrophic nutrition.

All researched seedcare products had negative influence upon primary roots growth up to BBCH 09 stage. When the first leaf appeared (BBCH 10) and active photosynthesis began, the inhibiting influence of seedcare products changed to stimulating influence. On the stage BBCH 11, with the appearance of top of the second leaf, dry substance in the roots was higher than the index of the control variant for 2.5 – 9.0 %. Generally, seedcare products combined with PGR AKM stimulate the growth of primary roots except mixtures containing Lamardor. The mixture with some components such as Lamardor plus Gaucho and AKM had the most negative influence over the growth of primary roots.

Usage of mixtures containing Lamardor for seed treatment before sowing decreased the shoot length to 4.4 – 6.0 cm and in control variant it was 9.5 cm. This factor should be concerned to determine the proper depth of sowing.

Seed treatment with protective products as well as with PGR almost had no influence upon germination power. It surely decreased to 3.4 %, when such product as Lamardor was applied, in control variant it was higher. AKM added to seedcare products (var. 7 and 8) increased negative Lamardor impact on germination potential which was less than 4.4 and 4.7%.

Influence of AKM and seedcare product upon laboratory similarity of seeds was not identical. This similarity increased only after application of Raxil Ultra alone, as well as together with AKM, proving that tebuconazole does not have phytotoxic impact. This low laboratory similarity in the control variant can be explained by strong biotic stress, but during the seed treatment such decline is a

result of stress development, especially in the periods of intense shoots and roots growth and increased oxygen consumption by the tissues.

**Key words:** winter wheat, treatment products, plant growth regulator, seed, germination potential, similarity.