



## THE EFFECT OF MICROFERTILIZERS AND REGULATORS ON THE ELEMENTAL COMPOSITION OF WHEAT GRAINS

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### Abstract

Plants have been shown to absorb all elements from the environment (1,2). The uptake of minerals by plants is influenced by a number of factors, including soil properties, metal pedochemistry, and plant physiological characteristics. Under natural conditions, the uptake of minerals is 10 or more times higher than normal (3). Changes in environmental factors, such as temperature, humidity, and light intensity, can cause a decrease or increase in the amount of minerals in plants during their growing season (4). During ontogenesis, their distribution in plant tissues and organs changes (5). Studying the accumulation of minerals in plants is important for assessing the state of plants, the biosphere in general, and for conducting environmental monitoring (6-7).

### Research Method and Purpose

The purpose of the research is to study the effect of processing on winter wheat seeds. The research will be conducted in the fields of the experimental farm of TashDAU in 2019-2021. The area of each variant is 2 hectares, and the experiment was conducted with Vincet Forte (1 l / t) in the proportions of microfertilizer (200 g / t) and stimulants Rostock (0.5 l / t) and Emistim (1 ml / t).

Table of contents: 1. Uruguayan diet (nazorate). 2. Vincet Forte: 3. Vincet Forte + Tenso Cocktail; 4. Vincet Forte + Rostok; 5. Vincet Forte + Emistim; 6. Vincet Forte + Tenso Cocktail + Rostok; 7. Vincet Forte + Tenso Cocktail + Emistim.

Minerallar tarkibi atom-adsorption spectrometer Conter AA-300 aniklandi va atom adsorption spectrometer MGA 915 electrothermal atomization bilan aniklandi.





### **Izlanishlar natijalari**

Tenso-cocktail microfertilizer contains Ca, Fe, Mn, Cu, Zn, Mo and B. In addition to element B, the above-mentioned minerals were detected in winter wheat grain. The content of calcium, iron, manganese and molybdenum in grains increased in 2019, and the content of copper was the lowest, this year it was noted that the soil was dry and the temperature was high. The content of iron was not affected by climatic conditions.

Calcium enhances plant growth and root system development, increases metabolism, and activates enzymes. According to the results of three years, the amount of calcium in grain decreased by 13% and 19% when using a fungicide and microfertilizer, and by 10% and 8% under the influence of the regulators Rostock and Emistim. (Table 1)

Iron regulates photosynthesis, respiration, protein metabolism, and auxin biosynthesis. When seeds are treated with a fungicide and micronutrients are added, the iron content in wheat grains increases by 96% and 103%, respectively, twice the norm. When a regulator is added to the fungicide, the Ca content in the grains increases, but to a relatively lesser extent - 40% and 65%.

In the process of plant respiration, the element Mn acts as a catalyst, participates in the process of photosynthesis, the metabolism of carbohydrates and proteins. With a deficiency of manganese, a disease manifests itself in the soil, chlorotic spots appear on wheat leaves, which later undergo necrosis (death). In this disease, plant growth stops and eventually dies. Drug+B, Incet Forte+ Tensococktail+Rostock increases the amount of manganese in the grain by 12 and 20%, while the two-component mixture reduces its amount by 3-19%.

The importance of copper for the plant organism is incomparable. Copper in plants accumulates in the chloroplasts of the leaves and is closely related to the process of photosynthesis; copper participates in the synthesis of complex organic compounds, participates in the synthesis of anthocyanins, chlorophyll, and protects chlorophyll from decomposition. Copper helps in the synthesis of iron-containing enzymes in plants. Copper also has a positive effect on protein synthesis in plants, participates in the synthesis of the peroxidase enzyme, and in the water-holding capacity of plants. In the opposite case, i.e., with a lack of copper, the hydrophilicity of colloids decreases. Therefore, when copper is used as a fertilizer, it increases the tolerance of plants to drought and cold. When seeds are treated with a drug, it reduces the amount of copper in the grain by up to 15% compared to the control, and when micronutrients and regulators are added to the drug, it decreases by 8-36% compared to the drug. All options do not increase the amount of copper above the norm.



No.	Variantlar	Miqdori mg/kg					
		Ca	Fe	Mn	Cu	Zn	Mo
1	Nazorat	135.4 $\pm$ 40.1	113.3 $\pm$ 33.7	96.5 $\pm$ 28.7	10.7 $\pm$ 3.1	30.7 $\pm$ 9.2	0.17 $\pm$ 0.005
2	Vincet Forte	119.3 $\pm$ 35.7	222.5 $\pm$ 66.7	109.1 $\pm$ 32.5	9.1 $\pm$ 2.5	35.8 $\pm$ 10.3	0.26 $\pm$ 0.08
3	Vincet Forte+Tenso cocktail	109.2 $\pm$ 32.8	224.3 $\pm$ 69.2	93.2 $\pm$ 27.8	8.4 $\pm$ 2.4	30.5 $\pm$ 9.1	0.17 $\pm$ 0.05
4	Vincet Forte+Rostock	121.7 $\pm$ 36.2	189 $\pm$ 55.9	90.1 $\pm$ 26.9	7.9 $\pm$ 2.5	27.7 $\pm$ 8.2	0.19 $\pm$ 0.06
5	Vincet Forte+Emistem	123.5 $\pm$ 36.8	158.4 $\pm$ 47.8	78.2 $\pm$ 23.0	5.8 $\pm$ 1.7	30.4 $\pm$ 9.2	0.17 $\pm$ 0.05
6	Vincet Forte + Tenso-cocktail + Rostock	123.4 $\pm$ 37.2	190.8 $\pm$ 37.3	116.5 $\pm$ 34.8	8.2 $\pm$ 2.5	31.3 $\pm$ 9.4	0.23 $\pm$ 0.07
7	Vincet Forte+ Tenso cocktail+ Emistem	118.8 $\pm$ 35.7	185,7 $\pm$ 55,6	96,0 $\pm$ 28,5	7,5 $\pm$ 2,3	22,9 $\pm$ 6,3	0,13 $\pm$ 0,04

The amount of nitrogen in plants varies depending on the plant species, living conditions, climate and other factors. It is necessary for the production of respiratory enzymes. Nitrogen deficiency leads to a decrease in the amount of auxin. Under the influence of nitrogen, the amount of vitamin C increases, and at the same time the amount of carotene, carbohydrates and proteins increases. Nitrogen has a positive effect on the root system, enhancing its growth, has a positive effect on cold resistance, and also increases the tolerance of plants to drought, heat and salt. The amount of nitrogen did not exceed the norm in all variants of the experiment. A significant decrease in the amount of nitrogen was observed in the 3rd variant of the experiment when the three-component mixture of Vincet Forte + Tenso cocktail + Emistem was given at a rate of 37%. It was found that the amount of nitrogen increased by 17% compared to the control with the use of one drug. In other variants of the experiment, the amount of nitrogen did not affect.

Molybdenum, which is part of the nitrate reductase enzyme, stimulates protein synthesis in plants by reducing nitrates. Therefore, under conditions of molybdenum deficiency, nitrates accumulate, while nitrogenous protein fractions in plants decrease. The drug Vincet Forte increases the amount of molybdenum in the grain composition by up to 53%. The addition of micronutrients and regulators to the drug reduces its amount by 12-35%. The lowest molybdenum content was observed in the three-component mixture Vincet Forte + Tenso cocktail + Emistem, a decrease of 50% compared to the drug.



## Conclusion

1. Iron content in winter wheat grain is higher than the norm (compared to the maximum established norm)
2. When a medicine is added to the seeds, iron, manganese, zinc, molybdenum content in the grain increases, calcium and copper content decreases.
3. Adding micronutrients to the fertilizer reduces the amount of Ca, Mn, Cu, Zn, and Mo in the grain.
4. Using regulators with fertilizers increases the amount of calcium and reduces the amount of other elements.
5. When additional micronutrients are applied with fertilizers and regulators, the amount of calcium and manganese increases, but the amount of iron and copper decreases. The Rostock regulator, along with the three-component mixture, increases the amount of zinc and molybdenum, while the Emistim regulator reduces it.

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