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THE IMPACT OF MINERAL NUTRITION ON SOYBEAN YIELD FORMATION

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At the current stage of development of Ukraine's agricultural sector, soybeans are valuable as a protein-oil crop with a wide range of uses in the food and technical industries. Soybeans concentrate the most valuable properties of the entire plant world. They are characterized by high adaptability to regional growing conditions, versatile usage, balanced protein composition with functional activity. Due to these properties and high productivity, soybeans hold the first place in the world among annual leguminous and oil crops in terms of sowing area and total seed yield [2].

Soybeans are demanding in terms of nutrition, consuming significantly more nutrients than other grain crops throughout the growing season. The main part of the nutrients is absorbed by soybean plants from the budding phase to pod formation and seed filling (80% nitrogen and phosphorus, 50% potassium). The absorption of nitrogen and potassium then slows down but does not completely stop until the end of the growing season. Soybeans consume the most nitrogen during the flowering and pod formation phases, potassium after 87–95 days, calcium and magnesium on the 70th–80th day after emergence, and sulfur during the pod formation phase [2].

The application of fertilizers for soybeans is specific due to its biological characteristic of absorbing atmospheric nitrogen through symbiosis with nitrogen-fixing rhizobia bacteria and phosphorus from hard-to-access compounds. Mineral fertilizers contribute 40–50% to the yield formation of agricultural crops [5]. However, growing high-yield soybean varieties (with a yield potential of 4.0–5.0 t/ha) does not always ensure full nitrogen supply in this manner [1, 3].

Alongside macronutrients, micronutrients also play an equally important role. For soybeans, the main micronutrients are molybdenum, boron, zinc, iron, copper, manganese, and cobalt. These elements are part of vitamins, enzymes, and other biologically active substances, which play a crucial role in the processes of metabolism and the synthesis of proteins, fats, and carbohydrates [6].

Soybeans remove a significant amount of nutrients from the soil, so it is necessary to create a sufficient amount of easily accessible nutrients in the root-containing layer of the soil for growing intensive varieties. Soybeans especially require a lot of nitrogen, as they extract the most from the soil, which explains the high protein content in their seeds. To produce 1 ton of grain, 65–75 kg of nitrogen, 13–17 kg of phosphorus, and 18–22 kg of potassium are needed [4].

On average, soybeans leave behind 60–150 kg/ha of biological nitrogen (which is used by subsequent crops at 90–100%, whereas mineral nitrogen is only used at 50–60%), 20–25 kg/ha of phosphorus, and 30–40 kg/ha of potassium. Despite soybeans' ability to meet a significant portion of their nitrogen needs (60–70%) through biological fixation from the atmosphere, they respond positively to the application of organic and mineral fertilizers [2].

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ВПЛИВ БІОСТИМУЛЯТОРІВ РОСТУ РОСЛИН НА ПРОДУКТИВНІСТЬ КАРТОПЛІ

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На ріст та розвиток картоплі в малих концентраціях мають вагомий вплив регулятори росту які за походженням можуть бути сполуками природнього та синтетичного походження. Потрапляючи на бульби картоплі або вегетативну масу рослин регулятори росту прискорюють обіг речовин в рослині та беруть активну участь в присвоєнні поживних елементів. В результаті чого в рослині відбуваються біохімічні зміни які підвищують життєдіяльний рівень рослини, так покращується стресостійкість до несприятливих умов які можуть відбуватися на території Слобожанщини. Регулятори росту впливають безпосередньо на систему гормональної регуляції картоплі, яка виконує функцію інтенсивності вегетації та розвитку картоплі[1].

Перше задокументоване застосування регуляторів росту у фермерському господарстві відбулося в 1930 р. у Америці. Першим регулятором росту рослин,