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Biological Activity of Quinazolone-4 Derivatives

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Annotation: This work is devoted to the study of the biological activity of 2-phenyl quinazolone-4 derivatives. The work presents data on the study of the effect of 2-phenyl quinazolone-4 derivatives on soybean yield. Optimum concentrations of the solution for soaking soybean seeds before sowing are determined.

Keywords: 2-phenyl quinazolone-4 derivatives, propargyl fragment, reaction center, yield.

Introduction. Heterocyclic organic compounds are widely used in agriculture. Quinolone-4 derivatives are employed as pharmaceutical drugs, herbicides, fungicides, bactericides, antifungal agents, specialty polymer materials, dyes, and rubber stabilizers [1].

It is known that compounds with a propargyl fragment, due to the presence of a triple bond and an acetylenic hydrogen atom, are capable of undergoing various reactions. Specifically, 3-propargyl derivatives of quinazolones-4, which contain multiple reactive centers in their molecules, can participate in hydrogen atom substitution reactions at the triple bond, as well as addition reactions across the triple bond. The hydrogen atom is easily replaced by metals or halogens, forming the corresponding acetylenides and halogen derivatives [2].

Discussion. Chemical products derived from acetylene and its derivatives have become the focus of extensive synthetic chemical research in recent years. This increased interest is due to their high reactivity and the significant potential for practical applications [3].

The salt-forming properties of the pyridine nitrogen atom were studied. The reaction of 2-substituted-3-(prop-2-yn-1-yl)quinazolones, leading to the formation of quaternary salts, known as

quaternization, involves a donor-acceptor interaction of the readily available sp^2-electron pair of the azo group with an electrophilic reagent.

The necessity of studying this reaction is also driven by the aim of obtaining water-soluble compounds, which are convenient for examining their biological activity [3].

The authors studied the synthesis of 1,2,3-triazole derivatives based on prop-2-yn-1-yl 2-(4-nitrophenoxy)acetates and prop-2-yn-1-yl 3-(4-nitrophenoxy)propionates. Reactions of phenyl azide with the starting reagents were carried out, and 1,4-isomers of 1,2,3-triazoles were obtained [4].

To investigate the biological activity of 2-phenylquinazolone-4 derivatives, laboratory experiments were conducted on soybean seeds. Before sowing, the soybean seeds were soaked in a solution of the compound AIKh-8 (2-phenyl-3-propyn-1-quinazolone-4 hydrochloride). The experiments were conducted in four variants, with seeds soaked in distilled water used as a control. AIKh-8 solutions of varying concentrations (0.1%, 0.01%, 0.001%, 0.005%) were used. The results of the experiments are presented in the table.

Key biological indicators of soybean seeds treated with AIKh-8

Experimental options	Weight of 1000 seeds (g)	Number of germinated seeds per bush	Mass of sprouted seeds per bush	Yield increase relative to control (in % per ha)
Control	120	282	34,4	-
0,01%	120	336	46,2	+6,4
0,001%	120	304	39,8	+4,2
0,005%	120	290	35,4	+2,4

Conclusion. The experimental results showed that a 0.01% solution of the AIKh-8 compound had the most effective impact on soybean yield.

The yield increase amounted to 6.4%, and with further reduction in concentration, the influence of AIKh-8 on growth energy and the overall development of soybean plants showed a decreasing trend. It was determined that as the concentration of AIKh-8 decreased, the yield also declined.

Thus, under the influence of the AIKh-8 compound, the germination energy of soybean seeds increases, and a rise in crop yield is observed.

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