

Study of the growth stimulating activity of methyl 4-aryl-2-[(4-sulfamoylphenyl)amino]-4-oxobut-2-enoates and the products of their interaction with ninhydrin

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Abstract

According to the literature, there is a link between nitrogen-containing and sulfur-containing compounds and plant biology, which suggests the presence of growth-stimulating activity in methyl (2Z)-4-aryl-2-[(4-sulfamoylphenyl)amino]-4-oxobut-2-enoates and their spiroheterocyclic derivatives, 4-aryl-3-[(4-sulfamoylphenyl)amino]spiro[2,5-dihydrofuran-5,2'-indane]-2,1',3'-triones having a sulfamide moiety.

We previously obtained methyl 4-aryl-2-[[4-(N-R-sulfamoyl)phenyl]amino]-4-oxobut-2-enoates containing a sulfamide group in the residue of sulfaguanidine, sulfacetamide and sulfatiazole, their growth-stimulating activity, among which compounds with growth-stimulating action were found.

To expand the number and synthesis of biologically active enamine esters of aroylpyruvic acids, and also to continue the work on their chemical modification, it was of interest to obtain methyl (2Z)-4-aryl-2-[(4-sulfamoylphenyl)amino]-4-oxobut-2-enoates containing a sulfanilamide residue (streptocide) and study their interaction with ninhydrin to prepare spiroheterocyclic furanone compounds – 4-aryl-3-[(4-sulfamoylphenyl)amino]spiro[2,5-dihydrofuran-5,2'-indane]-2,1',3'-trions. In this paper, the results of studying growth-stimulating activity on wheat seeds of synthesized compounds are presented.

The growth-stimulating activity of methyl (2Z)-4-aryl-2-[(4-sulfamoylphenyl)amino]-4-oxobut-2-enoates and the products of their interaction with ninhydrin was determined by the effect on laboratory germination of wheat seeds. In addition to determining germination and germination energy, the morphometric characteristics of wheat seedlings were studied on the third day after sowing seeds (shoot length, length of the largest rootlet and number of rootlets). As a control, distilled water was used, as well as a 20% aqueous solution of DMF. For seed treatment, 0.05% and 0.005% solutions of test compounds in a 20% solution of dimethylformamide were used.

The largest growth-stimulating activity is methyl (2Z)-4-(4-methoxyphenyl)-4-oxo-2-[(4-sulfamoylphenyl)amino]but-2-enoate in a concentration of 0.005%, as well as methyl (2Z)-4-oxo-2-[(4-sulfamoylphenyl)amino]-4-(4-ethoxyphenyl)but-2-enoate at a concentration of 0.05 and 0.005% containing 4-methoxyphenyl and 4-ethoxyphenyl substituent, respectively.

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