

**Екологія та охорона навколишнього середовища. Прикладні аспекти адаптації та хімічні основи життєдіяльності організмів**

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**DERIVATIVES OF UNSATURATED CARBONIC ACIDS IN ANIONARYLATION REACTIONS**

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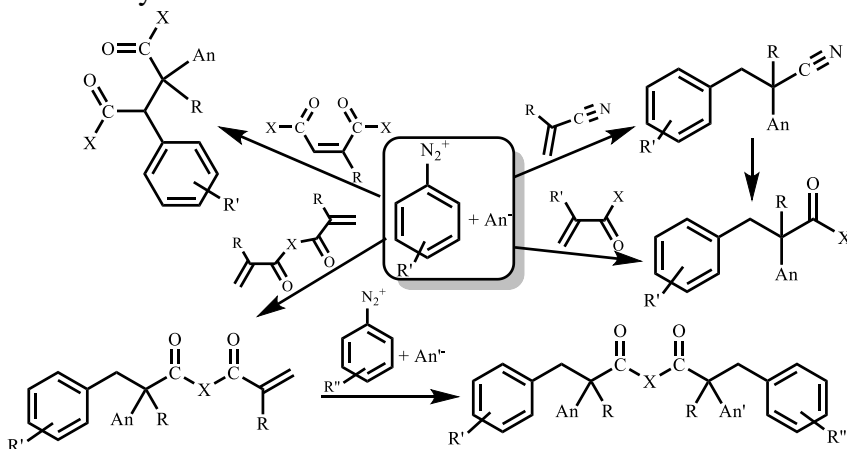
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Meerwein and anionarylation reactions occupy an important place among multicomponent reactions involving diazo compounds.

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The expansion of their synthetic capabilities can be carried out in several main directions: the study of new unsaturated compounds of various types (vinyl and allylic derivatives, unsaturated carboxylic acids and their derivatives, bisunsaturated compounds, aromatic and heteroaromatic systems); use of new arylating and anionoid reagents; construction of heterocyclic systems based on anionarylation products [1].

Among the wide range of unsaturated compounds studied in anionarylation reactions, derivatives of  $\alpha,\beta$ -unsaturated mono- and dicarboxylic acids deserve special attention, the high reactivity and relative availability of which determined their priority status when choosing model systems in anionarylation reactions.



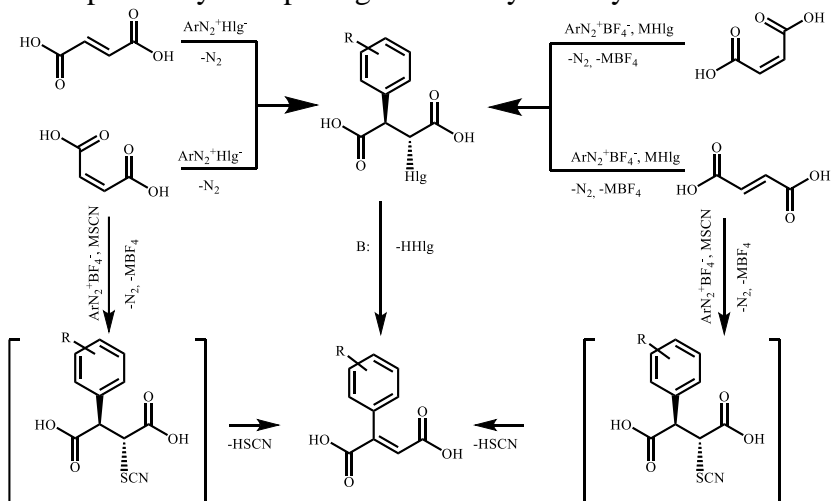
We have developed methods for the one-step synthesis of arylalkylic halides, sulfides, thio- and isothiocyanates, N,N-dialkyldithiocarbamates, O-alkyldithiocarbonates, O,O-dialkyl(diaryl)dithiophosphates based on derivatives of unsaturated acids, which are used as multifunctional reagents in organic synthesis.

One of the promising ways of expanding the synthetic possibilities of Meerwein and anionarylation reactions is the

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introduction of unsaturated dicarboxylic acids and their derivatives. Anionarylation products based on these acids are of interest as bifunctional synthons for cyclizations and biologically active substances with a fairly high surface activity [2].

2-Chloro(bromo)-3-arylbutanedioic acids were synthesized by interaction of aryldiazonium halides and tetrafluoroborates with maleic acid and its anhydride under the conditions of Meerwein and anionarylation reactions. These acids, upon interaction with bases, are dehydrohalogenated to *trans*-2-arylbutenedioic acids, which are also formed under the thiocyanatoarylation reaction. In the studied conditions, no decarboxylation processes are observed, and in the case of using maleic anhydride the arylation and anionarylation reactions are accompanied by the opening of the anhydride cycle.



A feature of the reactivity of maleic and fumaric acids under the conditions of Meerwein and halogenarylation reactions is the dominant route of formation of anionarylated derivatives, which have an identical structure. Despite the spatial configuration of the starting unsaturated acids, the same

products are formed during the reaction, which indicates the *trans*-addition of an aryl radical and a halogen atom to a carbon-carbon double bond. In the case of maleic acid, the transformation of the substrate structure occurs at the stage of the arylalkyl radical, which is an intermediate intermediate of Meerwein and anionarylation reactions.

Our research has shown that 3-aryl-2-chloro(bromo)butanedioic acids are effective stimulators of seed germination and plant growth regulators. Now these compounds are used as a component of the complex organo-mineral fertilizer "Fulvohumin".

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**SYNTHESIS AND BIOLOGICAL ACTIVITY OF 1,4-PHENYLENEBIS[2-O-ETHYLDITHIOCARBONATO-(2-METHYL)PROPANONITRILES]**

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Nitriles of acrylic and methacrylic acids are among the first