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# Decreasing the synthesis reaction time and toxicity of biologically active hetero (N-, P- and F-) organics using green chemistry

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Stimulation of immunity of living organisms (immunocorrection) allows inducing their complex nonspecific resistance to many diseases of fungal, bacterial and viral origin, furthermore to other unfavorable environmental factors. For the purpose of synthetic search of potential immunocorrectors, we have synthesized new  $\alpha$ -aminophosphonates based on 1-phenylpiperazine and 1-benzhydrylpiperidine using classical Kabachnik-Fields reaction conditions. Weak sides of the procedure used for their preparation is the reaction time-24 and more hours and as use of benzene. It turned out that microwave radiation, as expected, significantly reduces the reaction time to 15-25 min. To obtain the target  $\alpha$ -aminophosphonates, 15 min microwave radiation is most effective using BMIB. The effect of magnesium oxide on the reaction with 1-phenylpiperazine is well noticed. The catalytic activity of oxides of magnesium and zinc on formation of the target  $\alpha$ -aminophosphonates under 25 min microwave irradiation is shown. The lower yields of the products of benzhydryl group. In addition, microwave radiation lets to exclude use of benzene from the synthesis. The anesthetic properties and toxicity level were studied at National Medicinal University, in Almaty, Kazakhstan. These studies showed that synthesized organics have superior lethal dose concentration, higher anesthesia index and more effective infiltration and conductive anesthesia parameters when compared to known marketed local anesthetics.



Scheme for the Kabachnik-Field reaction for the synthesis of  $\alpha$ -aminophosphonates

### **Recent Publications**

1. Begimova G U, Akhmetsadyk O E, Praliyev K D and Yu V K (2016) Dimethyl[(3,4-dimethoxyphenyl) (4-phenylpiperazine-1-yl)methyl]phosphate: synthesis and structure // Chemical Journal of Kazakhstan 1:179-184.

### Biography

Olzhas Akhmetsadyk has completed his Graduation at Middle East Technical University in Ankara, Turkey. He is working as a Head of Medical Devices Testing Laboratory of National Center for Expertise of Medicines and Medical Devices, Ministry of Healthcare of Republic of Kazakhstan. His recent duties as a Medical Devices Regulator are to evaluate the quality management system of manufacturers upon registering their products in Kazakhstan and to assess the quality of the products according to quality specifications. His research interests include synthesis of bio-active (P-, N- and F-) heterocycles, β-cyclodextrin complexes with bio-active substances, NMR and X-ray studies of cyclodextrin complexes, biocompatibility of cyclodextrin complexes and microbial activity of cyclodextrin complexes.

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