

2. STRESZCZENIE W JEZYKU ANGIELSKIM (Abstract in English)

The research described in the herein presented doctoral dissertation included the synthesis of α -aminophosphonates of pyrrole-2-carboxaldehyde and 5-nitrofurfural derivatives and the study of the phyto- and ecotoxicological properties of these substances.

In the case of newly synthesized *N*-aryl-substituted dimethylamino(2-pyrrolyl)methylphosphonates, the ecotoxicological studies indicated toxicity of these substances. In phytotoxic tests, the aminophosphonic derivatives showed impact on both monocotyledonous and dicotyledonous plants, however, in the latter case, the toxic effect was stronger. The test compounds also showed significant toxicity against *Heterocypris incongruens* and *Aliivibrio fischeri* (indicators in the Ostracodtoxkit F™ and Microtox® tests). It has been found that substituents at a phenyl ring played a key role in the degree of toxicity of such compounds. Thus it can be concluded that potential applications of these compounds require careful analysis.

Also diphenyl-*N*-arylamino(pyrrol-2-yl)methylphosphonates, which synthesis was a part of this study, were subjected to ecotoxicological assessment. On its basis, it was found that the *N*-(4-nitrophenyl) derivative was the most toxic for bacteria as compared to other compounds tested. Crustaceans *Heterocypris incongruens* were sensitive to both *N*-phenyl and *N*-naphthyl derivatives. These substances, however, were harmless to bacteria.

Another group of compounds were *N*-arylamino(5-nitrofurfuryl)methylphosphonates, for which the phytotoxicity tests showed harmful effects on plants. However, the toxic effect of some derivatives with the nitrofuryl moiety was stronger in the case of dicotyledonous plants, which indicates the selective toxicity of these substances. The newly synthesized derivatives were also characterized by measurements of toxicity against bacteria *A. fischeri* and freshwater crustaceans *H. incogruens*. The toxicity was found to be higher for the bacteria.

The obtained results provide important information on the ecotoxicology of aminophosphonic derivatives, but any substance having interesting herbicidal properties with simultaneous harmless character to the tested organisms could not be found. This prompts to further exploration in a search for the substance having the desired properties in the field.