Maga I.M., Kushniruk A.V., Rujinskiy M.O., Avramenko O.S.
National Aviation University, Kyiv

Study of the conditions for determining some chloromethoxybenzoic acid derivatives

Chloromethoxybenzoic acid (CBA) Derivatives are part of many pesticides. An important role among which has a 3-chloro-5-methoxybenzoic acid, which in the form of isopropylamine salt, as the active ingredient Phenmedipham [1] is part of the herbicidal preparations of Reparations "Betanal", "Betanal Expert" and others. These herbicides are manufactured by Bayer and are used on sowing sugar and feed beets. Widespread use has a 2-chloro-4-methoxybenzoic acid that in the form of a butylocytyl ester [2] as the active substance Butafenacil is part of the Reparation "Inspire" and others that are used on sowing of sugar beets as a herbicidal drug. Many derivatives of Chloromethoxybenzoic ACID are formed in both the metabolites of pyrethroid drugs [3] and other products.Given the increased CBA use around the world and its prevalent human exposure, effective techniques for disposal of the pollutant are critically needed. Microorganisms are not only cost-effective but also show good detoxification efficiency with contaminates and provide an environmentally friendly solution to the problem of CBA pollution. Unfortunately, attempts to isolate microorganisms in pure culture able to mineralize CBA have usually failed, primarily due to the reason that this chemical is a recalcitrant substrate. It has been suggested that the accumulated CBA, which has antimicrobial property, prevents the proliferation of pyrethroid-degrading microorganisms.

To determine residual quantities CBA, used the Revers Phases HPLC method is most often, HPLC–MS equipped with electrospray ionization(ESI) interface has become the preferred platform for the simultaneous analysis of CBA residues without derivatization, due to advantages of improved throughput, selectivity, and sensitivity. Generally, applying tandem MS instrumentation (MS/MS) adds further selectivity to the MS detection of compounds in complex matrix. However, analytes with low molecular masses and relatively high polarities pose a general problem to LC–MS/MS sensitivity and selectivity when monitored in the conventionally used negative ESI. These analytes often possess poor ionization efficiency. Impacts on MS sensitivity from often abundant background noise in the low-mass range present additional challenges for CBA residues.

1. *Halden R.U., et al.* Degradation of 3-chloro-5-methoxybenzoic acid in soil by *Pseudomonas pseudoalcaligenes* POB310 (pPOB) and two modified *Pseudomonas* strains // Applied and Environmental Microbiology. — 1999. — 65. — P.3354–3359.
2. *Yuan C., et al.* Effects of permethrin, cypermethrin and 2-chloro-4-methoxybenzoic on rat sperm motility *in vitro* evaluated with computer-assisted sperm analysis // Toxicology in Vitro. — 2010. — 24. — P.382–386.

3. *Ahn K.C., et al.* Immunochemical analysis of 3-chloro-4-methoxybenzoic acid, a biomarker of forestry worker exposure to pyrethroid insecticides // Analytical and Bioanalytical Chemistry. — 2011. — 40. — P.1285–1293.