

In accordance with applicable law, only plant protection products that meet the technical requirements established can be used for plant protection in the process of their registration. In order to ensure a high level of protection of human, animal and environmental health, Regulation (EC) No 1107/2009 of the European Parliament and of the Council requires the Member States of the European Union (EU) to carry out independent quality control of environmental protection. - including concentration levels of relevant pollutants with undesirable toxicological, ecotoxicological and / or environmental properties.

The study developed a method allowing for the simultaneous qualitative and quantitative determination of azoxystrobin and its relevant impurities in the form of the (Z)-azoxystrobin isomer and toluene using the high-performance liquid chromatography technique with a diode array detector (HPLC-DAD). The analytical procedure used in the tests was validated in accordance with the requirements of the document SANCO / 3030/99 rev.5., And the obtained validation parameters, i.e. specificity, linearity, accuracy, precision of the method, and for impurities also the limit of quantification, allowed for its implementation in the routine activities of the laboratory .

The next part of the thesis presents examples of the use of chemometric methods without supervision in the quality control of environmental protection in the form of a Suspension Concentrate (SC) containing azoxystrobin as the active ingredient. In order to explore the data, Principal Component Analysis (PCA) was used, Cluster Analysis (CA). The discussed examples of quality analysis used the physicochemical data obtained in the scope of: suspension stability (MT 184 CIPAC K), wet sieve test (MT 185 CIPAC K), pH (MT 75.3 CIPAC J), density (OECD 109), content of active substance and color.

The next part of the thesis presents the use of chromatographic techniques and chemometric analysis in the testing of the authenticity of plant protection products as a concentrated suspension containing azoxystrobin as the active ingredient. In order to detect irregularities of the tested plant protection products, the possibilities of the SIMCA (Soft Independent Modeling by Class Analogy) classifier based on chemical "fingerprints" obtained using the HPLC-DAD technique and the technique of gas chromatography combined with a mass spectrometer using the technique of headspace analysis (HS-GC/MS).

In the next part of the research, a methodology was developed for the simultaneous determination of azoxystrobin and active substances combined with azoxystrobin in preparations registered on the Polish market: chlorothalonil, cyproconazole, difenoconazole, epoxiconazole, isopyrazam, propiconazole and tebuconazole. Determination of a wider spectrum of analytes within one analytical cycle allowed for obtaining analytical information, which is an important element of the decision-making process, while introducing the concept of "green chemistry" and maintaining the criteria for the effectiveness of the method.

The developed solutions are implemented and routinely used to control the quality of plant protection products at the Pesticide Quality Testing Laboratory of the Institute of Plant Protection - National Research Institute, laying the foundations for the development of the studied area in the project entitled: "Increasing the competitiveness of Polish plant products on international markets through improving their quality and phytosanitary safety - The use of various chromatographic techniques and chemometric analysis in tests of the quality of plant protection products" (GOSPOSTRATEG 1/385957/5 / NCBR / 2018) financed by the National Centre for Research and Development.