

# **The use of UHPLC with various types of detection in the field of environmental and food analysis**

## **Abstract**

The aim of this work was to inform about possible use of UHPLC instrumentation in connection with various types of detection when chromatographic separating of substances in the field of environmental and food analysis is performed. The next aim was to search and study a number of articles referring to UHPLC methodology, which are at present available in the internet databases ScienceDirect and Web of Science. On the basis of the information from the articles there is a graphic summary in this work relating to the number of found articles and the groups of analysed substances within years.

In the introduction of the work van Deemter's, Gidding's and Knox's theories about the efficiency of the chromatographic system are mentioned. These theories are substantial for understanding the principle of chromatographic separation. Following chapters deal with the problems of the development of chromatography in the last decades, especially concerning the length and type of analytical columns, the size of filling particles or the temperature and pressure in the chromatographic system. Now thanks to the development, the columns dimensions are 50 x 1 mm and are filled with particles less than 2  $\mu\text{m}$  in diameter and are able to work under the pressure of around 100 MPa. In the next chapters the problems concerning mass spectrometry, conventional and new ionization techniques, mass analyzers and detectors are mentioned. An important part of the work is a chapter dealing with the articles, found in the internet databases ScienceDirect and Web of Science. From the stated graphic summary results it follows that in the last years there have been more and more articles referring to UHPLC methodology and that the field of its use has been widening. The next part of the work contains table charts describing various applications of UHPLC methodology in environmental and food analysis. In final chapters we deal with several articles of interest, where particular UHPLC analyses of selected kinds of substances are described. In all the types of analyses it was confirmed that UHPLC methodology provides a number of advantages in comparison with conventional separation techniques.