

Summary of the PhD thesis

„Chromatographic and spectroscopic determination of new psychoactive substances (ie. designer drugs) in evidence and biological materials”

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In recent years, there has been a huge development of the designer drugs – substances which are legal and which are in their action not different from illegal drugs. New products are constantly appearing in Poland, containing in their composition known psychoactive substances, their mixtures or completely new compounds, not yet characterized. Synthetically received new psychoactive substances dominated the illegal designer drug industry, and the spectrum of modifications to their basic structures is getting wider. Possibilities of synthesis of changed structures are so large that when they are considered forbidden, new, properly modified ones appear on the market. Considering the currently unlimited access to legal highs, the increasing problem of their abuse in recent years and the more and more frequent cases of poisoning, including fatal ones, it is essential to develop and improve analytical procedures for their determination, both qualitative and quantitative. Expanding databases on a given group of derivatives with the physicochemical properties of new psychoactive substances will allow analysts, chemists and toxicologists in the future to quickly identify compounds in protected materials. In addition, supplementing the library with new designer drugs along with their physicochemical characteristics, is a bridge between accurate assessment of the materials being protected by toxicologists working on behalf of law enforcement agencies, and the possibility of increasing the list of measures prohibited by the legislators.

In the course of this doctoral dissertation an effective procedure for liquid-liquid extraction of compounds from the group of synthetic cathinone derivatives from the powder matrix was developed; for the first time, physicochemical properties of two new psychoactive substances from the group of cathinone derivatives, ie. α -PHP (1-phenyl-2-(1-pyrrolidine)-1-hexanone) and 4f-PV9 (1-(4-fluorophenyl)-2-(pyrrolidin-1-yl) octan-1-one), have been identified, characterized and described in the literature; a new psychoactive substance from the group of cathinone derivatives - α -propylaminopenthiophenone was identified and characterized in evidence material and quantified in post-mortem biological material using, among others, the HPLC-MS technique and for the first time described in the literature the case of fatal intoxication of them; a spectroscopic data library was created on the 43 latest cathinone derivatives available on the global pseudo-drug market, which can be used in toxicological analysis in forensic and forensic laboratories.