

## Chemical-toxicological study of maprotiline in urine

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### Abstract

Despite the tetracyclic antidepressant maprotiline is widely used in the territory of the Russian Federation, no systematic studies on this drug as a subject of chemical and toxicological research have been carried out in our country. In light of this, the purpose of this article is to develop methodology for chemical and toxicological study of maprotiline in urine. Maprotiline (Maprotiline or Ludiomil) is one of tetracyclic antidepressants exhibiting properties typical of tricyclic antidepressants. This drug is also similar to tricyclic antidepressants due to its chemical structure, particularly with regard to the side chain. The drug has antidepressive, anxiolytic, sedative and sympathomimetic effects. In the event of noncompliance with recommended dosage, cases of suicidal poisoning as well as accidental poisoning are the most frequent ones. The most part of the drug administered dose is excreted with urine; therefore it is urine which is an important subject of chemical and toxicological analysis, forensic chemical examination and doping control. The present article deals with the method of maprotiline isolation and extraction from urine using ready-made TOXI-PROBES extraction bottles with combined extraction fluid making it possible to carry out samples purification alongside with extraction. For the purpose of methodology for study, the most effective systems for maprotiline separation by thin-layer chromatography as well as staining reagents were selected, and R<sub>f</sub> values in various solvent systems were calculated. Maprotiline spectra were obtained by various physicochemical methods (UV spectroscopy, IR spectroscopy and gas chromatography-mass spectrometry). When poisoning with maprotiline, concentration of this drug was calculated by gas chromatography-mass spectrometry. Failure to provide medical aid or late medical aid may result in mortality. High concentration of the drug was correlated with severity of poisoning. Maprotiline concentration in urine of more than 4 mg/l is associated with clinical picture of severe poisoning. Given the fact that severity of poisoning is affected by such factors as a body physical condition, coexisting chronic diseases, advanced age, duration of toxicant exposure before treatment, lethal outcome may be also associated with lower concentration of maprotiline in urine. The said concentration of maprotiline can be considered as a lethal one in cases of lethal outcomes while carrying out forensic medical examination to determine a cause of death.

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