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Forensic Medical and Toxicological Expertise in a Case of Administrative License Revocation: Organizational and Methodological Considerations (A Case Report)

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ABSTRACT

The article discusses the controversial aspects of conducting medical examinations for intoxication. This work is based on a case report on determining the legitimacy of administrative license revocation, which involved a forensic medicine and toxicology expert.

A detailed chronology is provided, from the moment the driver was stopped by a traffic police officer and suspended from driving for an alcohol intoxication test, to the ruling by the magistrates' court, which was later upheld by the court of cassation.

This case study illustrates errors in interpreting the findings of chemical tests for intoxication, which occur when psychoactive substances are incorrectly identified in human biological fluids. This case of γ -butyrolactone detection in a professional car driver highlights the inadmissibility of unreliable methods for chemical compound identification. Moreover, the paper emphasizes insufficient training of clinical laboratory diagnostics physicians, addresses the issue of an overly mechanistic approach to their work, and proposes potential solutions to the identified shortcomings.

Keywords: forensic medical examination; toxicology; psychoactive substance; chemical tests for intoxication; γ -butyrolactone; methadone; barbiturates; hallucinogenic mushrooms; ethylene glycol; methanol; case report.

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Использование специальных знаний в области судебной медицины и токсикологии в деле о лишении права управления автомобилем: организационно-методические выводы (описание случая)

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АННОТАЦИЯ

В статье рассмотрены спорные аспекты проведения медицинского освидетельствования на состояние опьянения. Материалом для настоящей статьи послужил практический случай содействия специалиста в области судебной медицины и токсикологии при рассмотрении вопроса о правомерности лишения права управления автомобилем по административному делу.

В статье приведена подробная хронология событий с момента, когда инспектор дорожно-постовой службы останавливает водителя автомобиля и отстраняет его от управления транспортным средством для проведения освидетельствования на состояние алкогольного опьянения, до вынесения решения мировым судьей и его последующего утверждения судом кассационной инстанции.

На основе анализа реального случая из практики мы продемонстрировали ошибки в интерпретации результатов химико-токсикологических исследований, возникающие при недостоверном определении психоактивных веществ в биологических жидкостях человека. На примере конкретного случая выявления γ -бутиролактона у профессионального водителя легкового автомобиля представлены аргументы в пользу недопустимости использования недостоверных методик идентификации химических соединений. Дополнительно выявлены недостатки в подготовке врачей клинической лабораторной диагностики, освещена проблема недопустимости механистического подхода в их работе, а также предложены пути устранения имеющихся недоработок.

Ключевые слова: судебно-медицинская экспертиза; токсикология; психоактивное вещество; химико-токсикологическое исследование; γ -бутиролактон; метадон; барбитураты; галлюциногенные грибы; этиленгликоль; метанол; клинический случай.

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在机动车驾驶证吊销案件中运用法医学与毒理学专门知识：组织与方法方面的结论

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摘要

本文探讨了在进行醉酒状态医学检查过程中存在的争议性问题。研究材料基于一例实践案例，即在一起行政案件中，法医学与毒理学专家协助审查吊销机动车驾驶证合法性的过程。详细呈现了事件的时间顺序——从交通巡逻警察拦停一名机动车驾驶员，并当场将其停止驾驶车辆以进行酒精醉酒状态检查开始，直到治安法官作出裁决，该裁决随后由上诉法院维持原判。

通过对该真实案例的分析，表明在化学—毒理学检验中，由于对人体生物液体中精神活性物质的鉴定不可靠而产生的结果解释错误。以在一名职业小客车驾驶员体内检出 γ -丁内酯的案例为例，提出了反对采用不可靠化学物质鉴定方法的论据。此外，还发现了临床检验诊断医师培训中的不足，指出了其工作中机械化方法的不可取性，并提出了改进现有不足途径。

关键词：法医学鉴定；毒理学；精神活性物质；化学—毒理学检验； γ -丁内酯；美沙酮；巴比妥类；致幻蘑菇；乙二醇；甲醇；临床病例。

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INTRODUCTION

False positive results of a chemical toxicological analysis (CTA) are unfortunately quite common [1]. Metabolites of some (including illicit) psychoactive substances (PASs) can be detected after accidentally entering the body in cases that are not related to legal infractions. For example, opium metabolites can be detected after consuming poppy seed buns [2]. Even false positive CTA findings frequently serve as the basis for legal decisions. Furthermore, methodological limitations and the impact of human errors during sampling and laboratory analysis increase the risk of incorrect interpretation of results. This is especially relevant in cases of potential nonmedical use and nonphysiological metabolism of some PASs, including γ -butyrolactone, an organic solvent with various industrial applications. Furthermore, it can be used as a recreational PAS. The pharmacokinetics of γ -butyrolactone are unique in that it undergoes a complete metabolic transformation in the body, rather than retaining its original form. It is eliminated exclusively via the formation of metabolites: 1,4-butanediol or γ -hydroxybutyric acid, also known as 4-hydroxybutanoic acid [3].

Therefore, cases of non-accidental and accidental detection of specific illicit substances in a large sample of examined subjects must be clearly differentiated. The continued use of unreliable CTA findings increases the risk of unlawful decisions with legally significant consequences.

CASE DESCRIPTION

Incident Circumstances

According to an administrative case, citizen G. (31 years old), a driver for a private company, was stopped in his company car by traffic officer P. at 04:25 on April 18, 2021, in the Kirovsky District of St. Petersburg.

Based on Article 27.12 of the Code of the Russian Federation on Administrative Offenses,¹ citizen G. was suspended from driving for sobriety testing.

Traffic officer P. issued sobriety testing report 78 AB No. 024983 of April 18, 2021, indicating that citizen G. showed signs of intoxication (Table 1).

Furthermore, the report stated the following: "... was performed at 05:04 using Alcotector PRO 100 combi® (Shenzhen Well Electric Co., Ltd., China), serial number 634499, last calibrated on September 12, 2020, permissible absolute error limit ± 0.048 mg/L. Instrument reading 0.000 mg/L. Testing result: intoxication not detected..." A forensic toxicology expert was subsequently provided access to all materials, including the original output listing, which indicated the instrument reading of 0.000 mg/L at 05:04 on April 18, 2021 (Fig. 1).

Table 1. Data from sobriety testing report 78 AB No. 024983 of April 18, 2021 (citizen G.)

Assessed criterion	Detected
Alcohol breath	No
Postural instability	Yes
Speech impairment	No
Skin discoloration	No
Inappropriate behavior	Yes



Fig. 1. Results of analysis using Alcotector PRO 100 combi® (Shenzhen Well Electric Co., Ltd., China).

However, traffic officer P. referred citizen G. to a chemical test and issued a corresponding report (78 20 No. 010952), indicating "probable cause" as the reason. Citizen G., knowing he was not intoxicated, consented to the proposed chemical test.

Specifics of the Chemical Test

According to chemical test report No. 232/6 issued at St. Petersburg State Budgetary Healthcare Institution XXX on April 18, 2021, citizen G. was examined by addiction

¹ Code of the Russian Federation on Administrative Offenses No. 195-FZ of December 30, 2001. Available at: <https://base.garant.ru/12125267/> Accessed on: December 12, 2024.

Table 2. Data from chemical test report No. 232/6 issued at St. Petersburg State Budgetary Healthcare Institution XXX on April 18, 2021 (citizen G.)

Analyzed parameter	Result
Appearance of the examined individual (visible injuries, injection marks)	No visible injuries
Complaints of the examined individual	None
Changes in the mental activity of the examined individual	Euphoric; talkative; oriented to person, place, and time
Schulte test	>1 min
Vegetovascular responses of the examined individual	Pulse 84 bpm, rhythmic
Skin and visible mucosa	Pale
Pupils (constricted, dilated, normal)	Symmetrical, dilated
Pupillary light reflex (brisk, slow)	Slow
Respiratory rate	Normal
Scleras	Injected
Nystagmus	No
Motor activity of the examined individual	Normal motor coordination; no speech or gait impairment
Romberg's test (stable, unstable)	Stable
Coordination tests	Normal

psychiatrist Ch. at 05:20 at the medical examination department (Table 2).

Citizen G. denied the use of alcohol, drugs, or psychoactive substances, which was mentioned in the report.

The following equipment was used for the preliminary assessment during the chemical test on April 18, 2021:

- Jupiter® alcotector (ALCOTECTOR, Russia), No. 005896. The first test result (at 05:26) was 0.000 mg/L; the second test (after 15–20 min) was not performed;
- Immunochromatographic urine test using ICA-Multi-Factor test strips (Factor-Med Production, Russia) (at 05:35). The result was positive;
- Gas chromatography–mass spectrometry (GC–MS) as a confirmatory method. According to conclusion No. 005791 issued by clinical pathologist K. at St. Petersburg State Budgetary Healthcare Institution XXX: “Confirmatory methods: GC–MS. The chemical toxicological analysis detected (substance): γ -butyrolactone...”

Information on the detection of this substance was included in the chemical test report (No. 232/6 of April 18, 2021) issued at St. Petersburg State Budgetary Healthcare Institution XXX, confirming intoxication in citizen G. Notably, conclusion No. 005791 was absent from administrative case files.

Given the detected signs of intoxication (postural instability, inappropriate behavior) and CTA findings, based on Article 28.7 of the Code of the Russian Federation

on Administrative Offenses,¹ traffic officer P. initiated an administrative case against citizen G. according to Part 1, Article 12.8 of the Code:¹ Driving while intoxicated, unless such actions constitute a criminal offense. Senior traffic officer N. from the administrative enforcement group issued an administrative offense report based on Article 28.2 of the Code of the Russian Federation on Administrative Offenses.¹ According to the report, citizen G. drove while intoxicated (chemical test report No. 232/6 of April 18, 2021), which is classified as a violation of Item 2.7 of the Traffic Code of the Russian Federation.² Part 1, Article 12.8 of the Code of the Russian Federation on Administrative Offenses establishes the accountability for this offense.¹ The actions of citizen G. do not constitute elements of a criminal offense as defined in Article 264.1 of the Criminal Code of the Russian Federation.³ The case was submitted to magistrate court at the place of residence of citizen G.

Court Proceedings and Role of the Forensic Toxicology Expert

Three sessions of the court of first instance were held in 2022, with the participation of:

- traffic officer P.;
- clinical pathologist K.; St. Petersburg State Budgetary Healthcare Institution XXX;
- independent forensic toxicology expert.

² Decree of the Government of the Russian Federation No. 1090 of October 23, 1993, On the Traffic Code. Available at: https://www.consultant.ru/document/cons_doc_LAW_2709/. Accessed on: December 12, 2024.

³ Criminal Code of the Russian Federation No. 63-FZ of June 13, 1996. Available at: <https://base.garant.ru/10108000/>. Accessed on: December 12, 2024.

The independent expert was heard in court and clarified the issues that arose. The expert's conclusion was attached to the case. However, the court did not assess this conclusion and did not provide the expert the opportunity to ask questions to other parties involved.

In particular, the forensic toxicology expert drew the court's attention to the following circumstances.

- When analyzing report 78 20 No. 013330 of April 18, 2021, on driving suspension issued by traffic officer P., it is impossible to determine which signs (criteria) provided for by Item 6 of the Chemical Test Procedure approved by Order of the Ministry of Health of the Russian Federation No. 933n of December 18, 2015,⁴ were used to make the decision on driving suspension in citizen G.'s case. The required actions were not performed in sections of the protocol where it is necessary to cross out irrelevant reasons (signs/criteria). Moreover, individual signs were underlined, which is not permitted by the established protocol template, and certain signs were later crossed out. As a result, the forensic toxicology expert was unable to reliably assess the condition and behavior of citizen G. at the time of events in question.
- According to report 78 AB No. 024983 of April 18, 2021, traffic officer P. used Alcotector PRO 100 combi® (Shenzhen Well Electric Co., Ltd., China) for sobriety testing of citizen G. The instrument reading at 05:04 was 0.000 mg/L; therefore, the report stated that intoxication was not detected.
- Furthermore, according to report 78 20 No. 010952 of April 18, 2021, citizen G. was referred to a chemical test based on "probable cause." However, this reason, along with the absence of specific signs indicated in report 78 20 No. 013330 of April 18, 2021, does not comply with Item 6 of the Chemical Test Procedure⁴ and cannot be considered sufficient for driving suspension and referral to the chemical test.
- Citizen G.'s urine CTA findings obtained by clinical pathologist K. at St. Petersburg State Budgetary Healthcare Institution XXX are false positive. According to chemical test report No. 232/6 of April 18, 2021, issued at St. Petersburg State Budgetary Healthcare Institution XXX, citizen G. consented for urine sampling for CTA at 05:35. A qualitative preliminary rapid immunochromatographic urine test was then performed using ICA-Multi-Factor test strips (Factor-Med Production, Russia), which detected γ -butyrolactone.
- However, γ -butyrolactone cannot be detected in urine, because it is completely metabolized to γ -hydroxybutyric acid and is therefore never eliminated unchanged.

DISCUSSION

According to Resolution of Plenum of Supreme Court of the Russian Federation No. 20 of June 25, 2019,⁵ the following must be taken into account in cases of traffic violations (and appeals against the decisions in such cases). According to Part 3, Article 26.2 of the Code of the Russian Federation on Administrative Offenses,¹ evidence in administrative cases (administrative offense report, reports of proceedings on administrative offense, sobriety testing report, chemical test report, etc.) cannot be used if obtained in breach of the law.

Therefore, Articles 26.2 and 28.2 of the Code of the Russian Federation on Administrative Offenses¹ suggest that the administrative offense report is the primary service document, confirming that the offense has been committed by the subject of administrative sanctions. A report issued in violation of Article 28.2 of the Code of the Russian Federation on Administrative Offenses¹ cannot be used in administrative proceedings, which results in the reversal of judgment irrespective of evidence of offense.

According to Article 28.2 of the Code of the Russian Federation on Administrative Offenses,¹ which defines the procedure for drawing up a report, the administrative body must follow the established procedure to ensure protection of the subject of administrative sanctions. Furthermore, the Code of the Russian Federation on Administrative Offenses details all stages of liability, excluding the possibility of violent interpretation and preventing violation of the rights of parties involved.

When analyzing the reports issued by traffic officer P., there were no reasonable grounds for driving suspension and referral to the chemical test, according to Article 27.12 of the Code of the Russian Federation on Administrative Offenses.¹ Therefore, all subsequent examinations can be considered legally invalid.

In addition to this legal reasoning, let us consider the detected inconsistencies between the obtained evidence and the typical clinical and laboratory signs of intoxication.

Intoxication in citizen G. was initially suspected based on the signs of intoxication (postural instability and inappropriate behavior) reported by traffic officer P. When questioned in court, traffic officer P. stated that citizen G.'s actions appeared inadequate to him; however, he was unable to specify the signs of inadequacy because he "failed to remember" them.

According to chemical test report No. 232/6 of April 18, 2021, citizen G. consented for urine sampling for CTA at 05:35. An immunochromatographic urine test was performed using ICA-Multi-Factor test strips (Factor-Med Production, Russia), with a positive result. The report does not specify

⁴ Order of the Ministry of Health of the Russian Federation No. 933n of December 18, 2015, On the Chemical Test Procedure. Available at: <https://base.garant.ru/71350220/>. Accessed on: December 12, 2024.

⁵ Resolution of Plenum of Supreme Court of the Russian Federation No. 20 of June 25, 2019, On certain issues arising in judicial practice during administrative case hearings, provided for in Chapter 12 of the Code of the Russian Federation on Administrative Offenses. Available at: https://www.consultant.ru/document/cons_doc_LAW_327611/. Accessed on: December 12, 2024.

the name of the test used, which is vital, because test strips of this brand can qualitatively detect three, five, six, ten, or twelve addictive substances in urine (ICA-3-Multi-Factor,⁶ ICA-5-Multi-Factor,⁷ ICA-6-Multi-Factor,⁸ ICA-10-Multi-Factor,⁹ and ICA-12-Multi-Factor,¹⁰ respectively) (Factor-Med Production, Russia). However, none of these tests detect γ -butyrolactone. Therefore, γ -butyrolactone detection in citizen G.'s urine using ICA-Multi-Factor test strips (Factor-Med Production, Russia) is not reliable, because this is simply impossible.¹¹

According to Item 8 of the Rules for Chemical Toxicological Analysis in Medical Examination (Appendix 3 to the Procedure⁴), a CTA of a biological sample (urine) includes two stages:

- "...preliminary immunochemical tests using analyzers that record and quantitatively assess the results...";
- "...confirmatory tests by gas and/or liquid chromatography–mass spectrometry..."

Item 10 of the Rules states the following: "After the first stage of chemical toxicological analysis, if the biological sample (urine) does not contain addictive substances, psychoactive substances, or medicinal products that impair physical and mental functions, which may lead to adverse consequences of ultrahazardous activities, as well as metabolites and analogs of the specified substances, a conclusion is made that the examined biological sample (urine) does not contain intoxicating agents (substances), and the second stage of chemical toxicological analysis is not performed."⁴

Furthermore, the body can independently produce small amounts of γ -hydroxybutyric acid. Therefore, to rule out false positive results, Item 8 of the Rules for Chemical Toxicological Analysis in Medical Examination (Appendix 3 to the Procedure⁴) states that both qualitative and quantitative PAS detection is required during the first stage of CTA.

Notably, report No. 232/6 of April 18, 2021, is issued based on conclusion No. 005791 by clinical pathologist K. (St. Petersburg State Budgetary Healthcare Institution XXX), which indicates that γ -butyrolactone was detected in citizen G. by a confirmatory method (GC–MS). However, this is impossible. According to research, this substance begins to be metabolized to γ -hydroxybutyric acid within minutes

after entering the body [3]. In theory, it can be converted back to γ -butyrolactone in a laboratory by derivatization with trimethylsilyl derivatives. Notably, this conclusion was absent from administrative case files and therefore was not assessed during court sessions. When questioned in court about the retention period for conclusions according to Form No. 454/u-06 "Chemical Toxicological Analysis Reports," clinical pathologist K. answered: "We do not keep them for long." However, Item 9 of Appendix 12 (Guidelines for Filling Out Form No. 454/u-06 "Chemical Toxicological Analysis Reports") to Order of the Ministry of Health and Social Development of the Russian Federation No. 40 of January 27, 2006,¹² states the following: "The completed Form No. 454/u-06 must be signed by the specialist who conducted the chemical toxicological analysis and certified by seal of the substance abuse clinic/hospital to which the chemical toxicological laboratory belongs, or by stamp of the chemical toxicological laboratory, indicating the full name of the substance abuse clinic/hospital. It must be stored in the archive of the substance abuse clinic/hospital for 5 years, after which it is destroyed." Unfortunately, the court had no additional questions despite the unexpired 5-year period.

As a result, the court declared that citizen G. was intoxicated, thereby violating Item 2.7 of the Traffic Code of the Russian Federation.² Part 1, Article 12.8 of the Code of the Russian Federation on Administrative Offenses¹ establishes the accountability for this offense in the absence of signs of a criminal offense. By the decision of the magistrate court of March 1, 2022, citizen G. was found guilty of committing an administrative offense under Part 1, Article 12.8 of the Code of the Russian Federation on Administrative Offenses.¹ Driving while intoxicated, unless such actions constitute a criminal offense. A fine of 30,000 rubles was imposed, along with administrative license revocation for 1 year and 8 months.¹³

A session of the court of cassation was held, to which the parties involved were not invited, including the independent forensic toxicology expert, despite the lawyer's requests. The court of cassation upheld the decision of the court of first instance.¹⁴

Notably, some existing methods for PAS detection need to be aligned with the regulatory framework (or vice versa).

⁶ For detecting morphine, marijuana, amphetamine.

⁷ For detecting the above substances, as well as methamphetamine and cocaine.

⁸ For detecting the above substances, as well as benzodiazepine.

⁹ For detecting the above substances, as well as barbiturates, methadone, ecstasy, tricyclic antidepressants.

¹⁰ For detecting the above substances, as well as phencyclidine and ketamine.

¹¹ Posted on Telegram on December 9, 2024 [accessed on: December 9, 2024]. In: Bureau of Biomedical Expertise [Internet]. 2024–. Available at: <https://t.me/bmbex/493?>

¹² Order of the Ministry of Health and Social Development of the Russian Federation No. 40 of January 27, 2006, On chemical toxicological analysis for detecting alcohol, addictive substances, psychoactive substances, and other toxic substances in the human body. Available at: <https://base.garant.ru/12145258/>. Accessed on: December 12, 2024.

¹³ Judicial decisions of the Russian Federation. Decision of the Volkhov City Court of the Leningrad Region of July 7, 2022, in administrative case No. 516/2022. Available at: <https://судебныерешения.рф/68634872>. Accessed on: December 13, 2024.

¹⁴ Judicial decisions of the Russian Federation. Third General Court of Cassation ruling No. 16-5221/2022 of September 19, 2022. Available at: <https://судебныерешения.рф/69450260>. Accessed on: December 13, 2024.

It is especially relevant to develop quantification procedures for some PASs in line with Order of the Ministry of Health of the Russian Federation No. 933n of December 18, 2015.⁴ These include γ -butyrolactone, methadone, hallucinogenic mushrooms, etc. [2], as well as other toxicants and drugs (e.g., ethylene glycol, methanol, barbiturates, etc. [4]) mixed with addictive substances in urine and blood samples. The main challenge here is the need to use reference standards of PASs. However, the circulation of some PASs is restricted; therefore, healthcare providers must obtain permits for their use and storage.

The current practice in cases of false positive CTA findings has two-sided negative consequences:

- Unjustified prosecution of individuals who have not used PASs;
- Individuals who actually used PASs may be able to escape responsibility because of inconsistencies in laboratory procedures and regulatory shortcomings.

In the presented case, there are three plausible explanations for the presence of unchanged γ -butyrolactone, rather than its metabolite (γ -hydroxybutyric acid) in urine:

- The substance was introduced into the sample after urine collection;
- A non-conventional method of γ -butyrolactone isolation by derivatization with trimethylsilyl derivatives was used;
- CTA findings were falsified.

This case highlights existing issues in clinical pathology. In particular, unreliable detection methods are frequently associated with insufficient training of clinical pathologists [5], as well as a mechanistic approach to analysis. However, forensic medicine has accumulated a sufficient number of cases that can be used in the future to create evidence-based algorithms and criteria for interpreting analysis results [6–9].

CONCLUSION

The presented case highlights how unreliable laboratory analysis methods and incorrect interpretation of results can lead to inaccuracies in determining PASs in biological samples. Such false positive results have major implications

for patients' social and professional rights. In our case, the unlawful conclusion based on CTA findings effectively deprived the individual of their ability to continue working, which is unacceptable.

To minimize this risk, effective procedures for determining PASs in urine and blood samples are required, including γ -butyrolactone, methadone, hallucinogenic mushrooms, ethylene glycol, methanol, and barbiturates. Furthermore, standardized algorithms for interpreting laboratory findings are necessary, taking into account both the pharmacokinetics of analyzed substances and potential routes of sample contamination. Without such approaches, there is a high risk of judicial decisions based on unreliable conclusions, resulting in legal stigmatization of citizens.

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REFERENCES | СПИСОК ЛИТЕРАТУРЫ

1. Klimenko TV, Klevno VA, Maksimov AV. Problematic Aspects of Chemical and Toxicological Research of Psychoactive Substances. *Russian Journal of Forensic Medicine*. 2018;4(4):36–40. doi: 10.19048/2411-8729-2018-4-4-36-40 EDN: YWCEXB
2. Batotsyrenov CB, Kuznetsov SV, Lodyagin AN, et al. Thanatogenesis and Forensic Assessment of Severe Acute Methadone Poisoning. *Russian Journal of Forensic Medicine*. 2024;10(3):334–344. doi: 10.17816/fm16099 EDN: PWOOKA
3. Loban IE, Gorbacheva TV, Bychkov VA. The Chemical Toxicological Investigation of Gamma-Hydroxybutyric Acid in Biological Objects and the Interpretation of the Results of the Analysis. *Forensic Medical Expertise*. 2018;61(5):25–30. doi: 10.17116/sudmed20186105125 EDN: YLUVSH
4. Petrova OS, Matveeva LV, Sukhova NA. Relevance of Determination of Barbituric Acid Derivatives by Chemical and Toxicological Analysis

on Example of Cyclobarbitol. *International Research Journal*. 2020;(3-1):155–159. doi: 10.23670/IRJ.2020.93.3.026 EDN: NIZBFR

5. Kuznetsov SV. Problems of Forensic Medical Training of Physicians Working in Remote From the Centres of Settlements. *Medical Expertise and Law*. 2014;(5):16–18. EDN: SXVUKH

6. Kuznetsov SV. Iatrogenic Crimes Committed in the Field of Health Care, and a Special Approach to the Production of Forensic Medical Expert Research. *Vestnik of Saint Petersburg University. Medicine*. 2018;13(4):419–429. doi: 10.21638/11701/spbu11.2018.408 EDN: YUVOSD

7. Kuznetsov SV. About Qualification of Article 238 of the Criminal Code of the Russian Federation in Relation to Improper Medical Activity. *Bulletin of the Moscow Academy of the Investigative Committee of the Russian Federation*. 2018;(1): 58–62. EDN: YUTYMB

8. Kuznetsov SV. Features of Judicial and Medical Assistance in Proving Iatrogenic Crimes Under Article 125 of the Criminal code of the Russian Federation. *Bulletin of Moscow Academy of the Investigative Committee of the Russian Federation*. 2020;(1): 109–114. EDN: WYNDKP

9. Kuznetsov SV. *Methodology of expert support of investigation of crimes on facts of improper provision of medical care: Monograph*. 2nd ed., revised and updated. Saint Petersburg: RUSAINS; 2021. (In Russ). ISBN: 978-5-4365-8822-3 EDN: ZSFXPL

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