

# Fortified wines in Russia: selected social and health-related aspects

Sergei V. Jargin

Peoples' Friendship University of Russia, Moscow, Russian Federation

## Abstract

Fortified wines with alcohol concentration 16-20% were widely produced and sold in the former Soviet Union until the anti-alcohol campaign (1985-1989). The wines were largely natural products manufactured from grapes or fruit by fermentation with the addition of spirits distilled from grain or potatoes. Parties with female participation often preferred dessert (fortified up to 14-16 %) or sparkling wines, which were inexpensive and often good quality. Analogues of many internationally known wines have been produced. Port wine has been especially popular. The production in a technically correct manner turned out to be expensive after the transition to the market economy; the consumption of wine is less widespread these days. The problem is waiting for a solution: under which names and labels the imitations can be legally produced and sold. In regard to future research, poor-quality alcohol derived from non-edible sources and toxic substances is of importance. Modern methods should be applied for the assessment of alcoholic beverages and the detection of toxic admixtures. Alcohol consumption and heavy binge drinking tend to decline in Russia; but alcohol still remains a part of life, and it cannot be eliminated. The last anti-alcohol campaign has demonstrated this. Since 1985,

the consumption of wine has decreased in Russia, especially by lower social classes. This is a deplorable development because wine has certain advantages, especially for older people. In conclusion, it is recommended to restore the production of inexpensive wines, including dry, sparkling and fortified varieties. Alcohol used for the wine fortification should be derived from edible sources and properly purified.

## Introduction

The alcohol consumption in Russia is often associated with vodka. However, Fortified Wines (FWs) with alcohol concentration 16-20 % were widely produced and sold in the former Soviet Union (fSU) until the Anti-alcohol Campaign (AC) (1985-1989). Vodka prices doubled in 1985, but inexpensive wines were still available for several years, although their quality worsened and there were long queues at bottle stores. The central topic of this article is the question, why the great popularity of FWs in the fSU is not readily perceptible from the literature. Apparently, there are two reasons. First, some of the cheapest FWs were more toxic than vodka per unit of pure ethanol. It is easier to add insufficiently purified alcohol to red or brownish fluids with various tastes and flavors than to the rather standard product such as vodka. Second, FWs were largely natural products at that time: they were made from grapes or fruit by fermentation with the addition of spirits distilled from grain or potatoes. Many FWs were of acceptable quality. Their production in a technically correct manner turned out to be expensive after the transition to the market economy. The prime cost of FW, manufactured from grapes or fruit, was higher than that of vodka, but many FWs were sold at low prices. Parties with female participation often preferred dessert (fortified to 14-16 %) or sparkling wines, which were inexpensive and often good quality. Especially in the period between the two ACs (1972-1985), the part taken by FWs was considerable, comparable to that of vodka. Wines were not regularly available in remote areas of North and Siberia, but wine shipments were always welcomed. The increase in wine production prior to the recent AC (launched in 1985) occurred in accordance with the policy aimed at a gradual replacement of vodka by wine and beer. Authorities supervised the quality of beverages. However, substandard wines were produced, and there was a worsening tendency. In the period 1980-1985, the quality decline was acknowledged by professional literature; flavoring additives and sugar were used increasingly to disguise faults. However, the production continued growing; more details and references are in the preceding article.<sup>1</sup>

High-yield, low-quality sorts of grapes were increasingly used for wine production. Hygienic requirements were often neglected; there was no regular microbiological control. Some yeast cultures used for the fermentation were not sufficiently pure. Temperature regimes of fermentation were not always adhered to. The acidity of many wines was high. The quality of sparkling wines was noticed to be worsening: "Soviet Champagne" often smelled yeast. In the author's opinion, the quality decrease in the early 1980s was toler-

Correspondence: Sergei V. Jargin, Peoples' Friendship University of Russia, 117198 Moscow, Russian Federation.  
E-mail: sjargin@mail.ru

Key words: alcohol drinking; alcohol toxicity; alcohol policies; wine; Russia

Conflict of interest: the author declares no potential conflict of interest, and all authors confirm accuracy.

Ethics approval and consent to participate: not applicable.

Availability of data and materials: all data generated or analyzed during this study are included in this published article.

Received: 13 July 2024.  
Accepted: 6 March 2025.

This work is licensed under a Creative Commons Attribution 4.0 License (by-nc 4.0).

©Copyright: the Author(s), 2025  
Licensee PAGEPress, Italy  
Wine Studies 2025; 4:12805  
doi:10.4081/ws.2025.12805

*Publisher's note: all claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article or claim that may be made by its manufacturer is not guaranteed or endorsed by the publisher.*

ated by the authorities taciturnly planning to replace inexpensive natural wines with sweetish flavored substitutes. The new products have often been given popular names, for example, Port Wine 72, which used to be acceptable quality. The notorious Port Wine 777 appeared in the 1980s being increasingly poor quality. The Port Wine 777 is often mentioned by the media as “bormotukha” (cheap FW), apparently with the goal of discrediting inexpensive natural FWs destined to disappear from the market. The number 777 is meaningless, but earlier numbered varieties (Port wine 13, 33, 72) had been developed by winemakers and were recognizable. As for the fruit wines, after the onset of the AC, their production was planned to be abandoned, which indeed happened according to our observations. Today, natural fruit FWs are manufactured in Belarus.

### Imitations of foreign wines and spirits

The imitation of foreign wines in Russia has a long history. Numerous labels of that kind are depicted in the book.<sup>2</sup> Analogues of many internationally known wines and spirits were produced in the fSU: Jerez (Sherry), Madeira (spelt Madera in Russian), Champaign, Kagor (Cahors), Cognac and some liqueurs such as Chartreuse and Bénédictine. Gin and whiskey were manufactured as well. Port wine and Vermouth were especially popular. Many imitations were natural products manufactured more or less on the basis of original methods. Some sorts of Champagne, Port, Madeira, Sherry and Cognac were good quality; several generations enjoyed them when importation from the “capitalist” West was scarce or nonexistent. Thanks to this practice, many Russians are acquainted with internationally known wines and recognized the originals when the importation started after 1990. Quality wine and Cognac were affordable to the broad public during the Soviet time: Cognac was approximately twice as expensive as vodka; before 1970 the difference was even smaller. Inexpensive wines were imported from Bulgaria, Hungary, Romania, Yugoslavia and even Czechoslovakia. High-quality beer from the latter, as well as from the GDR and Poland was seldom on sale but always welcome and purchased by crates. Almost all aged consumers in Russia know what is it Tocai (Tokay) not only due to the occasional importation from Hungary but also thanks to rather sweet “Tocai” produced in Uzbekistan.

Development of Port, Sherry, Madera and Cognac has been continued. In some publications, imitations of Cognac are named brandy, and those of Port were called “wine of Portwein type”. However, both continue to be sold inside the country with the labels Cognac or Portwein. Exported Cognac was named brandy, while in Russia it was sold with the label Cognac; the same is true for Sekt vs. Champagne.<sup>3</sup> The brand “Russian Cognac” is being promoted. Madera is also produced in the south of Russia and Ukraine. Its taste and flavor resemble those of Madeira indeed. However, according to some back labels, it is fortified by “rectified alcohol from food materials” and not by grape spirit which is a usual practice. Cognac has been produced in different countries of the fSU. In the North Caucasus, manufacturing of Calvados is developing. Sherry (Jeres), produced in Crimea and sold in Moscow is not very different from some sorts of Sherry from Jerez de la Frontera (Spain), but sometimes tasted as if somewhat diluted. The same pertains to Port (Figure 1). True Port is manufactured at Vila Nova de Gaia and other places in Portugal. Another example: Kadarka wine, originating from Bulgaria, is sold in Moscow. Red wine of this sort was named Gamza (a variety of Hungarian wine Kadarka).<sup>4</sup> Gamza is known by Russian consumers; during the Soviet time it was sold in big bottles and was inexpensive. Probably, it was the reason for renaming. After the start of the AC in 1985, the quality of alcoholic beverages worsened. Following

the AC, together with inflation and the transition to the market economy, the prices and quality levels of beverages diversified. New labels appeared and disappeared; names and qualities correlated poorly. Imported products had sometimes been good initially, but later replaced by imitations. Well-known wines and cognacs disappeared, changed their taste or were replaced by surrogates made from technical alcohol with flavor and color additives.<sup>5-9</sup> The astringent taste of technical alcohol is known as it was purloined from factories, institutes of technology, physics etc., being often consumed during the AC. There have also been more expensive Port and Madera, which used to smell technical alcohol; today, however, the quality seems to be improving. The relative proportion of counterfeit beverages on sale is difficult to determine; it seems to be higher outside the Capital. The following data have been published: in the late 1990s ~60% of legally sold alcoholic beverages contained poorly purified ethanol produced by chemical synthesis from acetylene or by hydrolysis of sawdust/woodchips with subsequent fermentation.<sup>9</sup> The latter method of ethanol production was developed predominantly in fSU disposing of large resources of wood. In 2007, about half of all vodka originated from illegal sources; wine and cognac were often falsified as well.<sup>5</sup> A tendency of quality improvement has been noticed since approximately 2010. Reportedly, 27% of all alcoholic beverages were counterfeit in 2021.<sup>10</sup> However, in the third year of the Ukraine war (2025), some beverages savor technical alcohol as before.



**Figure 1.** Port wine ‘Chateau Cotes de Saint Daniel Forte’ intensely persuaded into buying at the Gastronomie No. 1 (Figure 2). It is quite expensive and unsavory. True Port Wine is renownedly manufactured at Vila Nova de Gaia and other places in Portugal.

Even in Moscow, beverages of constantly high quality can be found mainly in central shops such as the “Gastronome No. 1” within the famous GUM (Upper Trading Rows) (Figure 2). The wine collection here is among the best in Moscow. A product with the same foreign or domestic label may taste differently elsewhere.<sup>11</sup> Unfortunately, it has been recently noticed that falsified vodka and other beverages are also sold in most renowned shops. The quality of counterfeit beverages depends on their origin: they can be produced by regular factories, being concealed from excise duties, or “in garages”, using technical ethanol diverted from the industry or imported.<sup>5,8</sup> Since the 1990s, the Caucasus has been known as a nationwide source of cheap alcoholic beverages. Almost all vodka concealed from excise duties in North Ossetia was reported to be produced from technical ethanol.<sup>7</sup>

Exaggeration by some authors of an “unrecorded” alcohol consumption shifts responsibility for poisonings onto consumers, who allegedly prefer drinking surrogates.<sup>12</sup> The concept of unrecorded alcohol<sup>13</sup> is not directly applicable to Russia without a comment that ethanol from non-edible sources, diverted from the industry or imported, has been used for the production of beverages sold through legally operating shops and eateries,<sup>5,8,14-16</sup> thus being formally recorded. This occurred generally with the knowledge of authorities. In fact, “most vodka and liquor consumed by the population is purchased in the official retail stores”.<sup>17</sup> The Internet trade has been “typically for bulk orders only”.<sup>18</sup> The consumers are usually unable to distinguish by sight between branded and counterfeit products as they are sold at the same shops and look identically. Paradoxically, unrecorded alcohol (produced by a regular factory and concealed from excise duty) can be good quality, but “recorded” vodka can be produced from sawdust being insufficiently purified, as it has been the case in some places, e.g. in

Siberia for many decades. The same pertains to wines fortified with alcohol of different quality. As far as we know, in the West, only original wines and spirits are sold according to the Protected Geographical Status framework. The problem waits for a solution: under which names and labels the imitations can be legally produced and sold. In the author’s opinion, it would be preferable to preserve some popular names such as Crimean Madera and Port wine, because consumers are accustomed to them. Champagne-type wines could be named Sekt, Brut, or sparkling wine, Port-type wines - Ruby or Tawny, or be numbered (for example, Port wine 33 or 72) as they were in the rSU; these names can be used under the condition of adherence to the original formula.

## Discussion

As a part of the anti-alcohol measures in 1972, the sales of vodka on Sundays and within the time span 7 p.m.-11 a.m. all other days were prohibited. At the same time, wines were sold after 7 p.m. till the closure of shops at 8-10 p.m. and on Sundays. The absence of 250 ml and smaller vodka and wine bottles contributed to the consumption of higher doses. Wine was sold predominantly in 0.75-0.8 l and vodka in 0.5 l bottles. The cheapest FWs were named bormotukha - the “mumbler”: intoxicated individuals mumbled indeed, having lost control of their speech and behavior. It was caused by admixtures other than ethanol masked by the taste of wine or, increasingly since the 1980s, of artificial flavors. Many workers finished their shifts around 5 p.m.; considering queues at retail outlets, they could have started with vodka but continued with FWs or consumed the latter only. FWs were used for heavy



**Figure 2.** “Gastronome No. 1” within the famous GUM (Upper Trading Rows). The wine collection here is one of the best in Moscow.

binge drinking (~1.5 l per person); they were often better tolerated than vodka, which at higher doses sometimes provoked vomiting e.g. when the second 250 ml glass was ingested in a hurry, without a meal and accompanying drink such as beer or Pepsi. For many older consumers, wine or beer is preferable to vodka, as the latter can irritate or damage atrophic mucosa.

The AC launched in 1985 by Mikhail Gorbachev was initially effective but ended with a failure and was accompanied by increased consumption of home-made moonshine (samogon), technical liquids and lotions.<sup>5</sup> Many well-known wines disappeared around 1990; some of their names continued to be used for imitations.<sup>1,9</sup> After 1988, alcohol consumption increased, while vodka enhanced its share in the total.<sup>19,20</sup> Apparently, the AC and its predictable failure were exploited for political and economic purposes. The AC destabilized the Soviet society; the widespread drunkenness in the 1990s acted as anesthesia during a surgery: workers and intelligentsia did not protest against privatization of state properties because of drunkenness.

During the AC, many distilleries producing spirits from grain and potatoes were dismantled. At the same time, technical alcohol met no demand from the stagnating industry. Official permissions to use alcohol from non-edible raw materials for the production of beverages were issued during the 1990s.<sup>5,6</sup> The permissions have later been revoked but, in conditions of disregard for laws and regulations, the use of technical alcohol has been continued. It was demonstrated in animal bioassays that alcohol produced by synthesis from acetylene or by hydrolysis and fermentation from sawdust is more toxic than that from edible sources.<sup>14</sup> Later on, purified ethanol from non-edible sources was claimed to be compatible with requirements to beverage alcohol,<sup>6</sup> however, one can never be sure that purification was adequate. Bioassays may overestimate toxicity of alcohol produced from edible sources as animals are not adapted to it. Thousands years' adaptation of European and some other peoples to alcohol included adaptation to by-products of natural fermentation. Alcohol from non-edible raw materials has another spectrum of admixtures: higher concentrations of butanol, butanone, crotonaldehyde, acetone, diethyl ether, acetaldehyde etc.<sup>6</sup> Adaptation of humans to some new by-products is lacking. This topic needs further research. Claims by certain writers that the quantity but not quality of alcohol is important for health<sup>5</sup> deflects public attention from the toxicity of some beverages legally sold in Russia. After the abolition in 1992 of the state monopoly on alcohol, the country was flooded by domestic and imported products of variable quality. Sales of falsified beverages through legally operating shops, kiosks and eateries occurred generally with the knowledge and sometimes with the participation of authorities or their members. It is well known in Russia that legally sold beverages sometimes cause severe and lethal intoxications. The following absolute numbers of lethal poisonings with alcohol-containing fluids were reported: 1998 - 21,800, 1999 - 24,100, 2000 - 27,200; another upsurge was in 2006<sup>21</sup> (discussed below). About half of lethal poisonings with alcohol-containing fluids in some areas during the 1990s were reported to be caused by legally sold beverages, while in many lethal cases, the blood alcohol concentration was low.<sup>15</sup> The unrecorded figures were certainly higher, as many undiagnosed diseases and unnatural causes of death, including poisonings, have been misclassified post-mortem as resulting from cardiovascular diseases.<sup>22,23</sup> Overestimation of the cardiovascular morbidity/mortality on the one hand and of its cause-effect relationship with alcohol on the other,<sup>15,23</sup> tends to ascribe deaths from undiagnosed and untreated diseases, poisonings etc., to alcohol abuse, thus shifting responsibility from authorities onto the consumers. For example, the number of poisonings with jaundice during the period August-November 2006 was reported to be 12,611,

including 1189 lethal cases, supposedly caused by disinfectant Extrasept-1 containing apart from ethanol 0.08-0.15% of diethyl phthalate and 0.1-0.14% of polyhexamethylene guanidine hydrochloride (PHMG). The liquid was sold in vodka bottles.<sup>24,25</sup> Cholestatic hepatitis with "a marked inflammatory component" was described in the liver.<sup>24</sup> Apart from PHMG, "chloride compounds",<sup>26,27</sup> *i.e.* organochlorides have been discussed as possible causative factors. In particular, admixtures of carbon tetrachloride, dichloroethane or other solvents have been suspected to cause poisonings with acute hepatotoxicity. The latter seems to be more probable as PHMG and diethyl phthalate have no strong hepatotoxicity; in rat experiments with PHMG no liver injury was detected.<sup>28</sup> Poor quality alcohol, *i.e.* admixtures, are of importance as they may be more toxic than ethanol. Toxicity and quality control of alcoholic beverages is a perspective topic of the future research. In particular, the following methods should be applied more widely by supervising authorities: the gas chromatography with flame ionization detection (GC-FID), using a column separating admixtures, and the gas chromatography - mass spectrometry (GC-MS).<sup>6,29-32</sup>

As mentioned above, the drinking of alcohol-containing technical liquids (lotions, window cleaner etc.) decreased abruptly after the failure of the AC in 1989, when vodka, beer and other beverages have become easily available and relatively cheap. The only major exceptions are tinctures from the pharmacy: some people purchased them not because of the low price but as they hoped for a better quality of medicinal alcohol. In December 2016, 77 deaths were reported from a mass poisoning in Irkutsk. According to published information, the poisoning was caused by the bath lotion Boyaryshnik (Hawthorn), while chemical analysis found that it contained methanol.<sup>33</sup> In the author's opinion, the poisoning could have been caused by hawthorn (*Crataegus*) tincture from the pharmacy. This is the form of medicinal alcohol most frequently consumed by drinkers in Russia.<sup>34,35</sup> There could have been misinformation intended to disguise the fact that methanol was used as a substitute for medicinal alcohol. As for disinfectants like the above-mentioned Extrasept-1, to the best of our knowledge, hardly anybody would deliberately buy it for drinking.

## Conclusions

Alcohol consumption and heavy binge drinking tend to decline in Russia,<sup>36,37</sup> but alcohol still remains a part of life; and it can be eliminated only together with life. The last AC (1985-1989) has demonstrated this. The concept of absolute sobriety as an ideological basis of AC, propagated among others by well-known surgeon Fedor Uglov,<sup>38</sup> seems to be insincere, unconstructive and unrealistic. Uglov used lung resections and bronchoscopies without sufficient indications, overviewed in Jargin 2024.<sup>39</sup> Figuratively speaking, AC was a surgery performed without sufficient indications. In regard to future research, poor quality alcohol, that is, illicit spirits and potentially toxic substances, are of importance. Modern methods such as GC-FID and GC-MS should be applied for assessment of alcoholic beverages and the detection of toxic admixtures. The toxicity of alcohol and admixtures to beverages should be studied in bioassays by researchers having no conflicts of interest. In the author's opinion, the addition of alcohol from non-edible sources to beverages should be prohibited or, at least, its presence must be clearly indicated on the labels.

## References

- Jargin SV. Popular alcoholic beverages in Russia with special reference to quality and toxicity. *J Addiction Prevention* 2017;5:6.
- Kruchina EN, Shtyrlin MA, Sogoyan KR. Crimean wines. Moscow: Izdatelstvo Zhigul'skogo; 2004. (in Russian)
- Jargin S. Champagne, per favore. Francese? No, sovietico! *Spirito di Vino* 2015;12:79.
- Clarke Oz; translation from English by Dudkova T. The world of wine, sorts, vineyards: advice from the most famous British wine expert. Moscow: Eksmo; 2019.
- Nemtsov AV. Alcoholic history of Russia: contemporary period. Moscow; URSS; 2009. (in Russian)
- Nuzhnyi VP, Rozanets VV, Savchuk SA. Chemistry and toxicology of ethyl alcohol and beverages made on its basis: chromatographic analysis of alcoholic beverages (2nd edition). Moscow: Librekomp; 2011. (in Russian).
- Shaidullina ED. Criminal responsibility for illegal manufacturing and trade with alcoholic products. Kazan, Russia: Juridical Institute; 2014. (in Russian).
- Urumbaeva RN. On influence of different factors on the scale of illegal market of alcohol in Russian Federation. *Manufacture of Alcohol and Liqueur & Vodka Products* 2008;4-6.
- Govorin NV, Sakharov AV. Alcohol-related mortality. Tomsk, Russia: Ivan Fedorov; 2012. (in Russian).
- Utkin SI. Alcohol use disorders. In: Ivanets NN, Vinnikova MA. (eds.) *Narcology. National manual*. Moscow: Geotar-Media; 2024, pp. 260-276. (in Russian).
- Jargin SV. Back to the topic: high cardiovascular mortality in Russia. *J Epidemiol Community Health* 2021;75:311.
- Razvodovsky YE. Consumption of non-commercial alcohol among alcohol-dependent patients. *Psychiatry J* 2013;2013: 691050.
- Neufeld M, Rehm J. Effectiveness of policy changes to reduce harm from unrecorded alcohol in Russia between 2005 and now. *Int J Drug Policy* 2018;51:1-9.
- Nuzhnyi VP. Toxicological characteristic of ethyl alcohol, alcoholic beverages and of admixtures to them. *Voprosy Narkologii* 1995;3:65-74.
- Nuzhnyi VP, Kharchenko VI, Akopian AS. Alcohol abuse in Russia is an essential risk factor of cardiovascular diseases development and high population mortality (review). *Ter Arkh* 1998;70:57-64.
- Savchuk SA, Nuzhnyi VP, Rozhanets VV. Chemistry and toxicology of ethyl alcohol and beverages on its basis: chromatographic analysis of alcoholic beverages. Moscow: urss.ru; 2016. (in Russian).
- Khaltourina D, Korotayev A. Effects of specific alcohol control policy measures on alcohol-related mortality in Russia from 1998 to 2013. *Alcohol Alcohol* 2015;50:588-601.
- Neufeld M, Lachenmeier DW, Walch SG, Rehm J. The internet trade of counterfeit spirits in Russia - an emerging problem undermining alcohol, public health and youth protection policies? *J Studies Alcohol Drugs* 2017;6:520.
- Ryan M. Alcoholism and rising mortality in the Russian Federation. *BMJ* 1995;310:646-8.
- WHO. Russian Federation key indicators. *Global Information System on Alcohol and Health (GISAH)*, Geneva: World Health Organization; 2011.
- Pelipas VE, Miroshnichenko LD. Problems of the alcohol policy. In: Ivanets NN, Vinnikova MA (editors), *Alcoholism*. Moscow: MIA; 2011. pp. 817-851. (in Russian).
- Jargin SV. Cardiovascular mortality in Russia: a comment. *Cardiovasc Diagn Ther* 2017;7:E13-4.
- Davydov MI, Zaridze D G, Lazarev AF, et al. Analysis of mortality in Russian population. *Vestn Ross Akad Med Nauk* 2007;7:17-27.
- Ostapenko YN, Brusin KM, Zobnin YV, et al. Acute cholestatic liver injury caused by polyhexamethyleneguanidine hydrochloride admixed to ethyl alcohol. *Clin Toxicol (Phila)* 2011;49:471-7.
- Luzhnikov EA. *Medical Toxicology*. Moscow, Geotar-Media; 2014. (in Russian).
- Khaltourina D, Korotayev A. Alcohol control policies and alcohol-related mortality in Russia: reply to Razvodovsky and Nemtsov. *Alcohol Alcohol* 2016;51:628-9.
- Nuzhnyi VP, Rozhanets VV, Savchuk SA. Chemistry and toxicology of ethyl alcohol and beverages on its basis. Moscow: Librekomp; 2010. (in Russian).
- Bonitenko Elu, Sentsov VG, Grebeniuk AN. Clinic, diagnostics, treatment and forensic-medical examination of intoxication by alcohol and its surrogates. St. Petersburg; Elbi; 2013. (in Russian).
- Wiśniewska P, Śliwińska M, Dymerski T, et al. Application of gas chromatography to analysis of spirit-based alcoholic beverages. *Crit Rev Anal Chem* 2015;45:201-25.
- Linskens HF, Jackson JF, Conte LS, et al. *Wine analysis*. Berlin: Springer; 1988.
- Bigão VLCP, da Costa BRB, Gomes NC, et al. From inspection to analysis: A combined approach to identifying counterfeit whiskeys using HS-GC-FID and bottle integrity. *Forensic Sci Int* 2024;357:111977.
- Wunder C, Pogoda W, Paulke A, Toennes SW. Assay of ethanol and congener alcohols in serum and beverages by headspace gas chromatography/mass spectrometry. *MethodsX* 2021;8:101563.
- Zobnin YuV, Vygovsky EL, Degtyareva MA, et al. Mass poisoning with methanol in Irkutsk in December, 2016. *Baikal Medical Journal* 2017;3:29-36.
- Gil A, Polikina O, Koroleva N, McKee M, et al. Availability and characteristics of nonbeverage alcohols sold in 17 Russian cities in 2007. *Alcohol Clin Exp Res* 2009;33:79-85.
- Monakhova YB, Kuballa T, Leitz J, et al. Determination of diethyl phthalate and polyhexamethylene guanidine in surrogate alcohol from Russia. *Int J Anal Chem* 2011:704795.
- Perlman FJ. Drinking in transition: trends in alcohol consumption in Russia 1994-2004. *BMC Public Health* 2010;10:691.
- Radaev V. Impact of a new alcohol policy on homemade alcohol consumption and sales in Russia. *Alcohol Alcohol* 2015;50:365-72.
- Uglov FG. *Suicides*. Newspaper "Vozrozhdenie", Suppl. Saint Petersburg; 1995. (in Russian).
- Jargin SV. *Selected Aspects of Healthcare in Russia*. Newcastle upon Tyne: Cambridge Scholars Publishing; 2024.
- Jargin SV. Letter from Russia: minimal price for vodka established in Russia from 1 January 2010. *Alcohol & Alcoholism* 2010;45:586-8.
- Jargin SV. Why fortified wines have disappeared? *Wine-making and viticulture* 2014;3:19. (in Russian). Available at: <https://www.researchgate.net/publication/273145833>