

**FOOD PRODUCT SAFETY****Saidova Dildora Olimovna**

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**Abstract:** This article examines the dangers of consuming energy drinks. Special attention is given to high caffeine content, excess sugar and their health effects. Cardiovascular risks and possible metabolic and electrolyte imbalances are also discussed. Aspects of the effects of energy drinks on mental health and sleep are also being analyzed. The article provides guidelines for conscious consumption and emphasizes the importance of education and public awareness of potential risks to ensure consumer health safety. The purpose of energy drink risk studies is to identify and analyze the risks and effects these drinks may have on human health. The study aimed to examine concerns such as high levels of caffeine, excess sugar, cardiovascular effects, possible metabolic and electrolyte imbalances, mental health and sleep effects. The main goal is to provide evidence-based information to encourage the conscious consumption of energy drinks and to increase public awareness of the potential risks to the health and well-being of consumers.

**Key words:** Energy drinks, risks, health, caffeine, sugar, side effects, clinical research, mental health, epidemiology, safe consumption

**Enter:** Since ancient times, people around the world have been aware of natural psycho-stimulants derived from plant cultures. The energy expenditure of humans during those times was so great that the average life expectancy was: in the Stone and Bronze Ages - 18-20 years; in Ancient Egypt - up to 25 years; in Ancient Greece and Ancient Rome - up to 30 years. This was mainly due to the very high physical workloads, which led to rapid biological aging of the body. In the quest for a source of energy, primarily food, ancient humans noticed that plant and animal-derived foods produced different psycho-physiological effects.

In the ancient civilization of the Incas, priests used coca leaves to enter a trance during religious rituals. Later, among the inhabitants of highland regions, it became common to chew coca leaves to improve well-being, relieve fatigue, and reduce hunger. To restore their strength, Brazilian indigenous people, as well as the Tupi and Guarani tribes, used a drink made from guarana fruits. In West Africa, people consumed kola nuts, while in Brazil, Argentina, Uruguay, and Paraguay, a drink called mate (or maté) was made from the leaves of the Paraguay holly. In Ethiopia and ancient India, a drink made from coffee beans was popular, and in ancient China

and India, tea made from tea leaves was consumed. In Mongolia and Siberia, plants such as ginseng, eleutherococcus, aralia, and other stimulating plants were used.

**Research section:** Psycho-stimulants are primarily water-soluble, which is why the most common method of consumption is through beverages (infusions, tinctures). The emergence of the first tonic drinks can be traced back to the early 1960s, linked to the release in Japan by Taisho Pharmaceuticals of a drink called "Lipovitan D," with taurine as its main component. It was developed to help workers stay awake and alert during night shifts. In 1982, Austrian Dietrich Mateschitz tried local tonic beverages at the Mandarin hotel bar in Hong Kong, which inspired him to promote something similar back home. He found that it alleviated fatigue, boosted energy, and enhanced mood. The entrepreneur decided to introduce this wonder drink to Europe, starting with Austria.

In 1984, he founded Red Bull GmbH—the first company for the industrial production of a tonic beverage—and three years later began selling Red Bull Energy Drink in Austria. To establish the product more firmly, the entrepreneur slightly modified the drink's formula and packaged it in aluminum cans (unlike the Asian practice of selling drinks in small glass bottles). This is how Red Bull was born—the first of its kind among tonic beverages in the world. After its launch in Austria, the product began to gain popularity in nearby European countries. In 1992, the new tonic drink was first exported to Hungary. Today, Herr Mateschitz sells over 1 billion cans annually in 70 countries worldwide, including Russia. However, in some countries, such as Norway, Denmark, and France, the sale of Red Bull tonic drinks in grocery stores is prohibited, as they are considered medicinal products due to their high caffeine content. Nevertheless, in pharmacies in these countries, Red Bull is sold without restrictions. The product was so successful that soon dozens of drinks with similar properties appeared on the market. The giants of the beverage industry, Coca-Cola and Pepsi-Cola, also got involved, launching "Burn" and "Adrenaline Rush," respectively. Drinks from a variety of brands differ in taste but contain a similar set of ingredients, and their advertising campaigns emphasize the same effects. Specifically, tonic beverages promise to help alleviate fatigue and drowsiness, provide energy, and boost vitality, enabling consumers to apply this newfound energy for work, study, and sports activities. Tonic beverages enjoy significant popularity worldwide. However, they did not gain immediate traction in Russia. The invasion of tonic drinks into the Russian market began in the last decade. Major transnational companies and domestic producers joined the competition for consumers. According to experts, the sales volume of tonic beverages in the domestic market is

about 6 million liters. One of the features of the Russian tonic beverage market is the production of drinks with a specific alcohol content and with sugar substitutes.

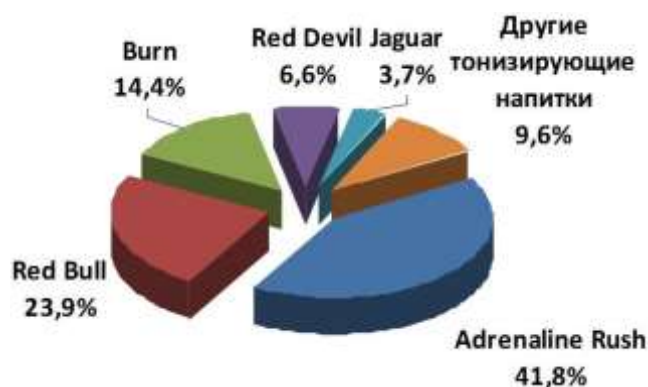
The European market for tonic beverages is much more developed than the Russian one.

However, attitudes towards energy drinks vary across countries. For instance, in Germany, the production of these beverages is prohibited, and therefore there are no sales. Until recently, tonic drinks were completely banned in France. Foreign specialists express some concern about these drinks due to the presence of food ingredients whose properties are not yet fully understood.

Domestic scientists also have varied opinions on such beverages: some see nothing harmful in their composition and consider them a good alternative to alcohol and drugs, while others express concern over the levels of taurine and caffeine they contain. Nonetheless, all experts agree that tonic beverages undoubtedly have a stimulating effect, but serious research has yet to be conducted in our country.

In 2021, the Russian market for non-alcoholic beverages grew by 17% in monetary terms, reaching \$8.9 billion, according to a report by AcNielsen Russia. In physical terms, production volume increased by 6.9%, totaling 9.365 billion liters. According to Euromonitor, Coca-Cola holds a leading position in Russia, with a 23.3% share of the non-alcoholic beverage market. For the company, Russia is an important market, accounting for over 6% of global sales. However, Red Bull is well aware of its competitors' standings. In the tonic beverage market, according to Business Analytics, Red Bull has a 23.9% share in Moscow and St. Petersburg. It is only surpassed by Pepsi with its drink Adrenaline Rush, which has a 41.8% share. Coca-Cola, with its product Burn, trails behind at 14.4%.

Other tonic drinks



**Figure 1.****Market Share of Producers in the Tonic Beverage Market for 2021**

In 2023, Adrenaline Rush accounted for 41.8% of the market in the two capitals, while Red Bull received 23.9%. The third place went to Burn from Coca-Cola, with 14.4%. Red Devil held only the fourth position with a result of 6.6%, although the previous year it had 2.6% more. Another tonic product, Happiland's Jaguar, lost market share more slowly, decreasing from 3.7% in 2021 to 3% in 2022.

In Russia, tonic beverages continue to be primarily consumed by young people, with demand also coming from drivers and athletes. Additionally, these drinks are gaining more fans among adults leading a less active lifestyle. According to preliminary estimates from Business Analytics, in 2024, the sales volume of non-alcoholic tonic and sports drinks amounted to only \$1.8 million. This means that an average Russian aged 18-34 consumes about two cans of energy drink per year. However, the growth rate is impressive at 40%. According to Nielsen, the highest number of people who prefer tonic drinks live in Moscow and St. Petersburg, with these cities accounting for 65% of total energy drink consumption in physical terms and 74% in monetary terms. In the last year and a half to two years, the market has seen the emergence of "budget energy drinks." An example is the emergence of "Bullit" from Red Bull in Russia in 2023—an energy drink that has a similar formulation but is cheaper than Red Bull itself. According to Alexander Yermenko, Managing Director of BrandLab Research, this was a necessary measure for the company: having entered the Russian market first among major foreign players, it clearly lags behind its followers. The market share of the Red Bull brand in the two capitals decreased from 24.2% to 23.9% in 2023, while its main competitors significantly strengthened their positions. Yermenko explains that Red Bull contains an expensive ingredient that is absent in other energy drinks, preventing the manufacturer from easily lowering the price to match that of its main competitor, Adrenaline Rush. Meanwhile, it is precisely this price factor that has allowed the latter to surpass the Austrian company: through the efforts of PepsiCo, energizing drinks have become accessible not only to premium clientele. Currently, tonic beverages like "Adrenaline RUSH," "Adrenaline Rush Body Power," "Burn," "Red Bull," and "Red Bull Sugar-Free" are particularly popular and widely available on supermarket shelves, while "Bullit" and "Jaguar" enjoy less popularity. Only one manufacturer, Jaguar, indicates compliance with GOST standards (GOST 28188-89 "Non-Alcoholic Beverages"). "Adrenaline RUSH," "Adrenaline Rush Body Power," and "Burn" are produced according to technical specifications developed for these products. Meanwhile, "Red Bull" and

"Bullit" do not provide any information about the regulatory documentation they comply with, raising doubts about their quality, despite the fact that Red Bull was the first tonic drink to be sold in an aluminum can. In December 2023, the Legislative Assembly of the Krasnodar Territory introduced Bill No. 127063-5 "On Restrictions on the Retail Sale and Consumption of Tonic Non-Alcoholic and Low-Alcohol Beverages." This bill establishes restrictions on the retail sale and consumption of specially designated non-alcoholic and low-alcohol tonic beverages in order to protect public morality and health, particularly that of minors. The draft federal law establishes restrictions on the retail sale and consumption of specially designated non-alcoholic and low-alcohol tonic beverages, including energy drinks, to protect public morality and health, particularly that of minors. Four articles have been developed, detailing the scope of application, restrictions on retail sales, consumption limitations, and the law's effective date. The proposed restrictions aim to limit the sale of tonic non-alcoholic and low-alcohol beverages, prohibiting their distribution in the following places:

1. In children's, educational, and medical organizations.
2. On all types of public transport (urban and suburban).
3. In cultural organizations (except for food service establishments located within them, including those without legal entity status), as well as in sports and wellness facilities.
4. At cultural and mass events involving adolescents and youth (such as discos, nightclubs, and other venues).
5. For self-produced beverages in food service organizations.
6. To minors.

However, these restrictions will not apply to the sale and consumption of other non-alcoholic beverages, including those based on tea and coffee extracts. Control over these regulations will be assigned to local government authorities, which will determine, in accordance with the provisions of this draft law and the regulations established by the constituent entity of the Russian Federation, the locations of trade and food service organizations where the retail sale and consumption of tonic low-alcohol beverages is prohibited within municipal areas. In the explanatory note to the draft federal law "On Restrictions on the Retail Sale and Consumption of Tonic Non-Alcoholic and Low-Alcohol Beverages," it is indicated that: "The consumption of tonic beverages requires a certain level of awareness from those who consume them. The primary consumers of this category of drinks are underage boys and girls, who, due to a lack of adequate life experience, are unable to properly perceive the advertising of tonic beverages in the



media, outdoor advertising, and numerous public promotional campaigns. In recent years, a large number of tonic beverages, including non-alcoholic and low-alcohol options, have appeared in the consumer market of the Russian Federation. The main tonic components of these beverages include synthetic caffeine, natural biologically active substances from approved medicinal plants or their extracts that have a tonic effect, as well as vitamins (C, PP, B2, B5, B6, B12)."

Considering that the caffeine content in tonic beverages usually reaches the upper permissible daily intake level (from 150 to 320 mg/L), with the acceptable daily consumption set at 150 mg, and that tonic drinks are packaged in volumes ranging from 250 ml to 330 ml, it is possible for a young person to consume more than one package of a tonic drink in a day. This could negatively impact the health of children, adolescents, pregnant and breastfeeding women, and individuals suffering from chronic diseases of the nervous and cardiovascular systems, hypertension, and other conditions. The consumption of low-alcohol tonic beverages affects the nature of alcohol intoxication, reducing its severity, which may lead to an inadequate assessment of one's own condition, contribute to the loss of control over alcohol intake, and encourage repeated alcohol consumption. (3, p.41) The average age at which adolescents begin consuming alcoholic beverages is 12-13 years. Over 70 percent of individuals in the age group of 11-24 consume alcohol. Notably, girls consume alcohol at rates comparable to boys. Currently, there is no federal law at the national level regulating the production and circulation of tonic beverages. By the order of the Federal Agency for Technical Regulation and Metrology dated December 27, 2007, No. 476-st "On the Approval of the National Standard," the national standard of the Russian Federation GOST R 52844-2007 "Non-Alcoholic Tonic Beverages. General Technical Conditions" was approved, with an effective date of January 1, 2009, and the right to early application. Additionally, by the order of the Federal Agency for Technical Regulation and Metrology dated December 27, 2007, No. 477-st "On the Approval of the National Standard," the national standard of the Russian Federation GOST R 52845-2007 "Low-Alcohol Tonic Beverages" was also approved. The general technical conditions, effective from January 1, 2009, with the right to early application, regulate the overall technical requirements (characteristics, requirements for raw materials and materials, packaging and labeling), as well as the acceptance rules, transportation, storage, and control methods for non-alcoholic and low-alcohol tonic beverages. According to these regulatory documents, non-alcoholic tonic beverages are defined as special-purpose non-alcoholic drinks containing caffeine and/or other tonic components in sufficient quantities to provide a tonic effect on the human body. Non-alcoholic tonic beverages must have a mass fraction of dry substances of at least 10%. onic components are defined as

individual chemical substances that have a stimulating effect on the human body (such as caffeine, taurine, L-carnitine, glucuronolactone, and vitamins C, B group, and some vitamin-like substances). Tonic ingredients refer to the components of non-alcoholic tonic beverages, whether simple or complex, that contain these tonic components. The provisions of the mentioned GOST standards suggest that tonic beverages pose a health risk. Additionally, the GOSTs highlight the necessity for manufacturers to provide consumers with recommendations on limiting daily consumption (in packaging units) in accordance with the content of biologically active substances in consumer packaging and the upper permissible levels of daily intake. Tonic beverages have specific characteristics compared to other drinks, regardless of whether they contain ethanol, as they include special components: tonic components and tonic ingredients. It should also be noted that, according to GOST R 52845-2007, the volumetric share of ethanol in low-alcohol tonic beverages should be between 1.2% and 9.0%. If the ethanol content exceeds 1.5% of the finished product's volume, the beverages are subject to the restrictions established by Part 2 of Article 16 of Federal Law No. 171-FZ "On State Regulation of the Production and Circulation of Ethyl Alcohol, Alcoholic Beverages, and Alcohol-Containing Products," dated November 22, 1995. If the ethanol content is less than 1.5%, low-alcohol tonic beverages fall outside the regulated legal framework. (3, p.42)

The effects of the combinations of components in tonic beverages are not well studied, and their psychophysiological impacts on the body remain unclear. In this case, government oversight of the production, sale, and consumption of these tonic drinks is necessary. According to the Russian Federation law "On Consumer Rights Protection," products must be safe for the life and health of consumers.

#### **References:**

1. ГОСТ Р 52844-2007 Напитки безалкогольные тонизирующие. ОТУ. – Введ. 2009.01.01. – М.: ФГУП «Стандартинформ», 2008. – С. 8.
2. ГОСТ Р 52845-2007 Напитки слабоалкогольные тонизирующие. ОТУ. – Введ. 2009.01.01. – М.: ФГУП «Стандартинформ», 2008. – С. 8.
3. Официоз // Спиртные напитки и технологии ALCOTECH. – 2008. – № 4 (декабрь) – С.31-42.
4. <http://moikompas.ru/compas/energydrink> - сайт коллективной базы знаний «Мой компас» / Все об энергетических напитках
5. <http://www.acnielsen.ru> - сайт исследовательской компании «AcNielsen Россия»

6. <http://www.businessanalytica.ru> – сайт исследовательской компании «Бизнес Аналитика»
7. <http://www.euromonitor.com> - сайт исследовательской компании «Euromonitor».
8. Miroyubova S. V. Semen V. Ya. Legal regulation of the fight against counterfeit goods in the Russian Federation. Archivio Penale 2013.
8. Cesareo L. Counterfeiting and Piracy. A Comprehensive Literature Review. University of Pennsylvania. 2016.
9. <http://www.researchgate.net/publication/284173806>
10. Carl-Henrik Hagelberg. Counterfeiting – The new economic phenomenon. An investigation of anti-counterfeiting measures and strategies from an organizational insight. 2011. . <http://www.ehl.lu.se>
11. Sassenfeld H.M. Counterfeit Prevention Strategies in the Military Supply Chain: Increasing Reliability at a Higher Price. The University of Texas at El Paso, 2013.
12. Counting the cost of counterfeiting. A Netnames Report. October 2015 \ 22.