

## DISINFECTION OF VEHICLES AT THE BULGARIAN BORDER CHECKPOINTS FOR THE YEARS 2021-2022 - POSITIVES AND IMPERFECTIONS. LITERATURE REVIEW AND CRITICAL ANALYSIS

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**Abstract:** This review was prepared to assess the appropriateness of disinfecting the of motor vehicles passing through the border control posts (BCPs) and Control Points (CPs) of the Republic of Bulgaria for the time period 2021-2022.

We reviewed available legal and scientific sources, and performed an analysis on the additional information provided by the Bulgarian Food Safety Agency and the epizootic situation in the world, Europe, and the Mediterranean basin.

Preventive disinfection as a biosecurity measure is of paramount importance to the Republic of Bulgaria due to the country's geographical position as an external border of the European Union.

Taking into consideration that pursuant to Article 4 Article 43, Article 47(1), and Annex I of Regulation (EU) 2017/625, the BFSA, as the single competent authority for performing official controls and other official activities along the entire agri-food chain in the Republic of Bulgaria, organizes and carries out official controls and other official activities upon the entry into EU territory of animals and goods of animal origin, originating from third countries, and that pursuant to Article 190 of the Law on Veterinary Activity, upon the declaration of an epizootic situation, motor vehicles entering the country are subject to preventive disinfection at border control posts.

Having the review of appropriateness of motor vehicles disinfection at BCPs of the Republic of Bulgaria for years 2021-2022 it could be said that the European Transport Corridor No. 10 is a primary high-risk route for livestock and agricultural products' entry and transit, while Corridors 4, 8, and 9 present secondary or context-specific risks. It could be concluded that land border BCPs handle for 2021 – 2022 the vast majority of official veterinary and phytosanitary consignments passing through Bulgaria, with BCP Kapitan Andreevo acting as the single critical gateway for plant and food cargo entering the EU.

Given the high volume of transit haulage through active disease zones and the threat of intentional or unintentional contamination, maintaining mandatory motor vehicle chassis and wheel disinfection at land borders remains an essential biosecurity safeguard for Bulgarian and EU agricultural security.

**Keywords:** appropriateness of disinfection, live animals, animal products, motor vehicles, border crossings points, bioterrorism.

### 1. INTRODUCTION

This review was prepared regarding the appropriateness of disinfecting the motor vehicles crossing the border control posts and control points of the Republic of Bulgaria, based on the epizootic situation in the world, Europe, and the Mediterranean basin, and the possibility of discontinuing prophylactic disinfection at the country's border control points (BCPs) and control points (CPs) for the time period 2021-2022. For this purpose, a review of available legal and scientific sources was carried out, and an analysis was performed on the additional information provided by the Bulgarian Food Safety Agency (BFSA) and the epizootic situation in the world, Europe, and the Mediterranean basin, as well as the possibility of discontinuing prophylactic disinfection at the country's BCPs.

### 2. MATERIAL AND METHODS

In connection with the need to assess the appropriateness of disinfecting the motor vehicles passing through the border crossings of the Republic of Bulgaria, we prepared a review on the appropriateness of disinfecting the motor vehicles passing through the border crossings of the Republic of Bulgaria for the time period 2021-2022. For this purpose, we reviewed the available legal and scientific sources, analyzed the risks associated with the preventive disinfection at the country BCPs, as well as the epizootic situation in the world, Europe and the Mediterranean basin.

### 3. RESULTS

Preventive disinfection as a biosecurity measure is of paramount importance to the Republic of Bulgaria due to the country's geographical position as an external border of the European Union.

Taking into consideration that pursuant to Article 4, Article 43, Article 47(1), and Annex I of Regulation (EU) 2017/625, the BFSA, as the single competent authority for performing official controls and other official

activities along the entire agrifood chain in the Republic of Bulgaria, organizes and carries out official controls and other official activities upon the entry into EU territory of animals and goods originating from third countries; and that pursuant to Article 190 of the Law on Veterinary Activity, upon the declaration of an epizootic situation, motor vehicles entering the country are subject to preventive disinfection at border control posts and control points. Based on the collected and analyzed information, the following recommendations could be formulating:

1. To evaluate the appropriateness of introducing or terminating preventive disinfection of the motor vehicles crossing the border control posts of the Republic of Bulgaria, the following must be taken into account the following:

a) Information related to the spread of contagious animal diseases and plant pests in countries or regions thereof where restrictive measures have been declared regarding animal diseases listed in Annex II to Regulation (EU) 2016/429 and plant pests listed in Delegated Regulation (EU) 2019/1702, Commission Implementing Regulation (EU) 2018/2019, Commission Implementing Regulation (EU) 2019/2072, as well as those listed in EPPO Lists 1 and 2;

b) The category of transported consignments, as well as the sanitary status of the countries or regions thereof through which transport corridors pass. This applies particularly to BCPs located on our border with the Republic of Turkey, taking into consideration that an improvement in the epizootic situation in European Turkey regarding certain particularly dangerous infectious animal diseases has been observed in recent years;

c) Identification of "high-risk" and potentially dangerous biological agents based on epidemiological, economic, and sociological criteria that could potentially be used as biological weapons when military actions are being conducted near Bulgarian borders.

2. Considering the impact of the factors under point 2, both individually and collectively, the BFSA may temporarily suspend the disinfection of motor vehicles. In the event of a deteriorating epizootic situation, preventive disinfection may be resumed by order of the Minister of Agriculture and Food.

3. It is also necessary to review the option provided under Article 5(4)(a) of Commission Implementing Regulation (EU) 2019/1014 regarding the performance of temporal separation and cross-contamination risk assessments at border control posts. This assessment must demonstrate how cross-contamination can be avoided and how the measures specified in the risk assessment are implemented to prevent such cross-contamination.

Furthermore, it must ensure temporal separation between the processing of animal consignments intended for export from the Union (or moved from one of the territories listed in Annex I to Regulation (EU) 2017/625 to another territory listed in Annex I to Regulation (EU) 2017/625 after passing through the territory of a third country) and any other animal consignments introduced into the Union. During the period of temporal separation, facilities used for handling animal consignments shall be cleaned, disinfected, and rested.

#### 4. DISCUSSION

OIE Terrestrial Animal Health Code of the World Organization for Animal Health (WOAH, former OIE) provides standards for improving animal health and veterinary public health worldwide.

With regard to disinfection of vehicles at borders, upon the arrival of a vehicle carrying an animal or animals infected with any of the diseases listed in there at the border post, it shall be considered infected (OIE Terrestrial Animal Health Code, Article 5.7.5).

International Plant Protection Convention (IPPC) is an intergovernmental treaty aimed at protecting the world's plant resources from the spread and introduction of pests and promoting safe trade. The Convention establishes international standards for phytosanitary measures as its main tool for achieving its objectives, making it the only global standard-setting organization for plant health.

Regulation (EU) 2017/625 establishes the minimum requirements to be fulfilled by border control posts in order to be designated as such. Article 43 of the Regulation sets out the requirements for the performance of official controls on animals and goods entering the Union. Official controls on animals and goods entering the Union should be organized on a risk basis. Official controls are carried out at the approved, in accordance with the requirements of Regulation (EU) 2019/1014, BCPs and CPs on the territory of the Republic of Bulgaria, with animals and goods referred to in Article 47(1) of Regulation (EU) 2017/625 subject to mandatory border controls.

Article 5 and 7, along with Annex II, are used to frame disease prevention criteria in Regulation (EU) 2016/429 that provides that the disease prevention and control rules specific to each disease shall apply to the diseases referred to in that Article and in Annex II to that Regulation. Furthermore, Article 5, par. 3 of that Regulation lays down certain criteria to be taken into account when amending the list in that Annex, and the assessment parameters to be used to determine whether a disease meets the conditions for inclusion in the list under that Article are set out in Article 7 of that Regulation.

Implementing Regulation (EU) 2018/2019 introduces in Annex I a provisional list of high-risk plants, plant products or other objects within the meaning of Article 42 of Regulation (EU) 2016/2031 and a list of plants for the introduction into the Union of which phytosanitary certificates are not required within the meaning of

Article 73 of that Regulation. According to it, the plants, plant products and other objects listed in Annex I shall be considered as high-risk plants, plant products or other objects within the meaning of Article 42(1) of Regulation (EU) 2016/2031 and their introduction into the Union territory shall be prohibited until a risk assessment has been carried out.

Regulation (EC) No 1/2005 on the protection of animals during transport requires carriers to keep records of disinfections carried out on their means of transport.

According to Law on Veterinary Activity the border inspection veterinary control also covers the disinfection and disinfestation of vehicles entering the country (Article 188). In the event of a declared epizootic situation, vehicles entering the country shall be subject to preventive disinfection and disinfestation at the border checkpoint (BCP). The disinfection of vehicles is carried out according to a scheme approved by the Executive Director of the BFSA (Art. 190).

WOAH (OIE) Terrestrial Animal Health Code: Article 5.7.5 regarding vehicle infection classification upon border arrival.

International plant health standards under the IPPC/SPS framework inform quarantine measures in global trade (Afriansyah and Ardiastuti, 2017). The ISPM 15 “Regulation of wood packaging material in international trade” is a standards of the International Plant Protection Convention which details the requirements for heat Treatment (maintaining a minimum core wood temperature of 56°C for 30 continuous minutes), dielectric heating (reaching 60°C for 1 minute throughout the wood profile using microwaves) and fumigation (treatment with methyl bromide or sulfuryl fluoride). The IPPC guide for the proper marking and inspection of treated materials

The Guide to regulation of wood packaging material (ISPM-043, 2023) improves understanding of ISPM 15 and manages pest risks linked to wood packaging material in international trade.

#### Risk Characteristics

To evaluate the probability of the spread of animal diseases and plant pests passing through border control posts and control posts, the following groups of potential risk factors (indicators) have been identified that could influence the spread of animal diseases and plant pests, namely:

I. Indicators related to the spread of contagious animal diseases and plant pests in countries or regions thereof where restrictive measures have been declared in connection with the animal diseases listed in Annex II to Regulation (EU) 2016/429 and the plant pests from the lists of Delegated Regulation (EU) 2019/1702, Commission Implementing Regulation (EU) 2018/2019 and Commission Implementing Regulation (EU) 2019/2072.

II. Indicators related to the category of transported consignments, as well as the sanitary status of the countries or regions thereof through which the transport corridors pass.

III. Indicators related to the identification of "high-risk" and potentially dangerous biological agents based on epidemiological, economic, and sociological criteria that could potentially be used as biological weapons.

Introduction of an animal viral disease, especially a notifiable disease, into an importing country or region free from the disease may lead to serious epidemiological consequences and economic losses. Trade in live animals is historically considered one of the most important risk pathways (Anna Gierak A., Smietanka K., 2021).

Contagious animal diseases negatively affect the productivity of livestock systems by reducing the quantity and quality of products derived from food producing animals. In this way, they not only compromise producers' livelihoods but can also lead to serious socio-economic consequences for the broader population. Furthermore, trade restrictions that frequently accompany the reporting of contagious animal diseases can add a significant economic burden. Control measures, such as mass depopulation, will also increase costs from both an economic and social perspective (FAO Livestock Policy Discussion Paper No. 9). Additionally, zoonotic diseases must be evaluated by their impact on public health (Beltran-Alcrudo, D., Falco, J.R., Raizman, E. et al., 2019). As examples of economic impact, the 1997 Classical Swine Fever epidemic in the Netherlands resulted in the destruction of 10 million pigs and an estimated cost of \$2.3 billion (Elber A.R., 1999). That same year, Foot-and-Mouth Disease (FMD) led to the destruction of Taiwan's swine industry (FAO, 2002). An even greater economic impact was observed during the 2001 FMD outbreak in the United Kingdom, which resulted in costs exceeding £3.1 billion (\$4.4 billion) for the agricultural and food chain sectors alone (Knight-Jones T.J., 2013). Also an example of the impact on livelihoods is the African Swine Fever (ASF) epidemic in Bulgaria. Following the ASF epizootic in our country in 2019, a reduction in the number of raised pigs compared to previous years was observed in almost all regions of the country, with the exception of the South-Central region. The region's most severely affected by ASF were North-Central and North-East one. A significant decline was recorded in the number of small family farms with 1–2 animals, which were reduced by 63.5%, and breeding sows in them by 40%. The number of large pig complexes with 200 or more breeding females decreased by 13.3% on an annual basis, with 27.3% fewer animals raised in them (MAF, 2019–2020).

According to the FAO “Guidelines for humane handling, transport and slaughter of livestock” (Chambers, P.G., Grandin, T., Heinz, G., Srisuvan, T., 2001), transport of animals is undoubtedly the most stressful and injurious stage in the chain of operations between farm and slaughterhouse and contributes significantly to poor animal

welfare and loss of production. Stress can have negative effects on the immune system, which may result in increased susceptibility to infections and increased infectivity (Manteca, X., 2008). Long-distance transportation can increase the fecal shedding of disease pathogens. Barham et al. (2002) established that the mean prevalence of *Salmonella* in feces and on cattle hides was 18% and 6%, respectively, before transportation. After animals were loaded onto the vehicle and transported by truck for 30 to 40 minutes, *Salmonella* levels detected in feces increased from 18% to 46%, and the number of animals with contaminated hides escalated from 6% to 89% upon arrival at the slaughterhouse. Barington et al. (2002) estimated that thorough cleaning of transport vehicles with disinfectants eliminates more than 95% of pathogens. In practice, however, a 2003 survey of livestock transporters revealed that only 16% of 132 respondents indicated they washed their vehicles between transported animal consignments, and fewer than 5% used disinfectants as a component of the cleaning process (Spire, M. 2004).

The WOAHP maintains a list of Transboundary Animal Diseases (available online: [www.oie.int/en/what-we-do/animal-health-and-welfare/animal-diseases/](http://www.oie.int/en/what-we-do/animal-health-and-welfare/animal-diseases/) accessed on 16 May 2021). This list contains highly contagious or transmissible epidemic diseases that have the potential to spread rapidly worldwide, cause significant socio-economic losses, and lead to adverse public health outcomes.

Allepuz, A., & Casal, J. (2021), by analyzing global distribution of the transboundary animal diseases, found out that they remain a serious threat to global food supplies and carry significant socio-economic consequences, along with the potential for severe public health implications for both humans and animals. This will continue until a better understanding of the diseases and their causative agents is gained, and until better available control measures and improved strategies for their application that rely on public involvement at the local level are implemented.

Many reportable animal diseases and plant pests are highly contagious and spread efficiently, as demonstrated by recent outbreaks of FMD, CSF, HPAI, ND, and Bluetongue (Elbers A.R., Stegeman J.A., Moser H., Ekker H.M., Smak J.A., Pluimers F.H., 1999). Furthermore, perpetrators can safely handle most of these pathogens or pests without personal risk of infection. Because trade sanctions are imposed following outbreaks for several of these pathogens or pests, even a minor outbreak can carry massive economic consequences. A prime example of a small-scale outbreak that triggered extensive countermeasures was the 2008 anthrax outbreak in a cattle herd in southern Sweden (Knutsson R., Elvander M., Olsson Engvall E., Eliasson K., Sternberg Lewerin S., 2012). Although only a single farm with one herd was infected, it resulted in one of the most expensive decontamination operations ever undertaken in Sweden.

Epizootiological analysis of the dangerous infectious disease outbreaks occurring in Bulgaria over the last 30–40 years demonstrates that over 90% of the epizootic outbreaks are located in settlements directly adjacent to the border with Turkey, where infection penetrated via infected animals, presenting a high level of risk. The probability of introducing the causative agents of these diseases via transported live animals in the incubation stage is very low due to the ban on live animal imports into EU Member States from Turkey (Georgiev G. et al, 2018).

As it was indicated in the DG Health and Food Safety's report on welfare of animals exported by road (2020), one of the pathways for viral transmission into the territory of the Republic of Bulgaria is via livestock trucks carrying breeding cattle, sheep, and goats from Europe to Turkey. They typically offload the animals at farms within Turkish territory, after which they should be cleaned and disinfected on site. Upon returning to Bulgaria, these vehicles are subject to inspection at BIPs. If they have not been cleaned and disinfected, they must either be turned back or undergo cleaning and disinfection in Bulgaria for a fee. Trucks transporting animals to slaughterhouses are subject to the same controls.

Risk Assessment Center on Food Chain (2022) consider that if appropriate control measures regarding vehicle cleanliness and disinfection are executed in accordance with prescribed requirements, the likelihood of introducing causative agents of exotic and particularly dangerous infectious animal diseases via transport vehicles is very low. Regarding the potential for infection transmission via products of animal origin, the probability is likewise low. The movement of meat and meat products from Europe (including Bulgaria) is directed toward Turkey, where prices are higher.

Since the beginning of 2022, 213 outbreaks have been declared on the territory of the Republic of Turkey, with the majority of them located in the Asian part of the country (WAHIS surveillance reports, 2022). It should be noted that at the end of 2016, the Eurasia Tunnel was opened, which is the shortest road for cars connecting the European and Asian parts of the country. The tunnel is 5.4 km long, allowing motor vehicles to reach from the Asian part to the European part of Turkey in an average of 15 minutes instead of two hours, as it was before its construction. This greatly facilitates the spread of animal diseases, especially during religious holidays in Turkey (RACFH, 2022).

Kostov I. et al. (2022) assessed cessation of disinfection for land transport vehicles at BCPs and BPs, and reported that one of the most critical components remains the analysis of commercial trade routes (corridors) utilized by land transport. These are:

1. European Transport Corridor No. 4: Dresden – Prague – Bratislava – Győr – Budapest – Arad – Craiova – Sofia – Plovdiv – BCP Kapitan Andreevo (BGKAN3) – Istanbul, with a branch line Sofia – Kulata – Thessaloniki connecting Central European countries with the Aegean Sea (Port of Thessaloniki). The section on Bulgarian territory (Vidin – Sofia – BCP "Kulata").
2. European Transport Corridor No. 8: Durrës – Tirana – Qafë Thanë / Kafasan – Skopje – Deve Bair – Gyueshevo – Sofia – Plovdiv – Burgas – (Varna) serves as the link between the Adriatic Sea and the countries of the Black Sea region, Russia, and Central Asian states, traversing Albania, North Macedonia, and Bulgaria.
3. European Transport Corridor No. 9: Helsinki – Saint Petersburg – Pskov – Vitebsk – Kyiv – Liubashivka – Chisinau – Bucharest – Ruse – Dimitrovgrad – Alexandroupolis provides a connection between Northeastern European states, through Romania and Bulgaria, to the Aegean Sea port of Alexandroupolis.
4. European Transport Corridor No. 10: Salzburg – Ljubljana – Zagreb – Belgrade – Niš – Skopje – Veles – Thessaloniki, with branches: Graz – Maribor – Zagreb; Budapest – Novi Sad – Belgrade; Niš – BCP Kalotina (BGKAL3) – Sofia – Dimitrovgrad – Svilengrad – BCP Kapitan Andreevo (BGKAN3) – Istanbul (along Corridor 4); Veles – Bitola – Florina – Via Egnatia to Igoumenitsa.

Another critical component of the risk assessment is the category of consignments transported, as well as the sanitary status of the countries or their respective regions through which these corridors pass.

The primary European transport corridor used for road haulage of consignments containing animals, plants, derived products, food, and feed introduced into or transiting through the territory of Bulgaria from third countries (predominantly the Western Balkans) is Corridor No. 10, whereas Corridors No. 4 and No. 8 are of lesser significance.

European Transport Corridors No. 9 and No. 4, along which consignments originating both from Member States and third countries (Russia, Ukraine, Belarus, Moldova, and Georgia) are transported, are primarily relevant from the standpoint of the sanitary status of the countries or regions through which they pass, as well as risks associated with military conflicts described above.

## 5. CONCLUSION

Having the review of appropriateness of disinfection of the motor vehicles in the Republic of Bulgaria for years 2021-2022 it could be said that the European Transport Corridor No. 10 is a primary high-risk route for livestock and agricultural product entry and transit, while Corridors 4, 8, and 9 present secondary or context-specific risks.

It could be concluded that land border BCPs handle for 2021 –2022 the vast majority of veterinary and phytosanitary consignments passing through Bulgaria, with Kapitan Andreevo acting as the single critical gateway for plant and food cargo entering the EU.

While natural biological events are more common, agricultural crops and livestock remain highly susceptible to bioterrorism due to the high contagiousness of pathogens (e.g., Anthrax, FMD, HPAI) and the significant trade disruption caused by even minor outbreaks.

Given the high volume of transit haulage through active disease zones and the threat of intentional or unintentional contamination, maintaining mandatory motor vehicle chassis and wheel disinfection at land borders remains an essential biosecurity safeguard for Bulgarian and EU agricultural security.

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