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Bioterrorism a Threat on Public Health and Food Safety

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Abstract: This article tackles a subject related to the field of public order and national safety, since it focuses on realities and perspective of the current security environment, from the perspective of the impact of bioterrorism on public health and order. With the beginning of this century, security has turned more and more into an extended concept and, at the same time into a security of synthesis, defined as a concept of complex integration, namely at a state, regional and global level, by the more and more powerful, evident and necessary multitude of interdependencies. The current world situation is extremely favorable to the spread of contagious diseases by means of agro-food products, taking into account the demographic explosion and the geopolitics of food in the last century. The set in of new diseases or reoccurrence of older ones, deemed eradicated, suggest that in the future we might face a recrudescence of infectious diseases of an epidemic or food nature, that is with possible bioterrorist or bio-security attacks.

Keywords: bioterrorism; security; food; health; weapon

1. Bioterrorism and Public Health

Health plays a central part in people's life and it should be supported by efficient measures and policies in the member states, at the level of the European Community (EC) and worldwide.

The member states have the main responsibility for the policy in the field of health and the delivery of medical assistance services to the European citizens. The role of EC is to reflect or double their activity. However, there are certain fields in which the member states cannot act efficiently in an independent manner and in which the common action at the level of the Community is a must. Among these, one can list the major threats against health and the trans-border or international issues, such as epidemics and bioterrorism, as well as those related to the free circulation of goods, services and people[2].

Along the history, natural (epidemics) of infectious diseases have caused many more fatalities than wars: almost one quarter of Europe's population (approximately 25 million) died during the plague epidemics (bubonic plague) in the 14th century (Gostin, 2002).

A recently declassified report in the USA, issued by **National Intelligence Council for the Central Inteligence Agency** (CIA), concludes that "infectious diseases are not only a public health issue, but also a national security one" (Cavon, 2000), the population of the United States being vulnerable both to emerging and re-emerging infectious diseases (4).

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[2] http://eur-lex.europa.eu/legal-content/RO/TXT/?uri=CELEX:52007DC0630.

The risks of bioterrorism spread worldwide. There are no barriers in the path of smallpox, anthrax or plague. **The threat is global** and, therefore, the response should be global as well. The United Nations (UN) considers the *cooperation between international, regional and sub-regional organizations* of a paramount importance. The international community must prevent the possession or use of mass destruction weapons (MDW) by non-state groups or entities (Ciobanu, 2008).

Bioterrorism and biocrime are real risks of the modern society and we need to be well-prepared, including with medical countermeasures, in the fight against bioterrorism. As it results from the specialized literature, from all groups of biologic agents, bacteria are most likely to be used as **bioterrorism agents**, since they can be easily cultivated in industrial quantities, on artificial culture environments and for a small price.

Among all bacteria, *Bacillus anthracis* is most likely to be used, since it spores naturally and remains viable, it can be stored as a chemical, radiologic or explosive agent. As a matter of fact, the bioterrorist attacks from the beginning of this century used anthrax spores. Out of several reasons (medical, military, industrial, etc.) anthrax has been and probably will remain the agent of choice for biological attacks.

These agents are, in fact, microorganisms that can cause serious diseases, deadly most of the time. One of them is the infamous anthrax, of which we have heard frequently in the recent years. It can make its way to the organisms through the skin, by inhalation or through the digestive tract. The cutaneous form of the disease is the most "benign", manifesting itself under the form of necrotic and hemorrhagic ulcerations which, with early treatment, can heal in several weeks. The pulmonary form debuts with high fever, intense feeling of suffocation and within 24 hours from the occurrence of the symptoms, the disease leads to death by hypoxia and septic shock. The digestive form is not milder either, making its debut with nausea, vomiting, digestive hemorrhage, followed by ascites (large amount of liquid in the abdomen) and, after 2-5 days, death.[1] The viral hemorrhagic fever (Lassa & Ebola) are not less dangerous. It is mostly transmitted through rodents, but the virus can enter the organism by inhalation or direct contact with the infected material; it produces modifications at the level of small blood vessels and death occurs mostly due to hemorrhagic and neurologic complications. Botulism, another biological weapon, acts through the botulinum toxin that attacks the nervous system, leading to paralysis, followed by respiratory shock. Botulism spreads through food, taking the form of food poisoning. There is an anti-toxin, but it is only efficient in case of early administration. Smallpox is a disease deemed extinct 25 years ago (the last case was reported in 1978), but of interest at the moment due to the possibility to use it as a biological weapon. It is a deadly viral infection with horrid cutaneous manifestations (vesicles covering the entire body), death being caused by pneumonia or septicemia. There is an anti-smallpox vaccine, which offers protection for 5-10 years, but we couldn't find out whether our county has it or not.[2]

Therefore, some of these diseases can be treated if an early treatment is administered, but they can easily escalate to serious complications and death. Their prevention by the mass vaccination of the population sounds nice in theory, but in practice we don't have vaccines to fight these rather rare diseases.[3]

The biological weapon is an invisible one. It can be transported, without being detected, across borders or "in cultures" to obtain the required quantity for committing a massacre. The microorganisms can be released without a noise and without causing immediate effects. The disease cannot be determined until the symptoms of the infection and the triggering agent aren't identified. If these agents, such as smallpox,

[1] www.armyacademy.ro/reviste/3_4_2002/r27.pdf.
[2] http://www.bioetica.ro/bioetica/ie2/info.jsp?item=9691&node=1395.
[3] http://www.bbc.co.uk/romanian/afghanistan_anthrax/biological.htm.

can propagate easily from one individual to another, the number of victims can reach thousands of cases[1].

These diseases can be transmitted in several ways, among which two are susceptible of reaching a large number of people: a) through the digestive tract. Certain microorganisms induce the disease not so much through their multiplication as through the action of toxins. Toxins are produced by bacteria. The ingestion of toxins induces the disease. This type of contamination is not considered "practical" except for the population agglomerations that have common water reservoirs in which these toxins could be discharged. It is about, first of all, about the botulinum toxin, responsible for botulism, whose gravity is related to muscular and respiratory paralysis; b) airborne. Most agents used in bioterrorism can be transmitted by air. They multiply, inducing the disease after a certain incubation period. The higher risk of contamination of thousand or even tens of thousands of people is the dissemination during public or sports manifestations, using airplanes similar to the ones spraying insecticides on crops or by the use of aerosol type devices.[2]

The threat of bioterrorism, meaning the use of a biological weapon in terrorist purposes in the urban environment is much more disturbing. Or, in this field there is an unsettling accumulation of symptomatic events. As far as terrorism escalation using **nonconventional means** is concerned, the most spectacular remains the sarin gas attack of Aum Shinrikzo sect in the Tokyo subway from March 20, 1995. If botulinum toxins had been used instead of sarin, several thousand or tens of thousands of people would have died under the same conditions.[3].

2. Genetically Modified Organisms

Scientific and military scientists warn on the danger represented by the creation of these genetically modified germs which, being resistant to any treatment and insensitive to any vaccine, and showing an increased virulence and an unexpected capacity of destruction, could be the "absolute weapon" of the future[4].

With genetically modified organisms we move from the field of small or clandestine labs to that of top of the line technologies. These involve the identification of the genes responsible for the resistance, virulence or specific harmfulness of certain toxins, followed by their integration in the genome of a biologic agent that can preserve their capacity of proliferation. The addition to this gene is often done to the detriment of the host's metabolism, a common problem of the genetic engineering in its attempts of producing proteins of therapeutic or industrial interest through modified bacteria (Ioan Zanc).

At the moment, the "classic" toxicological approach based on foreign poisons introduced in the organisms is about to be replaces by the use of hormones or human peptides that regulate most of the biological functions and whose genes have been isolated. The genetic therapy – an object of intense research – is a source of potential vectors for toxic molecules[5].

Numerous teams of researchers and clinicians work especially on cancer, in the idea of introducing a lethal gene (for instance, by coding a cellular toxin, such as ricinus) in tumor cells, by the use of viral vectors that recognize their specificity. A "weak" vector whose toxic gene integrates in any cell

[1] http://www.forum-criminalistic.ro/1%20of%202008.pdf, page 30.
[2] www.presamil.ro.
[3] www.presamil.ro.
[4] www.presamil.ro.
[5] www.presamil.ro.

constitutes a potential agent of biological war.

A strong point of the new biological weapons is their difficult detection. However virulent it might be, a biological agent needs to escape detection and countermeasures to be an efficient weapon. Modern diagnosis tools use mono-cloned antibodies specifically oriented against proteins from the surface of the detection microorganisms. Or, in the future, the sequence of the genes that code these proteins can be modified, which renders the carrier organism undetectable[1].

But due to the same scientists, Saddam Hussein's warehouses were well "supplied" with paralyzing gases and spores of killer bacteria. Science is the one that can bring happiness or destruction of humanity and it becomes more and more accessible due to the communication technologies and the internet. The virus that stood at the basis of the military biological program of Iraq was obtained with a simple post order from one of the Western labs that delivered such merchandise on request[2].

3. Conclusions

Remember to thank those that have supported you and your work. Use the singular heading even if you have many acknowledgments.

Bioterrorism is a phenomenon that has gained importance and international dimensions in the last decade. In view of preventing it, the UN deems as fundamental the cooperation among international, regional and sub-regional organizations.

Along time, humanity has gathered impressive knowledge in chemistry and biology. Due to well-known scientists, mankind was able to leave behind the miserable living conditions and the average life expectancy has doubled.

Terrorism is a war waged during times of peace, without frontiers and fronts, a war that terrorism considers just. Terrorism is a given fact, but also a creation of the human society, of men obsessed with power. What is unfair is that terrorist actions, of any nature whatsoever, affect the human being first of all. To achieve their purpose, terrorists engage in a fair fight from their perspective and use new weapons and technologies[3].

Such a weapon is the biological one, an invisible, yet extremely efficient and dangerous one. Bioterrorists create these arms effortlessly, in common locations and with minimum costs. The reality of our times shows that the fear of biological weapons exceeds the fear of the former nuclear war. Starting from these aspects, this article aims at triggering attention on an uncontestable fact: bioterrorism is a topical threat with serious implications against security[4].

[1] www.presamil.ro.
[2] http://www.scoalarosu.ro/RO-FILES/Info_pub/revista_pdf/14/Bioterorismul.pdf.
[3] http://buletinul.unap.ro/pagini/pdf/buletin-1-2012.pdf, page 13.
[4] http://buletinul.unap.ro/pagini/pdf/buletin-1-2012.pdf, page 13.

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