

# CBW

# Magazine

Journal on Chemical and Biological Weapons

Winter / July-December 2017

ISSN: 0974-0619

**EDITORIAL 3**

**INVITED ARTICLES 4**

Ricin: Feral Wolf to Hunting Dog!

**Mrinmayee Bhushan**

**VIEW POINT 9**

Russia & Chemical Weapons Destruction

**Kapil Patil**

**COVER STORY 13**

Islamic State's tryst with chemical weapons in Syria and Iraq

**Animesh Roul**

**CHEMICAL AND BIOLOGICAL NEWS 16**

**BOOK REVIEW 31**

Biological and Chemical Terrorism Countermeasures

**R. Mohan Babu**



INSTITUTE FOR DEFENCE  
STUDIES & ANALYSES

रक्षा अध्ययन एवं विश्लेषण संस्थान

# CBW

# Magazine

Journal on Chemical and Biological Weapons

Volume 10

Number 3-4

Jul-Dec 2017

ISSN: 0974-0619

**EDITORIAL 3**

**INVITED ARTICLE 4**

Ricin: Feral Wolf to Hunting Dog!

**Mrinmayee Bhushan**

**VIEW POINT 9**

Russia & Chemical Weapons Destruction

**Kapil Patil**

**COVER STORY 13**

Islamic State's tryst with chemical weapons in Syria and Iraq

**Animesh Roul**

**CHEMICAL AND BIOLOGICAL NEWS 16**

**BOOK REVIEW 31**

Biological and Chemical Terrorism Countermeasures

**R. Mohan Babu**



# Editorial

## Executive Editor

Ajey Lele

## Assistant Editor

Gunjan Singh

In September 2017 Russia declared complete destruction of its large chemical weapons stockpile. This achievement has raised the hopes of the international community and now Russia could take larger role in Chemical Weapons Convention (CWC) and also work towards restraining Syria. In this issue of the CBW Magazine Kapil Patil discusses this issue in detail.

The article by Mrinmayee Bhushan discusses the lethality as well as the therapeutic applications of Ricin. The indiscriminate use of chemical weapons by the ISIS against civilians as well as military personnel has brought the discussion of violation of humanitarian and international laws to the forefront. Animesh Roul in his article examines this very issue and also discusses the ISIS's chemical weapons programme.

This issue also comprises other regular features like the Book Review and Chemical and Biological News.

With our readers' feedback, we wish to publish issues in the future that focus on a subject of particular concern.

**Contributions and feedback are welcome and can be addressed to: [editorcbw@gmail.com](mailto:editorcbw@gmail.com)**

## Ricin: Feral Wolf to Hunting Dog!

**Ms. Mrinmayee Bhushan**

*The author is a National Awards winning Techno-entrepreneur; Chevening Rolls Royce Science, Innovation, Policy and Leadership (CRISP) Fellow at Oxford University; Medical Pharmacologist and Microbiologist; and co-founder of Mindfarm Novatech Pvt Ltd, an Indian innovations company.*

### Summary

Though not considered as effective bioterror agent as either botulinum toxin or anthrax, Ricin is notorious for its perceived potential. This fresh perspective is an effort to analyze the facts related to Ricin, with reference to its newfound therapeutic applications. This big picture should be helpful in understanding the threat in Indian context!

### History

Ricin is a protein, naturally synthesized by the castor bean plant. The castor bean contains 3- 5% of Ricin in it. It was discovered by Stillmark first in 1888 as the principal bioactive ingredient of castor bean<sup>1</sup>. This is the discovery that led to the birth of Immunology. However, in Ayurveda, there is long history of leaves, roots and beans of the castor plant being used for therapeutic uses, all of which contain varying concentrations of Ricin.

Ricin is one of the most notorious toxins known and is also considered a potential chemical weapon. It features in Chemical Weapons Convention as a placeholder toxin because till date there has been no known peaceful use of Ricin<sup>2</sup>.

However, due to the dark publicity it has received, Ricin has become a popular murder tool not just on TV shows, but also to attempt real life murders by disgruntled wives or to threaten Presidents with laced letters.

### Makov and Kostov

It started with the murder of a Bulgarian reporter Georgi Markov in London in 1978 (which has never clinically proved to be Ricin in spite of 30 years of investigation) and attempts to kill Kostov. There are multiple stories and numerous unsuccessful attempts of murder using Ricin and sometimes Abrin too. During the investigations no anti-Ricin antibodies or fool-proof evidence were found in either Markov's or Kostov's blood samples.

Dr. Rufus Crompton, who performed the autopsy on Markov, provided the following explanation for Kostov's survival: "I do not think we really have any idea, except that there is a much bandied about phrase these

days in toxicology: called the 'LD50', which is a dose that will kill 50 per cent of the population. I can only assume that they were working very closely on that” and at the end “circumstantially this was probably Ricin”<sup>3</sup>.

## **Toxic**

Historically Ricin and Abrin have been extensively researched proteins since 1888 and have been explored for their therapeutic potential as chemo-therapeutic agents.

Though known to be toxic as an aerosol by nasal or intravenous routes of administration, Ricin and Abrin are known to be dermally inactive<sup>4, 5, 6</sup>. Though known to be toxic, the practical issues related to weaponization of Ricin did not allow it to become a weapon of mass destruction.

## **Biocrimes or Bioterror?**

The exhaustive list of cases involving either confirmed or suspected use of Ricin in a crime, does not involve any incidence of mass bioterror. All cases with confirmed use of Ricin are classified as incidences of biocrimes, challenging the claim of history of use for bioterrorism. When this list of cases is deeply analyzed for the history of possible use of Ricin as a WMD by most feared terrorists groups, there is hardly any substance available<sup>7</sup>.

The fear industry is spending millions of dollars on Ricin-scare<sup>8</sup> whereas terrorist states and non-state terror groups are using other chemical weapons, planes, cars or lone-wolf attackers to create an impact. There is an urgent need to separate fact from fiction by clearly understanding the fear industry built around the WMD doomsday distractions<sup>9</sup>, because putting these fears in perspective will help us understand this massive focus on bioterror preparedness. Similarly, there is a need to understand the

clear distinction between bio-crimes targeted at individuals and bioterror attacks targeted as weapons of mass destruction.

Due to their hybrid nature, toxins with bioterror potential are either classified as Chemical Weapons or for research, administration and treaty applications as Bio-Weapons<sup>10</sup>. For optimizing the threat perception, the non-replicating, non-living, non-transmissible nature of these toxin agents needs to be emphasized.

## **Fear psychosis**

It is interesting to read the suspected origins of anthrax scares post-9/11 and the suspected theft of virulent strains of anthrax spores. There was also a controversy surrounding an anthrax vaccine-making company called Bioport and of its investors and networks. The Anthrax scares resulted in a turnaround of an almost bankrupt anthrax antibiotic making company called Bayer<sup>11</sup>.

With this reference, it is interesting to investigate the clinical progress of Ricin vaccine Rivax and the recent “mix-up” involving use of Ricin during a training program in the Center for Domestic Preparedness (US). The explanation came with a comment saying, “It is worth noting that all of this took place, inexplicably, nearly a month after The Anniston Star first reported that Ricin holotoxin had been used in CDP’s training program<sup>12</sup>.”

There is always a higher risk of theft of such agents from training facilities which may find their way to the hands of terrorist organizations.

This perspective is vital to decipher complexity of the fear psychosis involved in it and to look at the big picture objectively.

## **No treatment for Ricin toxicity?**

Ricin is a naturally occurring plant-derived protein. There are some treatment options like Lethal Toxin Neutralizing Factor (LTNF) from the opossum serum. It is effective not just for Ricin intoxication but also against a variety of snake venoms, bacterial toxins like Botulinum, scorpions and bee venoms. Such innovations which take inspiration from Nature<sup>13</sup> such as LTNF, and epigallocatechin gallate from green tea have potential for military applications<sup>14</sup>. Similarly, vaccines against Ricin such as Rivax are already under advanced stages of development and Rivax has completed pilot Phase 1B studies<sup>15, 16</sup>.

## **Botox and Ricin**

Other than Anthrax, one of the most likely biological battlefield threats is the Botulinum toxin. It is the most toxic known natural compound and is way more toxic than Ricin. Ricin is not considered to be as effective as either botulinum toxin or anthrax<sup>17</sup>. It is estimated that eight tons of Ricin as an aerosol would be necessary to cause same damage as using only eight kilograms of Botulinum toxin in a given area.

While not many successful botulinum bioterror incidents have occurred around the world, there are examples of unsuccessful attempts to use it as WMD in Japan (1980s) and in Iraq (1991). In spite of all this, scientists envisioned a peaceful therapeutic use of the deadliest toxin known to man and established its image as a glamor drug. And therefore it is not part of the Chemical Weapons Convention (CWC) schedule 1, like Ricin!

## **Therapeutic use**

Ricin has been placed under the 'Schedule 1 of CWC' as a placeholder with an argument

that it does not have any therapeutic value. A scientific publication<sup>18</sup> by our research team challenges even this well-known misconception.

Taking inspiration from therapeutic and commercial success of Botulinum Toxin popularly known as Botox, our research team has developed a breakthrough innovation in an effort to establish the authentic therapeutic and peaceful use of Ricin and Abrin. Ricin and Abrin are historically known to be dermally inactive at high dosage (50 mcg spot). This innovation shows that, at low doses, Ricin and Abrin inhibit the growth of hair follicles<sup>19</sup> by selectively inducing hair follicle dystrophy, without affecting any other skin structures adversely.

After successful preclinical toxicology studies, Ricin and Abrin are now ready for Phase II clinical trials by dermal route.

A clinically tested spin-off cosmetic product of this innovative technology called Romantaque, is already in the market with many happy consumers using it<sup>20</sup>. This product development was done with Indian Institute of Technology (IIT), Bombay and was funded by Government of India. This patented innovation has won two National Innovation awards in India.

Cytotoxic lectins like Ricin and Abrin have been traditionally considered to be dermally inactive. Their potential to selectively kill cancerous cells has always attracted attention from the scientific community. Phase I clinical trials of Ricin and Abrin have been successfully conducted for chemotherapy applications in 1980s<sup>21</sup>.

With this newfound therapeutic dermal role of Ricin and Abrin, we present a new perspective for the study and peaceful therapeutic use of cytotoxic lectins to the global scientific community.

## Indian perspective

India is the largest exporter of castor oil and exports 84% of global requirement of castor oil and its derivatives<sup>22</sup>. Ricin is part of toxic waste produced by this large industry. However, when we consider it on the research front, pure Ricin, as a protein standard necessary for research, is not commercially available in India. Moreover, there is a ban on export of even 10mg Ricin from the US or Europe. In 2003 the price of pure Ricin as reference protein was INR 13,000/-. With India being the World's largest castor oil industry, when a pharmacologist working in an Indian lab wants to establish the mode of action for an Ayurvedic medicine consisting of castor bean, she/ he cannot get access to pure Ricin as a standard protein. What an irony!

Similar to Ricin related biothreats in other countries; Wipro, a large Indian IT company received a Ricin related biothreat recently<sup>23</sup>. Hence, action needs to be taken before it becomes fashionable to use Ricin as a threat in India!

## Discussion

The objective of this article is not to discount the potential threat of Ricin, but to endeavor a fresh perspective of looking at a naturally occurring protein.

There is an urgent need to shift the focus from "bio-preparedness" to therapeutics while keeping the bigger picture in mind. This shift needs to occur not just in the scientific community but also in the awareness of the general population. This will help in reducing misconceptions its misuse for biocrimes. These logically flawed adventures not just put tremendous pressure on civic administrations but also create unnecessary fear psychosis in the society. In an era of global information access,

the focus needs to be shifted more towards accurate information which will help in creating awareness and preventing ignorant misuse.

All the arguments of keeping Ricin in Schedule 1 of CWC are moot. Now is the time to revisit this goal-post and eliminate the 'charm' of a cheap WMD from Ricin, and instead position it as a Wonder Drug. This perspective has far reaching research, commercial and strategic implications for India.

## Endnotes:

1. Cummings, R. D. & Etzler, M. E. R-type Lectins. in Essentials of Glycobiology (eds. Varki, A. et al.) (Cold Spring Harbor Laboratory Press, 2009). <http://www.ncbi.nlm.nih.gov/books/NBK1940/>
2. Medical Aspects of Chemical and Biological Warfare. <http://www.bvsde.paho.org/tutorial1/fulltex/armas/textos/chebio/chebio.pdf>
3. Dr. Rufus Crompton. Georgi Markov- Death in a Pellet. Available at: [http://elbdisliker.at.ua/Jedy/Georgi\\_Markov-Death\\_in\\_a\\_Pellet.pdf](http://elbdisliker.at.ua/Jedy/Georgi_Markov-Death_in_a_Pellet.pdf)
4. David R. Franz,. Defense Against Toxin Weapons. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.360.3660&rep=rep1&type=pdf>
5. Schep, L. J., Temple, W. A., Butt, G. A. & Beasley, M. D. Ricin as a weapon of mass terror - Separating fact from fiction. *Environ. Int.* 35, 1267-1271 (2009). <http://www.sciencedirect.com/science/article/pii/S0160412009001834>
6. Wannemacher, R.W.; Anderson, J.B. Inhalation Ricin: Aerosol Procedures, Animal Toxicology, and Therapy. In *Inhalation Toxicology*; Salem, H., Katz, S.A., Eds.; CRC Press Taylor & Francis Group: Boca Raton, FL, USA, 2006; pp. 973-982.
7. Bioterrorism and Bio crimes. Available at: <https://fas.org/irp/threat/cbw/carus.pdf>

8. The fear industry. The Washington Times. Available at: [www.washingtontimes.com/news/2007/may/5/20070505-101330-9891r/](http://www.washingtontimes.com/news/2007/may/5/20070505-101330-9891r/)
9. WMD doomsday distractions - Washington Times. Available at: <http://www.washingtontimes.com/news/2005/apr/9/20050409-102738-7969r/>
10. Madsen, J. M. Toxins as weapons of mass destruction. A comparison and contrast with biological-warfare and chemical-warfare agents. *Clin. Lab. Med.* 21, 593-605 (2001). <http://europepmc.org/abstract/med/11577702>
11. The CIA's Role in the Anthrax Mailings - Could Our Spies be Agents for Military-Industrial Sabotage, Terrorism, and Even Population Control? Available at: [http://www.bibliotecapleyades.net/ciencia/ciencia\\_anthrax-cia.htm](http://www.bibliotecapleyades.net/ciencia/ciencia_anthrax-cia.htm)
12. House Committee Wants Answers on CDP's Ricin Mixup. Available at: [https://www.printfriendly.com/print?url\\_s=uGGCKlrzFJBEyqmpBzlABqrlcbfid](https://www.printfriendly.com/print?url_s=uGGCKlrzFJBEyqmpBzlABqrlcbfid)
13. Carmen. Is Tea The Answer To Fighting Bioterror Attacks? | Off The Grid News. Available at: <http://www.offthegridnews.com/misc/is-tea-the-answer-to-fighting-bioterror-attacks/>
14. Lipps, B. V. Anti-lethal Factor from Opossum Serum is a Potent Antidote for Animal, Plant and Bacterial Toxins. *J. Venom. Anim. Toxins* 5, 56-66 (1999). [http://www.scielo.br/scielo.php?script=sci\\_abstract&pid=S0104-79301999000100005&lng=en&nrm=iso&tlng=en](http://www.scielo.br/scielo.php?script=sci_abstract&pid=S0104-79301999000100005&lng=en&nrm=iso&tlng=en)
15. Vitetta, E. S. et al. A pilot clinical trial of a recombinant ricin vaccine in normal humans. *Proc. Natl. Acad. Sci. U. S. A.* 103, 2268-2273 (2006). <http://www.pnas.org/content/103/7/2268>
16. Vitetta, E. S., Smallshaw, J. E. & Schindler, J. Pilot Phase IB Clinical Trial of an Alhydrogel-Adsorbed Recombinant Ricin Vaccine. *Clin. Vaccine Immunol.* 19, 1697-1699 (2012). <http://cvi.asm.org/content/19/10/1697>
17. Virginia I. Roxas-Duncan & Leonard A. Smith. Ricin Perspective in Bioterrorism. Available at: <http://cdn.intechopen.com/pdfs/33127.pdf>
18. Kondhalkar, M. B., Dr, K. A., Dr, M. W., Paygude, S. & Dr, P. P. Ugly Duckling or a Swan: Exploring therapeutic potential of Ricin for inhibiting unwanted hair growth. *Matters* 3, e201702000001 (2017). <https://sciencematters.io/articles/201702000001>
19. Kondhalkar M.B. & Parab P.B. 7th World Congress for Hair Research Abstracts. *J. Invest. Dermatol.* 133, 1391-1439 (2013). #P115 <http://www.nature.com/jid/journal/v133/n5/full/jid2013110a.html>
20. Kondhalkar M., Dudhbhate A., Apte K., Banerjee R. & Parab P. Clinical Study to Evaluate Safety and Efficacy of a Topical Hair Minimizing Lotion in Healthy Human Volunteers. Available at: <http://www.avensonline.org/wp-content/uploads/JCTP-02-0007.pdf>
21. Fodstad, Ø. et al. Phase I Study of the Plant Protein Ricin. *Cancer Res.* 44, 862-865 (1984). <http://cancerres.aacrjournals.org/content/44/2/862>
22. Castor Oil - It Promises Big Profits [Patience Please!]. Available at: <https://www.thedollarbusiness.com/magazine/castor-oil-it-promises-big-profits-patience-please/32744>
23. Wipro gets second threat mail seeking Rs 500 crore in bitcoin. The New Indian Express Available at: <http://www.newindianexpress.com/cities/bengaluru/2017/jun/02/wipro-gets-second-threat-mail-seeking-rs-500-crore-in-bitcoin-1611926.html>

## Russia & Chemical Weapons Destruction

**Mr. Kapil Patil**

*The author is a Researcher at the Indian Pugwash Society, New Delhi.*

### Summary

The chemical weapons destruction milestone achieved by Russia raises the hope of the international community that it will also play an important role in restraining Syria and also undertake leadership role in the CWC.

In a historic announcement on 27th September 2017, the Russian Federation declared the complete destruction of its huge Cold War-era chemical weapons stockpiles.<sup>1</sup> The Russian announcement has been greeted with widespread acclamation from the OPCW and several member states as it marks the 'major milestone' in the history of the Chemical Weapons Convention (CWC).<sup>2</sup> Among the various challenges facing the CWC regime, the timely destruction of large stockpiles possessed by Russia and the United States has been a long-standing one. While most of the CWC member states have carried out the destruction of their arsenals within the timeframes stipulated by the regime, the U.S. and Russia have repeatedly failed to meet both original as well as revised timelines for destroying their arsenals. Of the two major powers, however, the case of Russian Federation has attracted much concern as projections in the past had predicted only slower progress on Russia's chemical weapons destruction.<sup>3</sup> Belying such predictions, the Russian Federation has achieved the destruction well before the U.S. and shrewdly used the occasion to project its non-proliferation and disarmament credentials.<sup>4</sup>

While the Russian achievement is certainly laudable and noteworthy in every respect, it equally calls for underlining the role of significant financial and technical assistance rendered by the U.S. and other western countries without which Moscow wouldn't have achieved this milestone. Throughout the cold war years, the Soviet Union maintained the largest stockpiles of chemical weapons including wide-ranging chemical agents and munitions. It also built one of the largest chemical weapons complexes comprising of 4 research labs, 8 storage depots, and 2 test facilities.<sup>5</sup> Destroying such

large-scale arsenals and production facilities entailed enormous costs which the fledgling Federation emerged after the Soviet disintegration was clearly incapable of committing.

The beginning of Western assistance to Russia's chemical disarmament process started immediately after the Soviet Union under Mikhail Gorbachev's leadership announced a halt on the production of chemical weapons in 1989. The announcement was in line with the policies of Glasnost and Perestroika that Gorbachev pursued to initiate reforms within the Union. Subsequent to the announcement, the USSR signed a Wyoming Memorandum of Understanding (MOU) with the U.S. which called for bilateral verification experiments and information sharing to firm up verification procedures that were being negotiated under the CWC.<sup>6</sup> More importantly, however, the two countries signed an important Bilateral Destruction Agreement (BDA) within a year of signing the Wyoming MoU that provided for undertaking measures to destroy their respective stockpiles to 5000 tons by the year 2002.<sup>7</sup>

After the entry into force of the CWC in 1997, the reductions agreed under the BDA came to be replaced by the new targets and timelines prescribed under the CWC. The BDA, nonetheless, proved to be a major breakthrough for concluding negotiations on the CWC as it helped in resolving any outstanding differences between the two superpowers over verification issues relating to the convention. The newly emerged Russian Federation was clearly incapable carrying out its obligations either under the BDA or the CWC and stated the need for long-term financial assistance. The need for assistance to Russian Authorities after the Soviet disintegration was so dire that I presented serious difficulties to even retain

the technical staff manning Russian weapons facilities let alone allocating any budget for their dismantlement. Sensing the potential dangers of proliferation or seizures from these Soviet-era facilities, the U.S. in 1991 resolved to assist Russia through an assistance scheme widely known as the 'Cooperative Threat Reduction' (CTR) Programme.<sup>8</sup> Through CTR, funded majorly by the U.S. and partly by its allies such as Canada and Sweden, the U.S. ensured that Russia not only destroys its large chemical weapons stockpiles but is also able to safeguard these facilities and retain the technical staff.

As part of the programme, the U.S. officials including technical experts visited one of the Russian chemical weapons facilities in 1994 and thereafter concluded a joint study on the possible technological solutions to first safeguard and then destroy the large Russian stockpiles. These efforts significantly helped Russia to safeguard its production and storage facilities that had become the centers of serious potential proliferation risk. Upon the entry into force of the CWC on December 05, 1997, Russia declared to OPCW that it possessed about 40,000 metric tons of chemical agents.

The CWC requires all states-parties to destroy: within three years of entry into force of the convention, 1 percent of their Category 1 or the highest 'risk' category weapons; within five years of entry into force, 20 percent of the Category 1 weapons; within seven years of entry into force, 45 percent of the Category 1 weapons; and finally within 10 years of entry into force, all Category 1 chemical weapons.<sup>9</sup> Russia, however, missed the initial deadline due to what Jonathan Tucker, a noted analysts on WMDs had described as, "three years of inaction on chemical weapons destruction because of the August 1998 financial crisis that led to the devaluation of the ruble and bureaucratic

infighting among the three government bodies responsible for the program”.<sup>10</sup>

The lack of political commitment in the initial years was mainly the reason for Russia's inability to meet the deadlines. However, the furtherance of the Western assistance and especially Germany's technical aid in building Russia's first chemical weapon destruction plant which opened in December 2002 at Gorny site in the Saratov Oblast finally set in motion the long-delayed destruction process. In the following years, the Russian authorities showed strong commitment to destroy their stockpiles, and to accelerate the process of destruction, Russian authorities built as many as six additional plants at sites such as Kambarka in 2005, Maradikovskiy in 2006, Leonidovka in 2008, and Shchuch'ye in 2009, Pochev in 2011 and last one in Kizner in 2012.<sup>11</sup>

It is widely known that the construction of the aforementioned facilities was made possible only through financial assistance rendered through G-8 security initiative called “Global Partnership against the Spread of Weapons and Materials of Mass Destruction”.<sup>12</sup> The G8 summit held in Kananaskis, Canada in 2002 granted Russia, a long-term financial assistance to carry out the destruction of its arsenal. Through CTR programme alone, the U.S. had pledged more than one billion dollars to Russia since its inception in the mid-1990s. The programme ensured that Russia has latest available technologies to destroy its stockpiles. Apart from the U.S., Germany, Britain, Canada, Sweden all provided a significant amount of financial and technological assistance both to ensure that Kremlin meets its obligations under the CWC and that the threats of proliferation from these facilities are mitigated significantly.

The Western assistance to Russia's destruction programme began to decline only

towards the end of last decade when Russian economy began witnessing strong growth trends. With Russia able to shoulder the cost of destruction on its own, the long-running assistance programmes rendered through CTR were brought to closure. Nevertheless, the pivotal role that it played in Russia's chemical weapons destruction process is clearly without a doubt. While Russia's commitment too has been significant in destroying chemical weapons that enabled the OPCW to register a record 96 percent destruction of global stockpiles, the occasion calls for retaining the spirit of international cooperation and collaboration in mitigating the threats of WMD use.

The use of chemical weapons in Syria only presents a grim reminder that use of these weapons is yet to fully consign to the history. Given that the norm against their use is more than a century old; its defence represents a collective responsibility. In this context, Russia's diplomatic shielding of the Assad regime accused of using chemical weapons is clearly indefensible. Though Russia is free to aid the Syrian regime in very many legitimate means and pursue its own geo-strategic interest in the region, defending the use of chemical weapons by the Syrian regime grossly undermines the cause that Russia is trying to uphold after destroying its own stockpiles. The chemical weapons destruction milestone achieved by Moscow therefore only raises the hope that Kremlin will take appropriate measures to restrain the Syrian regime and show leadership in steering the CWC regime as it poised to enter the post-destruction phase, alas, in the larger interest of regional and global security.

## Endnotes:

1. Russia Reports Destruction of All Its Remaining Chemical Weapons, Associated Press, September 27, 2017, URL: <https://www.voanews.com/a/vladimir-putin-russia-destroy-chemical-weapons-today/4046551.html>.

2. OPCW Director-General Commends Major Milestone as Russia Completes Destruction of Chemical Weapons Stockpile under OPCW Verification, OPCW, September 27, 2017, URL: <https://www.opcw.org/news/article/opcw-director-general-commends-major-milestone-as-russia-completes-destruction-of-chemical-weapons-stockpile-under-opcw-verification/>.
3. Weise, Rachel A., "Russia, U.S. Lag on Chemical Arms Deadline", Arms Control Association, July 2, 2009, URL: [https://www.armscontrol.org/act/2009\\_07-08/chemical\\_weapons](https://www.armscontrol.org/act/2009_07-08/chemical_weapons).
4. Putin Hails Russia's Destruction Of Chemical Weapons, Chides U.S., RFE/RL, URL: <https://www.rferl.org/a/russia-chemical-weapons-destruction-united-states-stockpile/28760622.html>.
5. Russia: Chemical Weapons, Nuclear Threat Initiative, June 2015 URL: <http://www.nti.org/learn/countries/russia/chemical/>.
6. The CWC negotiations started in 1984. The period of early 1980's saw the emergence of so-called second Cold War, which made the progress on CWC increasingly difficult. Throughout these years, the U.S. accused USSR of using chemical weapons in countries like Afghanistan and Laos. The American allegations were never proven conclusively, unlike the known uses of chemical agents by U.S. during the Vietnam War. The USSR was also accused by U.S. for maintaining war-fighting doctrines involving use of chemical weapons. The allegations caused a major dispute between the two giants and hindered the progress of CWC negotiations. See, Wyoming Memorandum of Understanding (Wyoming MOU) Bilateral Verification Experiment and Data Exchange, Federation of American Scientists, URL: <https://fas.org/nuke/control/wyoming/index.html>.
7. Bilateral Destruction Agreement [BDA], Federation of American Scientists, URL: <https://fas.org/nuke/control/bda/index.html>.
8. Fact Sheet: The Nunn-Lugar Cooperative Threat Reduction Program, by Justin Bresolin, June 1, 2014, URL: <https://armscontrolcenter.org/fact-sheet-the-nunn-lugar-cooperative-threat-reduction-program/>.
9. See, Chemical Weapons Convention, OPCW, URL: [https://www.opcw.org/fileadmin/OPCW/CWC/CWC\\_en.pdf](https://www.opcw.org/fileadmin/OPCW/CWC/CWC_en.pdf).
10. Jonathan B. Tucker, "Russia's New Plan For Chemical Weapons Destruction", Arms Control Today, July 1, 2001, URL: [https://www.armscontrol.org/act/2001\\_07-08/tuckerjul\\_aug01](https://www.armscontrol.org/act/2001_07-08/tuckerjul_aug01).
11. Global Abolition of Chemical Weapons, Paul Walker, UNIDIR Forum, URL: <http://www.unidir.org/files/medias/pdfs/the-global-abolition-of-chemical-weapons-paul-walker-eng-0-451.pdf>.
12. Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, June 20, 2017, URL: <http://www.nti.org/learn/treaties-and-regimes/global-partnership-against-spread-weapons-and-materials-mass-destruction-10-plus-10-over-10-program/>.

## Islamic State's tryst with chemical weapons in Syria and Iraq

**Mr. Animesh Roul**

*The author is a founding member and presently, the Executive Director of research at the Society for the Study of Peace and Conflict, New Delhi.*

### Summary

The Islamic State in Syria and Iraq (ISIS) Jihadist group's indiscriminate use of chemical weapons or agents against civilian and military targets in the last few years violates every international and humanitarian laws. It has not only used the weapons in its violent campaigns, but has attempted to build full-fledged chemical arsenal within its controlled territories which makes it virtually the first non-state actor pursue chemical weapon for military purposes. This piece examines ISIS' nascent chemical weapons of mass destruction program and how it has effectively used against targets in Syria and Iraq.

The sporadic and indiscriminate use of chemical weapons in Syria and Iraq's conflict zones in the last five years by both State and non-state actors have posed a great challenge to the international arms control and non proliferation regimes. The use of these deadly weapons of mass destruction targeting civilians not only violates international law, but is also a crime against humanity. However, the perpetrators of the chemical weapons attacks including the Bashar al-Assad regime are still on the loose and have successfully evaded international scrutiny. The worst part of this otherwise multi dimensional conflict is the use of chemical weapons or agents by non-state jihadi group -- the Islamic State in Iraq and Syria (ISIS) or Daesh. It has not only used the weapons in its violent campaigns, but has attempted to build full-fledged chemical arsenal within its controlled territories.

Historically, no organized and designated terrorist groups have perpetrated mass fatality or disruptive attacks using any categories of weapons of mass destruction. Since the capability and intentions of jihadist groups such as Al Qaeda and ISIS have changed over the years, they opt for the most destructive and spectacular methods with available weapons system, materials or technology to maximize the impact and fear factor. The ISIS, the violent Sunni Jihadist movement that has dominated large swathes of territory had achieved some tangible success in employing these destructive and disruptive weapon systems or materials in Syria and Iraq.

Ideologically, Islamic State in Syria and Iraq has strong roots in the ideals of Abu Mushab al Zarqawi of Jordan, who was identified as Al Qaeda's chief biochemical engineer before his death in 2006. It was widely believed that

Zarqawi imparted training to a special terror cell in Afghanistan and Iraq on the use of biological and chemical agents for possible attacks in Europe and the Middle East. Zarqawi's lingering influence as a founding father of ISIS leads us to believe that this violent group won't hesitate to use these categories of weapons mass destruction and disruption against its civilian or military targets.

It is also believed that the IS leadership has received religious approval from various Islamist clerics for the use of such weapon systems. One such jihadi cleric named Nasir al-Fahd, who is currently imprisoned in Saudi Arabia, issued a religious edict or fatwa sometime in 2003 saying, "If the Muslims can't overwhelm the infidels in any other way, they are allowed to use weapons of mass destruction to kill everyone and erase them and their descendants from the earth." Al-Fahd has authored a book that approves the use of weapons of mass destruction against the non-believers.<sup>1</sup> So use of chemical or biological weapons by Jihadist groups against adversaries is not any more un-Islamic. In other words, the use of these weapons is no more prohibited in Islam as perceived earlier.

ISIS faced massive territorial and military reversal in Syria and Iraq recently. However, in the initial years of territorial consolidation phase, the Islamic State captured secret labs and factories in Iraq and Syria that may have helped it to pursue chemical weapon production activities. In all probability, Islamic State exploited the existing stockpiles belonging to the Iraqi or Syrian regimes, which had extensive CW programs.<sup>2</sup> In June 2014, there were reports about the capture of Saddam Hussein era chemical facility at Muthanna, near the city of Samarra, by Islamic State militants. However, the claim from the IS side regarding the possession of chemical

weapons, such as mustard agents, came in late August 2015 from a Dutch soldier turned IS fighter identified as Omar Yilmaz, who indicated that the group has acquired chemical weapons once belonging to Syrian President Bashar al-Assad's government. Yilmaz's revelations came with a series of suspected incidents of mustard gas attacks in northern Iraq and Syria.

In February 2016, the capture of Suleiman Daoud al-Afari, a senior engineer of ISIS' chemical weapons program, from Badoosh in north-west of Mosul, then a IS stronghold, unearthed the evil designs of IS and how it planned to use chemical agents against its adversaries in Syria and Iraq.<sup>3</sup> Some Iraq affair experts had informed then that al-Afari was the technical expert on the chemical weapons project, but the real ideological driver behind the program was Taha Rahim al-Dulaimi. It is important to note here that al-Afari had been a member of the military under Saddam Hussein and had joined the Islamic State later.

With significant territorial losses in Iraq and Syria in mid 2017 (between June -August), the IS may have abandoned its chemical weapons/agent production by now. However, before abandoning its embryonic chemical weapons program, IS has left a mark using this insidious weapon several times since 2014 mostly with industrial chemicals like chlorine and phosphine. Independent sources such as Conflict Armament Research (CAR) and the Syrian Observatory for Human Rights (SOHR) have claimed that the ISIS has used chemical weapons several times against Kurdish forces between January-June 2015. In August 2015, the German Defence Ministry too reported IS's chemical weapon use in Erbil in Iraqi Kurdistan.<sup>4</sup> The same month, the United States officials stationed in Iraq claimed that IS used sulphur-mustard in a mortar attack on Kurdish forces in

Makhmour town located in northern Iraq.<sup>5</sup> Also, few reports of mustard agent use in al-Hasakah and Marea towns in Syria surfaced that month and the IS was suspected behind these strikes. In early 2016, the IS activities involving use of chemical weapons surfaced frequently as CW attacks spiked till January 2017 in Iraq and Syria.

In April 2016 the Islamic State group used mustard gas on Assad regime troops at an air base near the city of Deir el-Zour.<sup>6</sup> Again between September and December 2016, chemical agents, mostly sulphur mustard, were used by the Islamic State group against targets in Aleppo and Hama Governorates. The last reported chemical attack by the Islamic State in Syria occurred in Talla al-Maqri, Aleppo in January this year (2017).<sup>7</sup>

In May 2016, Islamic State militants targeted Bashir in Kirkuk in northern Iraq releasing toxic mustard gas.<sup>8</sup> Few months earlier, Islamic State fighters launched two chemical attacks in Kirkuk targeting the town of Taza.<sup>9</sup> In 2017, there were few cases of suspected chemical weapons use by ISIS in Iraq's Mosul.<sup>10</sup>

The IHS Markit's Conflict Monitor suggests that there were over 70 alleged chemical weapons attacks perpetrated by the ISIS-41 in Iraq and 30 in Syria.<sup>11</sup> With a series of attacks to its credit, the Islamic State virtually became the first non-state actor to develop and deploy banned chemical warfare agents for military purposes. However, with the loss of its last few bastions in Iraq and Syria, the Islamic State, which is now virtually on the run and seeking safe haven for its leaders and loyal foot soldiers, may abandon this weapons program. But so far there is no publicly available evidence to suggest that the Islamic State has dumped or concealed its chemical arsenals or transferred any CW materials from its earlier strongholds.

## Endnotes:

1. "A Treatise on the Legal Status of Using Weapons of Mass Destruction Against Infidels," <https://nsarchive2.gwu.edu/nukevault/ebb270/07.pdf>
2. "ISIS' chemical weapons: a mix of Saddam, Assad and the West", Rudaw, March 15, 2016, <http://www.rudaw.net/NewsDetails.aspx?PageID=201594>
3. "US 'quizzes Islamic State chemical arms expert in Iraq", BBC News, March 9, 2016, <http://www.bbc.com/news/world-middle-east-35768377>
4. "Tests prove ISIS using mustard gas against Kurds", Rudaw, August 14, 2015, <http://www.rudaw.net/english/kurdistan/140820151>
5. "Chemical agent' traced in IS mortar fire, says US general", BBC News, August 21, 2015, <http://www.bbc.com/news/world-middle-east-34020268>.
6. "ISIS launches chemical weapons attack on Syria's airbase in Deir Ez-zor", Russian Times/Reuters, April 5, 2016, <https://www.rt.com/news/338426-isis-syria-poisonous-gas-attack/>
7. "Islamic State's Chemical Weapons Capability Degraded, IHS Markit Says", IHS Markit, June 13, 2017, <http://news.ihsmarkit.com/press-release/aerospace-defense-security/islamic-states-chemical-weapons-capability-degraded-ihs-mar>
8. "ISIS Bombed Us with Chemical Weapons, Iraqi Police Say", TIME, May 18, 2016, <http://time.com/4327503/isis-chemical-weapons-iraq-bashir/>
9. Inside Taza, the Iraqi Town Gassed by the Islamic State, VICE, March 16, 2016, <https://news.vice.com/article/inside-taza-the-iraqi-town-gassed-by-isis-with-chemical-rockets>
- 10 "ISIS Accused of Unleashing Chemical Weapons in Mosul", Human Rights Watch, March 06, 2017, <https://www.hrw.org/news/2017/03/06/isis-accused-unleashing-chemical-weapons-mosul>
11. Cited in "Islamic State's Chemical Weapons Capability Degraded, IHS Markit Says", IHS Markit, June 13, 2017, <http://news.ihsmarkit.com/press-release/aerospace-defense-security/islamic-states-chemical-weapons-capability-degraded-ihs-mar>

# Chemical and Biological News

---

## NATIONAL AND INTERNATIONAL DEVELOPMENTS

### Israel reported to have bombed Syrian chemical weapons facility

Syrian military appears to confirm media reports of attack on research centre near Mediterranean coast in night-time raid

*By Peter Beaumont, September 7, 2017*

Israeli jets have reportedly bombed a Syrian government facility in north-west of the country believed to be associated with Bashar al-Assad's chemical weapons programme.

The strikes were initially reported by Hebrew and Arab media sources on Thursday morning. A Syrian military statement appears to confirm the reports.

The airstrike on the Syrian Scientific Studies and Research Centre was reported to have taken place overnight. Western intelligence reports have linked the centre near the town of Masyaf to Syria's chemical weapons programme.

A statement from the Syrian military said the attack had occurred early on Thursday and hit a facility close to the Mediterranean coast. It said Israeli warplanes fired several missiles after entering neighbouring Lebanon's air space.

"Israeli warplanes at 2.42am fired a number of missiles from Lebanese air space, targeting one of our military positions near Masyaf, which led to material damage and the deaths of two members of the site," the army said in a statement.

It warned of the "dangerous repercussions of such hostile acts on the security and stability of the region".

Syrian opposition sources said four Israeli warplanes were involved in the strike. The Syrian Observatory for Human Rights, along with others, identified the target as the al-Talai facility, a site that had been subject to US sanctions for its role in the Syrian non-conventional weapons agency.

The strikes follow a series of statements by Israel in recent weeks accusing Iran of seeking to establish itself in Syria and Lebanon and of building a weapons factory, as the six-year Syrian civil war has continued to swing in favour of Assad.

Israel rarely confirms its strikes inside Syria but it has launched numerous strikes during the country's civil war, usually against arms convoys and weapons storage sites associated with Hezbollah, a key Assad ally.

An Israeli army spokeswoman declined to discuss reports of a strike in Syria, but Amos Yadlin, a former head of Israeli military intelligence, tweeted that the reported attack was not routine and targeted a Syrian military scientific centre.

"The facility at Masyaf also produces chemical weapons and explosive barrels that have killed thousands of Syrian civilians," he said.

Amir Eshel, a former Israeli air force chief, suggested in August that Israel had conducted dozens of airstrikes on weapons convoys destined for the Hezbollah over the past five years.

Washington claims the al-Talai centre developed the sarin gas weapon allegedly

used in a chemical attack on the Syrian town of Khan Sheikhun in April, which left about 80 people dead.

UN war crimes investigators announced on Wednesday they had an "extensive body of information" that indicated Syrian warplanes were behind the attack.

In a conference call with journalists, the former Israeli national security adviser Yaakov Amidror said the fact that the target was a Syrian military facility took Israeli intervention to a new level.

"I know the organisation and facility," he said. "For many years it has been one of the Syrian centres for research and development for weapons systems including chemical weapons ... and weapons that have been transferred to Hezbollah."

The only logical explanation for the attack was that the facility was producing weapons systems for Hezbollah, he said.

Even before the outbreak of the war in Syria, the al-Talal centre was on Israel's radar. The director of the Israeli national security council's counter-terrorism bureau called for the destruction of the centre in 2010, alleging it had provided weapons to Hezbollah and Hamas.

Israel is conducting its biggest military exercise in 19 years on its northern border, involving tens of thousands of troops. It has been widely described as a dress rehearsal for a future war with Hezbollah, including civilian evacuation drills.

The strike, if confirmed, follows increasingly bellicose statements from senior Israeli government officials, including the country's prime minister, Benjamin Netanyahu, about the advances Assad has made in the civil war, backed by Iran, Hezbollah and Russia.

Netanyahu accused Iran last week of building sites to produce precision-guided missiles in Syria and Lebanon, but the commentator Amos Harel suggested in Haaretz that the Israeli action may have been a message aimed as much at Washington and Moscow as Tehran and Hezbollah after Israeli disquiet over a Russian-backed partial ceasefire in Syria.

"The United States, whose interest in Syria has been on the decline, acceded to the Russian initiative. Washington and Moscow also failed to heed Israeli protests that the agreement to reduce friction in southern Syria failed to require Iran and allied militias to steer clear of the Golan Heights," he wrote.

<https://www.theguardian.com/world/2017/sep/07/israel-airstrike-syria-chemical-weapons-facility>

## **North Korea and the Threat of Chemical Warfare**

*By Theo Emery, October 27, 2017*

The war of words between President Trump and the North Korean leader Kim Jong-un over Pyongyang's nuclear program has rattled nerves around the world. But the trial of two women in Malaysia for using the nerve agent VX to kill Mr. Kim's half brother is a reminder that North Korea's lethal arsenal isn't limited to nuclear weapons. The North's chemical weapons pose a grave risk to South Korea and to regional stability.

Experts say chemical munitions have long been deployed along the demilitarized zone that separates the North and South. In the event of a military attack against the North, analysts say, the regime sees chemicals as an option for a first response. Seoul and its 10 million inhabitants could be hit immediately.

Estimates of casualties are staggering. Images from Syria of children gassed with sarin in recent years have horrified the world; imagine a death toll in South Korea a thousand times larger.

In a June article in *Bulletin of the Atomic Scientists*, the military historian Reid Kirby used the term "sea of sarin" to describe such an attack. Accounting for sarin's toxicity, the types of artillery along the DMZ, and vulnerability of children and the elderly, he estimated that a sarin attack could kill as many as 2.5 million people in Seoul and injure millions more. There are about 24,000 United States military personnel in South Korea, along with their families, and thousands of American expatriates.

No one outside of the North Korean government knows with certainty the composition of the country's chemical stockpile, but intelligence from defectors and the South Korean government suggests that Pyongyang has 2,500 to 5,000 metric tons of some 20 chemical warfare agents.

Experts have long suspected that the North's arsenal includes VX, which is far more toxic than sarin. The gruesome murder in February of Mr. Kim's estranged half brother, Kim Jong-nam - a brazen killing in a Malaysian airport that prosecutors say was carried out by two women, trained by North Korean agents, who rubbed the victim's face with VX - has dispelled any doubts that the North has the chemical. Unlike sarin, VX is "persistent," meaning it lingers in the environment rather than disperses. The mustard gas that drenched World War I battlefields is the original persistent chemical.

Kim Jong-nam's murder also raises the specter of new proliferation of chemical arms. The fact that VX made its way out of North Korea undetected to another country could indicate that Mr. Kim would use the North's extensive criminal smuggling networks to

secretly assist other nations, or nonstate actors, in obtaining or producing it.

The chemical menace from North Korea recalls a time when chemical weapons posed far more of a global threat than they do today. The doctrine of strategic deterrence - maintaining stockpiles of powerful weapons to keep a similarly armed adversary in check - didn't begin with nuclear weapons; rather, it emerged from gas warfare in World War I.

In the war's aftermath, the Geneva Protocol of 1925 banned chemical warfare but not chemical weapons. The rationale for that apparent contradiction was that rogue nations might disregard international law and use chemical arms to attack cities and civilian populations in much the way North Korea threatens to do today. The way to deter such attacks, the logic went, was to maintain a stockpile. If signatory nations suffered a chemical attack, they could then retaliate in kind.

The United States Senate, convinced that the agreement was folly in a dangerous world, refused to ratify the pact. Many nations developed sophisticated chemical weapons programs, as well as biological weapons. By the 1990s, the United States had an arsenal of 27,700 metric tons of chemical agents, and Russia had at least 40,000.

The threat of chemical warfare diminished because of the far greater power of nuclear weapons, but also because of the 1997 Chemical Weapons Convention, which outlawed the weapons altogether. The United States and South Korea are among the 192 nations party to the agreement, and they agreed to destroy their chemical arsenals. North Korea did not join.

After President Bashar al-Assad of Syria was accused of using sarin in 2013, he joined the convention. He promptly violated it with

more chemical barrages, including the sarin attack in Khan Sheikhoun in April that spurred President Trump to retaliate with a missile strike.

A similar show of force against Mr. Kim's regime could have catastrophic consequences for South Korea. The North's nuclear arms are one layer of deterrence against attack; the chemical arms are a second. Many experts say that Mr. Kim, if attacked with conventional weapons as a warning or a pre-emptive strike, could see chemical weapons as a way to retaliate without escalating to nuclear weapons.

After the Syrian sarin attack in April, Mr. Trump used unusually emotional terms in his speech about his decision to launch the missile strike. "Even beautiful babies were cruelly murdered in this very barbaric attack," he said. "No child of God should ever suffer such horror."

Let's hope that the president's memory of those searing images will make him think twice before attacking Kim Jong-un. The fate of millions of South Koreans within range of Mr. Kim's chemical arsenal may depend on it.

<https://www.nytimes.com/2017/10/27/opinion/north-korean-chemical-weapons.html>

### **OPCW Aids Three African States in Devising Plans to Incorporate Chemical Weapons Convention into National Laws**

*August 31, 2017*

THE HAGUE, Netherlands - 31 August 2017 - Representatives of Benin, Djibouti and Ghana are better equipped in drafting national legislation for the implementation of the Chemical Weapons Convention (CWC), after participating in an Internship Programme for Legal Drafters and National

Authority Representatives held in The Hague from 7 to 11 August 2017.

The Internship Programme, which was conducted by members of OPCW's Technical Secretariat, enabled six participants from three countries to draft national legislation and to formulate a plan for its implementation.

A legal expert from Cameroon, Mr Patrick Endezoumou shared Cameroon's experience in developing and adopting CWC national implementing legislation. Mr Endezoumou was also a facilitator for the drafting sessions.

The programme covered a wide range of topics, including: overview of the legal requirements under the CWC, legal issues in national implementation, initial and annual declarations to the OPCW, the role of the National Authority, and provisions in national implementing legislation to address chemical terrorism.

After the presentations about the CWC and drafting sessions, participants from each country submitted a comprehensive National Action Plan and a summary of its draft legislation. The plan comprised a timeline for the adoption of the CWC which would serve as reference for the Technical Secretariat.

Since its launch in 2012, the Internship Programme has benefited 35 States Parties. Among these, Cape Verde, Grenada, Panama, Paraguay and Uganda have successfully enacted national legislation, while others are at various stages of the adoption process.

### **Background**

As the implementing body for the Chemical Weapons Convention, the OPCW oversees the global endeavour to permanently eliminate chemical weapons. Since the

Convention's entry into force in 1997 - with its 192 States Parties - it is the most successful disarmament treaty eliminating an entire class of weapons of mass destruction.

Ninety-five per cent of all chemical weapon stockpiles declared by possessor States have been destroyed under OPCW verification. For its extensive efforts in eliminating chemical weapons, the OPCW received the 2013 Nobel Prize for Peace.

<https://www.opcw.org/news/article/opcw-aids-three-african-states-in-devising-plans-to-incorporate-chemical-weapons-convention-into-national-laws/>

### **Russia vetoes U.S. effort to extend Syria chemical weapons investigation**

*By Pamela Falk Cbs News, October 24, 2017*

UNITED NATIONS -- Russia vetoed a U.N. Security Council vote on a U.S.-sponsored resolution to extend the mandate of chemical weapons inspectors in Syria.

The veto will prevent inspectors from doing their job and investigating chemical weapons attacks in Syria unless a new agreement is struck to extend them before mid-November.

The resolution did garner 11 votes, so it would have passed if not for the Russian veto. France, which holds the presidency, read the vote. Ambassador Francois Delattre said that the vote failed because of the veto.

U.S. Ambassador Nikki Haley, who is traveling in Africa, condemned the Russian veto. "Russia has once again demonstrated it will do whatever it takes to ensure the barbaric Assad regime never faces consequences for its continued use of chemicals as weapons," she said in a statement.

"It stinks," Russia's U.N. Ambassador Vassily Nebenzia said before the vote, but after Russia failed in its proposal to postpone the vote until after the report is issued. "Why put the cart before the horse? Russia is always guilty in everything."

The vote took place days before a report is due on who is responsible for an attack that killed nearly 100 civilians, including children, in Syria's Idlib province six months ago.

A joint investigation between the Organization for the Prohibition of Chemical Weapons (OPCW) and the U.N. is expected to say who was to blame for the attack on the town of Khan Sheikhoun.

Nebenzia said that the vote today "in no way" will have an impact on the work of the inspectors, and that Russia is ready to extend the mandate after the report is issued.

Earlier this month, Ambassador Mikhail Ulyanov, head of Russia's delegation to the General Assembly's disarmament committee, told reporters at the U.N. that Russia wanted to wait for the inspectors' report.

Russia, which is an ally of the Assad regime in Syria, has been critical of the work of the Joint Investigative Mechanism (JIM) program, which was created with Russian approval and was passed unanimously by the Security Council in 2015. It was later renewed in 2016.

When the OPCW found traces of "sarin or sarin-related chemicals" in an earlier attack in Syria, U.S. Ambassador Nikki Haley said it was "clear that the Syrian regime not only lied about the extent of their chemical weapons program, but that they will continue to refuse to cooperate with watchdog organizations like the OPCW."

OPCW Director-General Ahmet Üzümcü said "the perpetrators of this horrific attack must be held accountable for their crimes."

Haley urged other members of the U.N. Security Council to join the U.S. in voting to renew the mandate of the JIM for another year when it expires in November.

"The Russians have made it very clear that should the report blame the Syrians suddenly they won't have faith in the JIM. If the report doesn't blame the Syrians, then they say that they will. We can't work like that," Haley said. "We can't go and pick and choose who we want to be at fault, who we don't."

In June of this year, a report released by the OPCW Fact-Finding Mission (FFM) confirmed that people were exposed to a chemical weapon called sarin in April 2017 in the Khan Sheikhou area.

The report was sent to the U.N. Security Council and the OPCW.

Last year, the JIM found that the Syrian government was behind at least three attacks involving chlorine gas and the Islamic State of Iraq and Syria (ISIS) was responsible for at least one involving mustard gas.

The Khan Sheikhou provoked worldwide horror after images of infants and children were shown dying from exposure to the chemical weapons.

In retaliation for the Khan Sheikhou attack six months ago, the Trump administration launched 59 cruise missiles at the Shayrat military airfield in Homs province, Syria, in April. It was the first direct American assault against the Assad regime since that country's civil war began.

The history of the agreement is important to remember. The Assad government was

responsible for a sarin nerve agent attack as far back as 2013 in a Damascus suburb of Ghouta, where 1,000 people died and the then-Obama administration threatened a military response, only to reverse course.

In a diplomatic agreement, Syria agreed to destroy its declared chemical weapons, but kept some of its undeclared stockpiles.

Russia has complained frequently about the work of the JIM. And on Monday, in anticipation of the vote, the Foreign Ministry said the extension of the JIM mandate "should depend on the quality of its work" for which it needs to read the final report.

The Security Council has until mid-November to renew the mandate of the inspectors

<https://www.cbsnews.com/news/russia-veto-u-s-effort-to-extend-syria-chemical-weapons-investigation/>

### **North Korea also has nerve agent VX, chemical weapons expert warns**

*By Nick Bailey and Michele Neubert, September 24, 2017*

Amid a flurry of missile tests and inflammatory rhetoric, the world's attention is focused on North Korea's nuclear program.

But one expert believes the rogue state's stockpile of chemical weapons could also bring catastrophic consequences.

The Center for Nonproliferation Studies estimates North Korea has between 2,500 and 5,000 metric tons of chemical weapons.

In particular, it has a large supply of VX, the deadliest nerve agent ever created; last year it was used to assassinate Kim Jong Un's half-brother, Kim Jong Nam, at Kuala Lumpur airport.

The chemical stockpile could harm thousands of people if it were attached to a missile or if it ended up in the hands of Islamist extremists, according to Hamish de Bretton-Gordon, former commanding officer of the U.K. Chemical, Biological, Radiological and Nuclear Regiment (CBRN) and NATO's Rapid Reaction CBRN Battalion.

"The chance that North Korea might provide jihadis with some of their chemical or nuclear capability is a huge concern at the moment," he said. "What some people forget ... is that in 2006 North Korea helped [Syrian President Bashar al-] Assad and his regime set up their own nuclear program which was destroyed by the Israelis. But only as recently as a few weeks ago, the Organization for the Prohibition of Chemical Weapons intercepted two North Korean ships heading towards northern Syria with equipment to make chemical weapons."

De Bretton-Gordon has described VX as "the most toxic chemical weapon ever produced," highlighting that even a "microscopic amount" can prove deadly. VX also featured in the 1996 action thriller "The Rock."

It's banned under several international conventions and was designated a weapon of mass destruction by a U.N. resolution in April 1991. Its origins date back to the early 1950s, when a British scientist named Ranajit Ghosh was researching pesticides and developed the "V-series" of nerve agents - the V stood for "venom."

De Bretton-Gordon, who now works for military supplier Avon, fears impoverished Pyongyang could be more tempted to sell its chemical stockpile as it grapples with toughening global sanctions.

"We know that the jihadis have a lot of money and only last year tried to buy a highly enriched uranium from Russian criminals for

\$40 million a kilogram," he said. "So, would Kim Jong Un sell deadly VX for \$40 million a kilogram? I think absolutely they would the more that they get pushed."

However, Professor Hazel Smith at London's School of Oriental and African Studies (SOAS) says that would be a major change in policy for the North Korean regime.

"Historically North Korea values state sovereignty and doesn't value interactions with non-state entities such as ISIS and al Qaeda," she said. "Given the level of surveillance over their shipping activities it's also unlikely they would be able to, or try to transport weapons."

She says the regime would be more concerned right now with protecting its oil imports, which are still flowing despite economic sanctions.

There also fears that North Korea could put VX to use itself. Japanese Prime Minister Shinzo Abe has warned of that possibility, and Pyongyang's recent successful missile launch tests and nuclear tests have heightened the likelihood of chemical warfare in any conflict on the Korean peninsula.

"I think we now know that they have 5,000 tons of VX," de Bretton-Gordon said, speaking to NBC News at the Defence and Security Equipment International conference in London. "We know they have missiles capable of firing 4,000 to 6,000 miles, probably with a payload of half a ton, so half a ton of VX in those missiles could kill tens of thousands of people, and they could do that now, so that is a genuine concern."

He added: "We are focusing on the nuclear ... but whatever military option there is [for dealing with] North Korea, it must include mitigating and destroying that very large stock of VX that we know of."

But Smith says chemical weaponry doesn't form part of the regime's strategic plans.

"Were there to be an escalation of the current crisis, there would next be the use of conventional weapons. [North Korea] would not need chemical weapons for an attack on Seoul [and] if it did ... it would invite a wholesale global response to any military conflict between North and South Korea."

North Korea has said in public statements that it wants an official end to the Korean War, which was halted by a 1953 armistice but not ended by peace treaty. It also wants nothing short of full normalization of relations with the U.S. and to be treated with respect and as an equal in the global arena.

<https://www.aol.com/article/news/2017/09/24/north-korea-also-has-nerve-agent-vx-chemical-weapons-expert-warns/23221091/>

### **Revealed: Pak Arming Hizbul Mujahideen With Chemical Weapons**

According to the accessed transcripts, Hizbul members have already got their hands on these chemical weapons.

*By Manoj Gupta, July 12, 2017*

New Delhi: Pakistan is arming the terror group Hizbul Mujahideen with chemical weapons to carry out terror strikes in Kashmir, audio excerpts intercepted by security agencies have revealed.

These transcripts are undeniable and damning proof of how Pakistan is aiding and abetting terror activities in Pakistan. Terror outfits have lost 90 members to military offensives during the past few months, and hitting back with chemical weapons may be a desperate way for Hizbul to get back at the Indian security establishment.

According to the accessed transcripts, Hizbul members have already got their hands on these chemical weapons. Plans to use these weapons, primarily at forces, seem to be a desperate attempt to retaliate against the back-to-back successful offences launched by the security forces.

"Peer Sahib [LeT chief Hafiz Muhammed Saeed] wants me, but my people want me back. Our next programme will be after Eid...We will plan our next move after Eid," says the transcript accessed by News 18.

Members of this outfit hope to surprise the Indian security forces, which have so far been dealing in conventional weaponry, with this chemical attack. "Inshallah, we are going to get lots of support from Pakistan...things are happening along the border. In days to come, Pakistan will step-up its anti-India game,' a Hizbul operative can be heard saying at one point.

At another instance, this operative adds, "Till now we've used grenade launchers on the Indian army...killing just 3-4 and injuring a few. But now it's time to change our tactics. We will straightaway use chemical weapons...to kill as many as possible at the same time."

Hizbul Mujahideen is the biggest terror outfit in the Valley with around 200 active members. Its members are suspected to have aided Monday's Amarnath Yatra attacks.

Seven pilgrims were killed and several injured on Monday evening when terrorists attacked a bus carrying the pilgrims in Batingu, near Anantnag, Jammu and Kashmir.

The Jammu and Kashmir Police said that the Lashkar-e-Taiba was responsible for the attack on a bus carrying Amarnath pilgrims, which has been denied by the group.

"There is a LeT hand behind the terror attack on Amarnath pilgrims in Anantnag district where seven yatis were killed and 19 were injured. Investigation is still going on. Security has been reviewed," the IG Kashmir said. Meanwhile, LeT condemned the attack on the pilgrims and called it a 'reprehensible' and 'un-Islamic' attack.

Reacting to CNN-News18's report, BJP leader RK Singh said, "If this sort of escalation take place then that will lead to war. Handler of Hizbul Mujahideen need to think carefully. This will lead to massive outrage in India and world."

LT General (Retd) GD Bakshi said, "It seems they are looking for a big terror attack. You (CNN-News18) have done great service by exposing this."

<http://www.news18.com/news/india/revealed-pak-arming-hizbul-with-chemical-weapons-1459029.html>

### **North Korea could be mass producing biological weapons to unleash smallpox and plague, report warns**

Programme to develop deadly chemicals such as anthrax reportedly began in 1960s

*By Caroline Mortimer, October 23, 2017*

North Korea is likely to be developing biological weapons alongside its nuclear programme, a new report has warned.

A new study by the Belfer Centre, a US thinktank, warns that Pyongyang is likely to have a programme to develop its biological weaponry.

Based on testimony from defectors, it is believed to have begun in the 1960s after the Korean War between 1950 and 1953 caused the deaths of thousands in outbreaks of cholera, typhus, typhoid, and smallpox

which the regime blamed on biological attacks by the US.

Following the assassination of Kim Jong-un's brother Kim Jong-nam in Malaysia with the deadly nerve agent VX in February which reputedly came from the Pyongyang Biotechnical Institute.

The state research centre is run by the North Korean Army and was visited by the dictator himself according to photos which emerged in 2015.

It is thought to be producing several different diseases and manmade biological weapons that the US deems dangerous such as plague, anthrax, viral haemorrhagic fevers and smallpox.

South Korean intelligence believes there are at least three possible biological weapons production facilities and seven research centres associated with developing them.

The authors of the report say although the majority of the international community's attention has been focused on the ramping up of North Korea's nuclear weapons programme, their biological programme also needs attention.

They said: "Preparation against BW [biological weapons] is urgent and necessary, which will also serve as defence against naturally occurring epidemics that increasingly threaten the 21st century. "Military and public health sectors should cooperate to urgently prepare for 'dual-response' mechanisms.

"Components of a well-established 'dual-response' program should include the best possible threat assessment by military and intelligence communities, a strong public health detection and response system, a well-coordinated crisis communication

strategy among multiple stakeholders, and compliance from an informed public."

The report also warns that they do not know the extent of the programme or how fast North Korean agents would be able to deploy them.

It quoted a recent statement by the South Korean Defence Ministry which said Pyongyang could weaponise 13 types of biological agents within 10 days.

Weaponising means stabilising and preparing dangerous biological agents such as anthrax, yellow fever or plague to be ready for release against their chosen target.

The report said it was also unclear how these biological weapons could be deployed and methods could range from using missiles, drones, aeroplanes, sprays and even human beings to cause devastation on mass scale.

It noted that North Korea had 200,000 members in its special forces and "even a handful of those special forces armed with biological weapons would be enough to devastate South Korea" and that agents did not need sophisticated training in order to spread the diseases to their intended targets.

The report warned that it was "theoretically possible" for the regime to deploy hundreds of sleeper agents to carry out attacks "disguised as cleaning and disinfection personnel" deploying the weapons "with backpack sprayers" or for them to release dangerous chemicals and bacteria into the water supply.

<http://www.independent.co.uk/news/world/asia/north-korea-biological-weapons-belfer-centre-pyongyang-nuclear-kim-jong-un-smallpox-plague-nerve-gas-a8015931.html>

## **Is the U.S. Really Targeting Russians With Bio Weapons?**

One expert says there are easier ways to kill off a population

*By Evan Gershkovich, November 3, 2017*

President Vladimir Putin on Monday held a conference with the Civil Society and Human Rights Development Council fielding questions on the topics du jour - theater director Kirill Serebrennikov's embezzlement trial and the recent knife attack on journalist Tatiana Felgenhauer.

At one point, council member Igor Borisov raised concerns that foreigners were taking photos of Russians, for unknown - potentially malicious - purposes, he implied.

But that was no concern of Putin's. He brushed the question aside to pivot to an altogether more unexpected concern: That foreigners are collecting biomaterials across Russia - "purposefully and professionally." This, the president seemed to suggest, was the more nefarious affair.

"Why are they going to different ethnic groups and to people living in different geographical locations across Russia?" the president asked. "Why are they doing this?"

That night, Franz Klintsevich, the deputy chairman of the Federation Council's Committee for Defense and Security, offered a theory.

"I'm not saying that this is about preparing a biological war against Russia," he wrote on his Facebook page. "But those scenarios, without a doubt, are being developed. That is to say, in case the need suddenly arises."

It wasn't long until some of Russia's most infamous officials were adding to the charged

rhetoric. The collection of Russian fluids, organs and tissues, said Gennady Onishchenko of the Duma's committee on education and science, is "nothing other than proof that the United States has not ceased its offensive military program."

To cap it off, Onishchenko claimed there was a "belt of biological warfare facilities" surrounding Russia in neighboring Georgia, Kazakhstan, Azerbaijan and Ukraine.

### **The U.S. explanation**

In July, Russian state-run network RT discovered that the U.S. Air Force had put out a request to acquire samples of synovial fluid, which fills joint cavities, and ribonucleic acid (RNA) from Russians. They would be "collected from Russia and must be Caucasian," the request read. The samples, the Air Force said, would further research on the musculoskeletal system.

Bo Downey, a spokesperson, told RT that the ongoing study by the Medical Air Force Molecular Research Center required further samples. Because the first data set sent by an American company had included samples collected in Russia, the second set would need Russian samples too.

"The main thing here is the task of keeping the research clean," Downey told the Meduza news outlet.

Mikhail Davydov, the head of the Russian Academy of Medical Sciences, told The Moscow Times that there was nothing new about how Russian samples were being collected.

"This has been going on for twenty years," he said, adding that the practice was reciprocal. "We send material to various countries, and they send material to us."

Could a U.S. bio-weapon really kill off Russians?

In the past, there has been some speculation that a specific ethnic group could be targeted with a biological weapon, potentially through a process known as "RNA interference."

The process, discovered by Andrew Fire and Craig Mello in 1998 - which earned them the Nobel Prize in 2006 - renders certain genes inactive. It is thought to be a promising technology for the treatment of diseases like arthritis by "silencing" malignant genes.

But could RNA interference be used to target the Russian ethnic group? Konstantin Severinov, a professor of molecular biology and biochemistry at the Skolkovo Institute of Science and Technology and Rutgers University in the U.S., says it would be "impossible."

"For it to work, the weapon would have to target a group of people with a shared specific genetic marker while excluding anyone who doesn't have that marker," he explained.

"In a modern country the size of Russia - or the United States or China, for example - these kinds of specific markers just don't exist, since people living there have long, mixed genetic histories. The guy standing next to you on the metro in Moscow could be more dissimilar to you genetically than some guy on the subway in New York."

Mikhail Gelfand, deputy director of the Institute for Information Transmission Problems of the Russian Academy of Sciences, said that the goal of studying genetic material is primarily to cure diseases, not to develop weapons.

"If such weapons were possible, we would have already cured cancer by now," he said. "That would be relatively easy: The patient

is right in front of you, so you don't have to drop something out of an airplane and hope it lands on people below."

Gelfand also said that, hypothetically, it could be possible to develop a biological weapon but only to target some very isolated group that hadn't been in contact with anyone else for thousands of years.

"It is probably possible if you spend a lot of money to develop a weapon that could exterminate the inhabitants of some isolated island," said Gelfand. "But it would be much easier to just show up and kill them."

### **‘Majorly deceived’**

On Thursday, Onishchenko called the American explanation a "clumsy, ill-conceived legend."

"If the person who had been explaining this had revealed their actual goals, they would have had to shoot him," he said, adding he was proposing new legislation that would protect Russians' "biological security."

But there have been worries over the extraction of biological materials before. In 2007, the Federal Customs Service banned their export after Nikolai Patrushev, the then- head of the FSB, expressed concern to Putin over the development of biological weapons.

Perhaps, some have wondered, the head of state was misinformed again.

Gelfand, in an earlier interview with the NSN radio station, put it bluntly. "Someone majorly deceived Vladimir Putin," he said.

A Russian Twitter user echoed the point - and, in turn, made light of the fuss: "Someone misled Putin again. A bunch of biomaterial has been sitting at the entrance to our building for several weeks and no one's taking it away."

Another user joked: "Left some biomaterial in the elevator for the CIA."

On Thursday, Russian media reported that the laboratory accused of exporting Russian biomaterials was among ten organizations that received the Russian government's award for service quality on Nov. 1. The announcement was signed by Prime Minister Dmitry Medvedev.

<https://themoscowtimes.com/articles/is-the-us-suddenly-targeting-russians-with-bio-weapons-59464>

## **DISARMAMENT**

### **OPCW Deputy Director-General Visits Russia to Mark Closure of Kizner Chemical Weapons Destruction Facility**

*September 29, 2017*

THE HAGUE, Netherlands - 29 September 2017 - At the invitation of the Government of the Russian Federation, Deputy Director-General Hamid Ali Rao, on behalf of the OPCW, participated today in a ceremony on the completion of operations at the Kizner Chemical Weapons Destruction Facility in the Udmurt Republic. This also marks the completion of the full destruction of the 39,967 metric tons of chemical weapons that had been possessed by the Russian Federation.

The Deputy Director-General attended a video conference with President of the Russian Federation, H.E. Mr Vladimir Putin; together with Presidential Envoy to the Volga Federal District and Chairman of the State Commission for Chemical Disarmament, Mr Mikhail Babich; Minister of Industry and Trade, Mr Denis Manturov; and the Head of the Federal Directorate for Safe Storage and Disposal of Chemical Weapons, General Valery Kapashin.

The Closing Ceremony at Kizner was attended by high-ranking officials and representatives of the State Commission for Chemical Disarmament and various ministries and agencies of the Russian Federation. Also present were representatives of the States Parties that assisted the Russian Federation with its destruction programme.

Ambassador Rao acknowledged the efforts of the Russian Government to destroy its entire stockpile in a safe and efficient manner. He also recognised the important financial and in-kind contributions made by other OPCW Member States in support of these efforts.

Since this facility was commissioned in December 2013, a dedicated team of specialists and support staff from both the Russian facility personnel and Technical Secretariat have carried out the challenging task of destroying and then verifying a large portion of Russia's chemical weapons legacy, more than 5,745 metric tonnes of chemical agents, including sarin, soman, VX and lewisite were rendered unusable in Kizner. This facility was responsible for the destruction of almost 2,187,000 munitions in various calibres.

With the completion of Russian chemical weapon destruction activities at Kizner, 96.3 per cent of all chemical weapon stockpiles declared by possessor States have been destroyed under OPCW verification. For its extensive efforts in eliminating chemical weapons, the OPCW received the 2013 Nobel Prize for Peace.

## **Background**

As the implementing body for the Chemical Weapons Convention, the OPCW oversees the global endeavour to permanently eliminate chemical weapons. Since the

Convention's entry into force in 1997 - with its 192 States Parties - it is the most successful disarmament treaty eliminating an entire class of weapons of mass destruction.

<https://www.opcw.org/news/article/opcw-deputy-director-general-visits-russia-to-mark-closure-of-kizner-chemical-weapons-destruction-facility/>

## **OPCW Marks Completion of Destruction of Russian Chemical Weapons Stockpile**

*October 11, 2017*

THE HAGUE, Netherlands -11 October 2017- In the margins of the 86th Session of the Executive Council of the Organisation for the Prohibition of Chemical Weapons (OPCW), a ceremony to mark the completion of the destruction of the Russian Federation's chemical weapons took place today at the residence of Ambassador Alexander Shulgin, the Permanent Representative of the Russian Federation to the OPCW. The Permanent Representatives and delegates from States Parties to the Chemical Weapons Convention (CWC) and OPCW Technical Secretariat staff attended the ceremony.

The Head of the Russian National Authority, Deputy Minister of Industry and Trade, Mr Georgy Kalamonov, delivered a statement expressing his thanks to the OPCW and States Parties for supporting the destruction programme.

OPCW Director-General, Ambassador Ahmet Üzümcü, acknowledged the remarkable achievement by the Russian Federation and presented a memorable certificate to Deputy Minister Kalamonov marking the full destruction of the 39,967 metric tons of Russian chemical weapons. He also gave a commemorative plate to General Viktor Kholstov to recognise his personal

commitment to and efforts in achieving this milestone.

The OPCW's inspection teams have verified the destruction at seven chemical weapons destruction facilities in the Russian Federation. On 27 September 2017, the last of these facilities, located in Kizner, officially concluded its operations.

With the total elimination of Russia's declared chemical weapons programme, 96.3 per cent of all chemical weapon stockpiles declared by possessor States have been destroyed under OPCW verification.

## **Background**

As the implementing body for the Chemical Weapons Convention, the OPCW oversees the global endeavour to permanently eliminate chemical weapons. Since the Convention's entry into force in 1997 - with its 192 States Parties - it is the most successful disarmament treaty eliminating an entire class of weapons of mass destruction.

For its extensive efforts in eliminating chemical weapons, the OPCW received the 2013 Nobel Prize for Peace.

<https://www.opcw.org/news/article/opcw-marks-completion-of-destruction-of-russian-chemical-weapons-stockpile/>

## **Search Continues for Chemical Weapons in Lincolnshire**

*October 9, 2017*

A Lincolnshire wood remains closed a week after canisters containing mustard gas were unearthed.

Police and other agencies are continuing to search Roughton Moor Woods, near Woodhall Spa, Lincolnshire. Sonar is being used to help search a nearby lake.

Two people were treated in hospital for minor burns after making the find.

A woman and two men have been arrested and bailed on suspicion of possessing a noxious substance.

More on this and other Lincolnshire stories

Lincolnshire Police said investigators were "conducting tests and removing the contaminated items".

Ch Insp Dan Whyment said he appreciated the public's patience and said the search would continue this week "and possibly beyond".

"We're very much aware that people want to see the woodland reopened and we're doing our best to make sure that this happens as soon as possible," he said.

"We hope that people aren't unduly worried as we've been working at the location for some time now.

"I'd like to reiterate that this is simply to ensure that we are being thorough and public safety remains our priority."

Officers have also searched addresses in Woodhall Spa and Lincoln, but no further noxious substances were recovered.

The canisters found at Roughton Moor are believed to be leftover from an RAF station and military base which was on the site from 1942 until it closed in the late 1960s.

Mustard gas was used as a weapon during World War One and outlawed by the Geneva Protocol of 1925.

The people burnt when they unearthed canisters had been digging for vintage bottles in the woods.

<http://www.bbc.com/news/uk-england-lincolnshire-41552907>

# Book Review

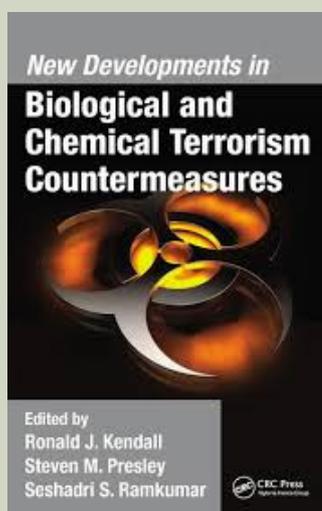
**Biological and Chemical Terrorism Countermeasures,**  
**Editors: Ronald J. Kendall, Steven M. Presley and Seshadri S. Ramkumar,**  
**ISBN: 978-1-4987-4758-5,**  
**CRC PRESS, 2016**

**Mr. R. Mohan Babu**

*The author was a Research Intern at Strategic Technologies Centre, IDSA.*

## Summary

The book is a science-based guide to counter CBW threats. With thorough research on the threats, vulnerabilities and the toxic effects of various agents, the book provides a detailed understanding on how to successfully implement CBW counter measures in the present and the future.



It is no doubt that science has propelled humankind forward in the 21st century. The globalization of science and technology in the modern era has made ineffective the transnational physical borders, thereby expanding its reach and benefitting the global population. However, along with the boon comes the curse. The advancements in the field of science, have also rendered the human population vulnerable to new kinds of threats. One of those being, the development of Chemical and Biological Weapons (CBW). Since time immemorial, CBW have been used as agents of warfare between states. Of late, their easy availability, accessibility and means of delivery have made it possible not just for states, but also for the terrorists to use them without hassle. The magnitude of the risks associated with CBW has increased compared to what it was during both the World Wars or even the Cold War. The peculiarity of the threats associated with the CBW agents necessitates the scientific understanding of their characteristics which could make the countermeasures effective.

The book *New Developments in Biological and Chemical Terrorism Countermeasures*, as one of its editors Ronald J. Kendall mentions in the preface, is meant to enhance the effectiveness of the science of countermeasures that would/shall be deployed against CBW threats. The evaluation of the threats posed by CBW can be optimized if the characteristics of the CBW threat agents are comprehended clearly. In that sense, the book proves to be a scientific guide in finding potential advancements when it comes to countering CBW threats.

The book's first chapter starts under the pretext that the enemy is not any one nation-state but a collection of individuals leaning towards a radical religious ideology that seeks to confine

the world under one theocratic rule. To add on, it also says that the hatred towards the west would drive those radical religious entities to fulfill their goals by any means necessary. A modern day occurrence that contrasts the pretext is the killing of Kim Jong-Nam, the half-brother of the North Korean leader, Kim Jong-Un in the Kuala Lumpur airport by using the liquid nerve agent VX.<sup>1</sup> This serves to highlight the fact that religious radicalism and the hatred towards the west are not necessarily the only driving forces behind the use of CBW.

The same chapter brings to the readers' notice the available technologies and related difficulties involved in the detection and identification of biological and chemical threat agents. CBW surveillance and detection systems are necessary not just to improve the public health response and readiness, but also to improve the quality of public health policies, because they help analyze the gravity of the threats.

The second chapter speaks about framing an effective model that can counter the challenges and risks of vector-borne diseases. Insects as vectors can be used as agents of entomological warfare because they are easily available at a meager cost hence making their deliverability easy. With around 1 million people losing their lives to vector-borne diseases,<sup>2</sup> it is imperative to construct a compact model that can help improve the quality of countermeasures against them. The authors examine two frameworks for designing a model that can assess the risk of vector-borne diseases.

The third and the fourth chapters embody the threats and vulnerabilities associated with biological threat agents; and the pathogenic and toxic effects of the same, respectively. As mentioned earlier, biological threat agents are easily available and are plain simple in contrast to nuclear weapons. These factors make the civilian populations around the world an easy target for terrorists to deploy biological threat agents as a means to make their statement, rather than conventional modes of terrorism.

Understanding each agent's characteristics independently is imperative when it comes to formulating prevention strategies and improving the state of science of countermeasures that would be deployed during a potential combinational attack (Two or more agents used as a bio-weapon at the same time).

The fifth chapter is solely dedicated to Ricin. Despite the difficulties in converting castor beans into a lethal form of ricin, the small dosage required to cause numerous casualties makes ricin one of the most dangerous biological threat agents. Having been used as a bio-warfare agent since the First World War, the increase in the number of ricin attacks in the 21st century lays importance as to why ricin needs to be studied in detail. In this chapter, a wide array of facets related to ricin, ranging from its properties to how its toxicity can be deterred is discussed in detail.

The sixth chapter's content is dedicated to developing a probiotic bio-therapeutic countermeasure against the cholera toxin. Diarrheal diseases caused by viruses such as vibrio cholera, Shigella, rotavirus, etc are severe in consequences. The reason for a probiotic cure as an alternative for a disease such as cholera is that the viruses have become antibiotic resistant, hence rendering the conventional treatment methods ineffective most of the times. If Cholera breaks within the civilian population as a plot of a terrorist attack, probiotics can turn out to be an effective and an easily available cure.

The penultimate chapter "New perspectives on protective fibrous substrates" explores the domain of technical textiles. Given the hybrid nature of threats that prevail in the current era, it is important for both civilians (in the conflict prone zones) and the military personnel to use clothing that can protect them from getting injured or incapacitated. To transform the protective textile domain into a protean one, more collaborative, inter and multi-disciplinary

research must be undertaken. Most of the concepts discussed in the chapter have not yet been put to a wider use and with larger threats looming, the faster and sensible the research process is, the better the situational readiness would become. The eighth chapter serves as the conclusion in which the authors stress on the importance of continuing vigilance to counter the ever evolving CBW threats.

The book ends with the authors giving a set of recommendations and the reasons for future research needs owing to the evolving nature of CBW threats faced by the modern day nation states. Overall the book adds value to the literature on the subject. However, there are few shortcomings that have to be mentioned. One, is that the book is USA- centric , which does not take into its account, the fact that most of the third world countries, lack the technology and resources to deploy high end CBW surveillance. Many other factors such as economic status, policy hurdles, bureaucratic hurdles vary from one part of the globe to another hence making it difficult to incorporate "one size fits all" countermeasures against CBW. Second is that the flow of the book seems disconnected as each chapter discusses in detail an independent topic which is in contrast with the preceding and the succeeding chapters. Although biological threat agents and their effects have been studied independently, the lack of sequential cohesion makes comprehending the book's purpose difficult for the reader.

The third and the major drawback of the book is that, there has been very less emphasis on chemical weapons. The substances used in chemical warfare are more dangerous and lethal than some of the substances used in biological warfare, therefore countering them must have been given equal priority. Nerve agents such as VX, Tabun, and especially Sarin which has been used in Syria frequently in the last few years have been left out completely. Use of Sarin started in Syria in 2013 and ever since the usage and banning of chemical threat

agents have been a subject of a global debate. Even regularly used blistering agents such as mustard have not found a place in the book. Since the book is about the science of countermeasures the makers of the book must have included a chapter on different types of chemical threat agents, the symptoms caused by them, magnitude of their toxicity and the complexity of treatments for chemical attack victims, amongst others. Also, by not adding such a chapter, the focus on prevention strategies for an attack of this nature has been compromised from the view of the book. This loophole along with the two previously mentioned ones end up doing less justice to the title of the book.

## Endnotes:

1. Holmes, Oliver, and Tom Phillips. "Kim Jong-nam killed by VX nerve agent, say Malaysian police." *The Guardian*. February 24, 2017. (Accessed August 09, 2017) at <https://www.theguardian.com/world/2017/feb/24/kim-jong-nam-north-korea-killed-chemical-weapon-nerve-agent-mass-destruction-malaysian-police>.
2. A global brief on vector-borne diseases. Issue brief no. WHO/DCO/WHD/2014.1. World Health Organization. 2014. (Accessed August 16, 2017) at [http://apps.who.int/iris/bitstream/10665/111008/1/WHO\\_DCO\\_WHD\\_2014.1\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/111008/1/WHO_DCO_WHD_2014.1_eng.pdf)

# CBW Magazine

Journal on Chemical and Biological Weapons

Winter / July-December 2017



INSTITUTE FOR DEFENCE  
STUDIES & ANALYSES

रक्षा अध्ययन एवं विश्लेषण संस्थान

**Institute for Defence Studies and Analyses**

No. 1, Development Enclave, Rao Tula Ram Marg

Delhi Cantt., New Delhi-110 010

<http://www.idsa.in>