



Thirty-Sixth Session  
26 – 29 September 2022

SAB-36/WP.2  
17 November 2022  
ENGLISH only

### **SUMMARY OF THE FIFTH MEETING OF THE SCIENTIFIC ADVISORY BOARD'S TEMPORARY WORKING GROUP ON THE ANALYSIS OF BIOTOXINS**

#### **1. AGENDA ITEM ONE – Opening of the meeting**

- 1.1 The Temporary Working Group (TWG) on the Analysis of Biotoxins of the Scientific Advisory Board (SAB) held its Fifth Meeting from 21 to 23 June 2022 in The Hague. The meeting was chaired by Dr Crister Åstot on behalf of the SAB, with Dr Suzy Kalb as Vice-Chairperson.
- 1.2 The TWG Chairperson opened the session welcoming everyone to the fifth official meeting of the TWG. He noted that the focus of the meeting was to hear from several external experts on various topics of relevance to the TWG, as well as to continue to refine the subgroup contributions towards the end of mandate report.

#### **2. AGENDA ITEM TWO – Adoption of the agenda**

The TWG adopted the following agenda for its fifth meeting:

1. Opening of the meeting (TWG Chairperson)
2. Adoption of the agenda (All)
3. Subgroup breakout sessions (All)
4. Managing the threat from mid-spectrum agents: a view from civil society (Prof Malcolm Dando and Dr Michael Crowley)
5. Contamination of food by mycotoxins (Dr Isabelle Oswald)
6. CBRN<sup>1</sup> post-incident response (Mr David Frisby)
7. Subgroup updates (All)
8. Any other business and next steps (All)
9. Closure of the meeting (TWG Chairperson)

#### **3. AGENDA ITEM THREE – Subgroup breakout sessions**

The meeting participants split up into subgroups to continue their respective discussions. The overarching questions being considered by each subgroup are:

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<sup>1</sup> CBRN = chemical, biological, radiological, nuclear.



- (a) What are the underlying requirements for the analysis of biological toxins in order to investigate alleged use of toxic chemicals as weapons? (subgroup 1)
- (b) What classes of biological toxins are most likely to be relevant in investigations of alleged use? (subgroup 2)
- (c) Are there other relevant compounds of biological origin that should also be considered based on their potential for misuse or technological change associated with them? (subgroup 2)
- (d) What are the technical requirements for analysis of the most relevant types of biological toxins? (subgroup 3)
- (e) What are the analytical standards and requirements of other international and national investigative authorities and how do these compare and/or factor into OPCW considerations and operations? (subgroup 4)
- (f) How can programmes of analytical exercises conducted by different networks of laboratories be coordinated or harmonised to minimise duplication, promote consistent practices, and develop a comprehensive picture of laboratory capabilities? (subgroup 4)
- (g) What institutional or legal measures need to be established to facilitate cooperation between the OPCW and other organisations working on the development of capabilities for the analysis of biological toxins? (subgroup 5)

#### **4. AGENDA ITEM FOUR – Managing the threat from mid-spectrum agents: a view from civil society**

- 4.1 Professor Malcolm Dando and Dr Michael Crowley, both at the University of Bradford in the United Kingdom, gave a virtual presentation to the TWG on mid-spectrum agents. The presentation began by stressing that civil society had repeatedly raised concerns that rather than there being an overlap between the Chemical Weapons Convention (“the Convention”) and the Biological Weapons Convention (BWC) in terms of scope of substances covered, there was in fact an implementation gap into which mid-spectrum agents often fell, as the States Parties to each Convention focused on their main business of classical chemical agents for the Convention, and traditional microbial pathogens for the BWC. The presentation gave a brief overview of the book “Toxin and Bioregulator Weapons: Preventing the Misuse of the Chemical and Life Sciences” that had just been completed by the presenters for publication by Palgrave McMillan in the autumn of 2022. Chapter 2 of the book was then reviewed, examining how research on toxins, bioregulators, and associated agents of biological origin (and their chemically synthesised analogues) has progressed at the same rapid pace as the rest of the chemical, life, and associated sciences and technologies, and the implications for the BWC and the Convention were explored.
- 4.2 Illustrative contemporary examples of potential dual-use concern—drawn from six country case studies—in the following areas were explored:
  - (a) dual-use defence-related research on toxins and bioregulators purportedly for “protective purposes”;

- (b) dual-use military-related research on both ‘classic’ toxins previously explored as warfare agents, and ‘novel’ toxins that potentially could be utilised for such purposes;
  - (c) civilian- and military-related brain research projects including on non-human primates;
  - (d) research and development of incapacitating chemical agent and central nervous system-acting chemicals, and related bioregulator research;
  - (e) research and development of malodorant weapons; and
  - (f) research and development of riot control agents of biological origin and their synthetic analogues, as well as associated means of delivery.
- 4.3 The implications of such research and associated activities for the Convention and the BWC were examined, and the range of appropriate responses by the OPCW and/or BWC States Parties were discussed.
- 4.4 The TWG asked whether either of the speakers had any understanding about the toxicities of known peptides that have bioregulatory properties. Professor Dando indicated that other than substance P, which has been widely studied, there is not much known about these types of peptides. Dr Crowley noted that there are other properties of bioregulators, other than toxicity, that may be of importance as well and this should not be forgotten. Subsequent discussion focused on how one would prioritise the concerns around different bioregulators.
- 4.5 Another discussion centred around dissemination and dispersal technologies for mid-spectrum agents and how these are being further developed. Various countries and companies still develop these technologies for what are ostensibly purposes not prohibited, though certain countries have decided not to develop these types of techniques at all.
- 4.6 Lastly, the TWG then discussed behaviour-modifying compounds. For example, research is being conducted on soldier enhancement, using chemicals to enhance the capabilities of a person, whether that be reflexes, strength, mental acuity. The TWG discussed how these types of compounds are covered under the Convention and circumstances in which their use would be considered a violation thereof.

## **5. AGENDA ITEM FIVE – Contamination of food by mycotoxins**

- 5.1 Dr Isabelle Oswald, from INRAE in France, gave an overview of mycotoxins and when and how they can contaminate foods. Mycotoxins are products of secondary metabolism of moulds that can develop on the plant in the field or during storage and have a toxic potential for humans and animals. Mycotoxins are secreted by moulds belonging to the genera *Aspergillus*, *Penicillium*, and *Fusarium*. More than 1000 mycotoxins have been identified.
- 5.2 Human exposure to mycotoxins through our diet is a growing concern in term of both food safety and public health. Because of their very different chemical structure and mode of action, mycotoxins induce several health effects. At the European level,

regulations based on their occurrence in food and/or their toxicity for humans and animals, have been established for seven mycotoxins: aflatoxin B1, deoxynivalenol, fumonisin B1, ochratoxin, patulin, zearalenone, and ergot alkaloids.

- 5.3 In addition to these ‘regulated’ toxins, new secondary fungal metabolites, described as “modified forms” and “emerging” mycotoxins represent a challenge in term of research. Indeed, their occurrence and their toxicity are poorly documented. Since our food can be contaminated by many substances, the study of mycotoxin mixtures or the association of mycotoxins with other food contaminants is another challenge for research. Temperature and humidity are important parameters for fungal growth and mycotoxin production. Therefore, climate change is expected to affect mycotoxin contamination of foodstuffs.
- 5.4 Following her presentation, Dr Oswald was first asked how many different mycotoxins were known. She indicated only about 20% of secondary fungi metabolites have been discovered, so more are constantly being discovered. Of course, not all of the undiscovered ones will have toxic properties. A further question related to whether new mycotoxins will have similar core chemical structures to existing mycotoxins. Dr Oswald explained that, in the case of aflatoxin, which has been extremely well studied due to its carcinogenicity, additional aflatoxin types can indeed be correlated back to known aflatoxins.
- 5.5 The TWG then asked what the regulatory limits of mycotoxins are in food. Dr Oswald indicated that while of course specific regulatory limits do exist and are often useful and necessary, there are some certain circumstances where the accepted limits are actually zero. This is the case for aflatoxin, which is also considered carcinogenic. In this case, then, as a risk mitigation, there are no limits established. Instead, a risk-based approach is taken where the toxin’s carcinogenicity dictates that an acceptable exposure limit be several levels of magnitude lower than it would otherwise be.
- 5.6 The group then had a discussion on routes of exposure of mycotoxins. Dr Oswald indicated the usual route of exposure is through food, though of course, situations exist where inhalation exposure can happen. However, airborne exposure to mycotoxins has not been studied comprehensively.

## **6. AGENDA ITEM SIX – CBRN post-incident response**

- 6.1 Mr David Frisby, from the Metropolitan Police in London, gave an overview of the United Kingdom’s policing network and how they conduct their investigations, to include information related to the ongoing investigation following events in Salisbury in 2018 related to exposure to a chemical weapon agent. He began by providing an introduction to the United Kingdom’s policing network, the different geographic regions, and organisational responsibility. This was followed by a description of their operational framework, namely their remit, current workload, and the duties, responsibilities, and skill sets of the practitioners, particularly in the Forensic Management Teams.
- 6.2 The presentation then turned more technical, with first a general overview of how they collect and consider forensic evidence, followed by background and details of how they work safely in areas that may be contaminated with CBRN materials. It was noted that investigation scenes are highly organised and controlled. There is also a lot of ongoing collaboration with other parts of the government.

- 6.3 Mr Frisby mentioned the importance of the management and recording of evidence within contaminated areas, as well as the different options they have available to assist in crime scene preservation. They often make use of a forensic evidence management tent (FEMT) and a forensic evidence store (FES) collectively known as a FEMT/FES system. An important element of any FEMT/FES system is to ensure a clean/dirty line is determined and that cross-cordon transfer then follows the dictated rules to ensure that the clean side of the line stays clean, while allowing for the proper sampling, documenting, and transporting of evidence that may possibly be contaminated.
- 6.4 The presentation then turned to the various innovations the United Kingdom’s policing network is making use of when conducting investigations and crime scene management. This includes making use of mobile forensic analysis tools, as well as the ability to store information related to evidence in a digital format—complete with the ability to store attachments and verified digital signatures, among others.
- 6.5 Mr Frisby concluded by giving some information and lessons learned regarding the ongoing investigation from the Salisbury incident several years ago where there was exposure to a chemical weapon agent. He noted some of the early considerations that came to bear and noted that these hold for any large investigation. These include public safety, ensuring the evidence is properly followed, utilising scientific resources early, managing political pressures, and considering consequence management appropriately, among others.

## **7. AGENDA ITEM SEVEN – Subgroup updates**

Each of the subgroups provided a progress report on their work, highlighting what work was left to do and beginning to share recommendations they feel should be made in the end-of-mandate report. Decisions were made regarding how particular considerations and recommendations should be phrased for the end of mandate report.

## **8. AGENDA ITEM EIGHT – Any other business and next steps**

A substantial discussion took place regarding potential speakers for the next meeting of the TWG. It was remarked that this will likely be the last substantive meeting the TWG is able to hold, with a final drafting meeting in January to focus solely on finalising the text and recommendations in the end-of-mandate report.

## **9. AGENDA ITEM NINE – Closure of the meeting**

The Chairperson ended the meeting at 16:25 on 23 June 2022.

## **ACKNOWLEDGEMENTS**

The TWG members thank all the guest speakers for their informative presentations and participation in the meeting and discussions. The TWG also wishes to acknowledge Ms Ernesa Ademagić of the OPCW Office of Strategy and Policy for her support and contributions to the meeting and its preparations. Lastly, the TWG thanks the OPCW Director-General for his establishment and support of the TWG and acknowledges the generous contribution of the European Union that helps to cover the costs of the Group's work.

Annex: List of Participants at the Fifth Meeting of the Scientific Advisory Board's Temporary Working Group on the Analysis of Biotoxins

## Annex

**LIST OF PARTICIPANTS AT THE FIFTH MEETING  
OF THE SCIENTIFIC ADVISORY BOARD'S TEMPORARY WORKING GROUP  
ON THE ANALYSIS OF BIOTOXINS**

	<b>TWG Member</b>	<b>Institution</b>
1.	Dr Crister Åstot <sup>*1</sup>	Swedish Defence Research Agency (FOI), Umeå, Sweden
2.	Dr Anne Bossée <sup>*</sup>	DGA CBRN Defence, France
3.	Dr Graeme Clark	Defence Science and Technology Laboratory, Porton Down, Salisbury, United Kingdom of Great Britain and Northern Ireland
4.	Dr Cindi Corbett	National Microbiology Laboratory, Public Health Agency of Canada
5.	Dr Christophe Curty	Spiez Laboratory, Switzerland
6.	Dr Brigitte Dorner	Robert Koch Institute, Germany
7.	Dr Mostafa Ghanei <sup>*</sup>	Baqiyatallah University of Medical Sciences, Islamic Republic of Iran
8.	Dr Suzy Kalb <sup>2</sup>	Centers for Disease Control and Prevention, United States of America
9.	Dr Zrinka Kovarik	Institute for Medical Research and Occupational Health, Croatia
10.	Dr Andrea Leisewitz <sup>*4</sup>	Universidad San Sebastián, Chile
11.	Dr Robert Mikulak	Department of State, United States of America
12.	Dr Yulia Polyak	Russian Academy of Sciences, Russian Federation
13.	Mr Günter Povoden <sup>*3</sup>	CBRN Defence Centre, Ministry of Defence, Austria
14.	Dr Fengxia Sun <sup>*</sup>	Hebei University of Science and Technology, People's Republic of China
	<b>External Speakers</b>	<b>Institution</b>
15.	Dr Michael Crowley	Bradford University, United Kingdom of Great Britain and Northern Ireland
16.	Prof Malcolm Dando	Bradford University, United Kingdom of Great Britain and Northern Ireland
17.	Mr David Frisby	London Metropolitan Police, United Kingdom of Great Britain and Northern Ireland
18.	Dr Isabelle Oswald	INRAE, France
	<b>Technical Secretariat Staff</b>	<b>Division</b>
19.	Dr Peter Hotchkiss	Office of Strategy and Policy

\* Member of the SAB

<sup>1</sup> Chairperson of the TWG

<sup>2</sup> Vice-Chairperson of the TWG

<sup>3</sup> Chairperson of the SAB

<sup>4</sup> Vice-Chairperson of the SAB