

Central Nervous System-Acting Chemicals The Scientific Perspective

Dr Christopher M. Timperley
Chair of the Scientific Advisory Board, OPCW

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CWC Article II Definitions

Toxic chemical. Any chemical which through its chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals.

Riot control agent. Any chemical not listed in a Schedule, which can produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure.

Purposes not prohibited under this Convention means (d) law enforcement including domestic riot control purposes.

Central Nervous System (CNS)



Comprises brain and spinal cord and nerves that arise from them

Junction of brain and spinal cord regulates vital functions: body temperature, respiration etc.

CNS-acting chemical. Defined herein as a toxic chemical that targets the central nervous system (CNS).

CNS-acting chemicals

Used in human and veterinary medicine to cause :

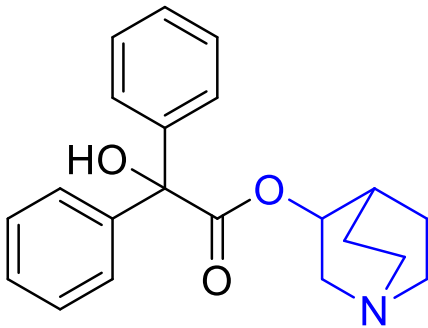
- sedation (decreased locomotion/mental sharpness)
- hypnosis (increased sleepiness)
- analgesia (reduced pain)
- anaesthesia (decreased awareness, unconsciousness)

Moscow Theatre Siege 2002

125 people died from aerosol of two CNS-acting chemicals belonging to the fentanyl class (carfentanil and remifentanil)

These chemicals are as toxic by inhalation as nerve agents

Psychochemical warfare agent BZ

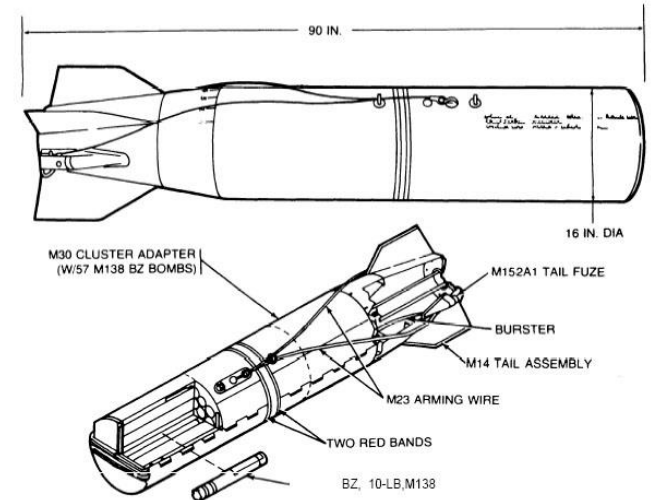


3-quinuclidinyl benzilate (BZ)

Schedule 2.A.3

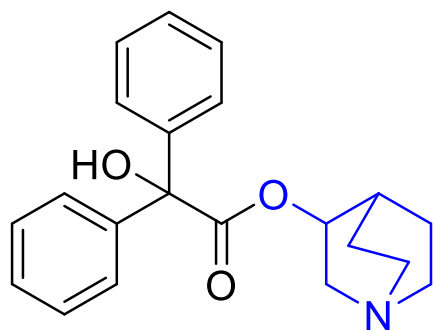


CLUSTER, BOMB: INCAPACITATING, BZ, 750-POUND, M43



In small doses, BZ causes sleepiness and decreased alertness. In large doses, it causes a progressive intoxication, leading to an inability to respond effectively or move about for 48-96 h.

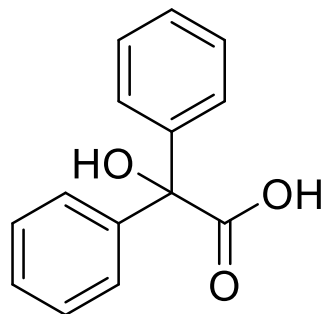
Psychochemical warfare agent BZ



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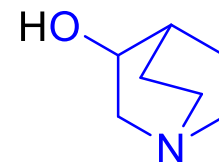
made from



2,2-diphenyl-2-hydroxyacetic acid

Schedule 2.B.8

and



quinuclidin-3-ol

Schedule 2.B.9

BZ is the only 'CNS-acting chemical' that is on the schedules of the Annex of Chemicals of the Chemical Weapons Convention

2003 SAB S&T report to RC-1

“The SAB noted that the science related to such agents is rapidly evolving, and that results of current programmes to develop such "non-lethal" agents should be monitored and assessed in terms of their relevance to the Convention.”

“However, based on past experience and the fact that many of these compounds act on the central nervous system, it appears unlikely from a scientific point of view that compounds with a sufficient safety ratio would be found.”

2008 SAB S&T report to RC-2

“The Director-General wishes to add that some aspects of the development of means of delivery of such incapacitants for law-enforcement purposes might be difficult to distinguish from aspects of a chemical weapons development programme.”

SAB S&T report to RC-2, RC-2/DG.1 of 28 February 2008, para. 2.3

“The potential risks to the Convention associated with advances in science and technology would increase significantly, should dedicated chemical weapons programmes exist and should they take advantage of new toxic chemicals.”

SAB S&T report to RC-2, RC-2/DG.1 of 28 February 2008, para. 3.14

2008 SAB S&T report to RC-2

“There is therefore good reason to call for transparency in chemical-defence programmes, and to assess carefully the compatibility with the Convention of the development of weapons that employ toxic chemicals for law-enforcement purposes (including so-called non-lethal weapons).”

SAB S&T review to RC-2, RC-2/DG.1 of 28 February 2008, para. 3.14

2008 Director-General to RC-2

“Likewise, in due course, States Parties may also wish to look into developments related to incapacitating agents and address questions such as the effect on the Convention of their possible introduction for the purposes of law enforcement and of new means for their use.”

Opening statement by the Director-General, RC-2/DG.2 of 7 April 2008, para. 57

2009 Director-General to CSP-14

“One other matter I wish to refer to is my perception about the need for the OPCW, at some stage in the not too distant future, to take stock of the growing interest on the part of some governments and civil society, in developments related to matters where the Convention might be - perhaps purposely - ambiguous or have lacunae, and which might impact on the ultimate effectiveness of the ban on chemical weapons.”

“Incapacitants or non-lethal weapons is one such area when it comes to the exact types and quantities of chemicals and their permitted use.”

2010 SAB-15

The SAB considered the history of the development of incapacitating chemical agents since the 1950s, including the fact that no chemical has been discovered or developed that satisfies the requirements of being able to produce almost instantaneous incapacitating effects which will last for some hours with no health risks to the exposed individuals.

“The SAB recognised the complexities presented by riot control agents and incapacitating chemical agents, and their treatment under the Convention. It recalled that both the SAB itself and the Director-General had made reference to the matter on several occasions.”

2011 SAB-16

A summary was provided on chemicals that had been considered incapacitating chemical agents from open literature.

“Most incapacitating chemical agents emerged from drug programmes in the 1960s and 1970s, and are centrally acting compounds that target specific neuronal pathways in the brain.”

“The most recent attention has focused on opioids of the fentanyl class. These are in clinical use as analgesics /anaesthetics, and in veterinary use for immobilising large animals. They are reported to have been components of the agent used in ending the siege of a Moscow theatre in 2002.”

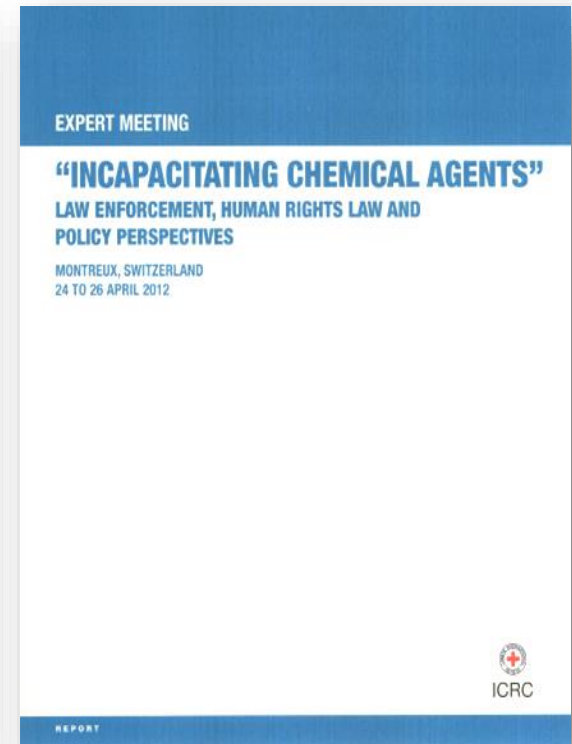
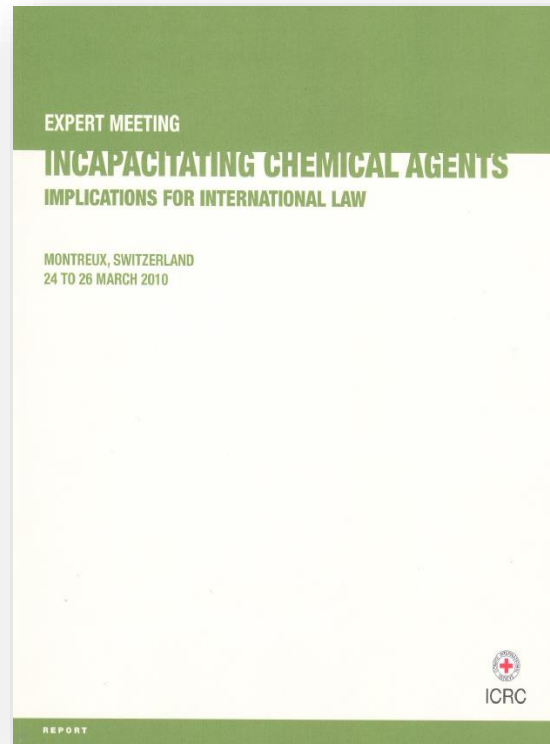
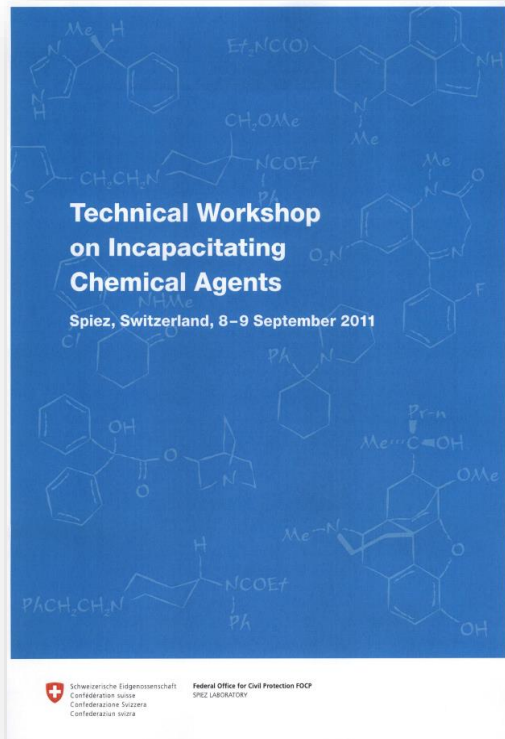
Report of Sixteenth Meeting of SAB, SAB-16/1 of 6 April 2011, para. 10.4

Toxicity of fentanyls

The equivalent of one grain
of salt of Carfentanil is
enough to kill a human
being



2011-2012 SAB-18 and SAB-19



“No recent scientific advances in regard to incapacitating chemical agents have been reported. There are no indications that problems of safety have been resolved.”

Report of Eighteenth Meeting of SAB, SAB-18/1 of 19 April 2012, para 8.8

2012 SAB S&T report to RC-3

“The Board considers the term ‘non-lethal’ as inappropriate when referring to chemicals intended for use as incapacitants, because for all chemicals toxicity is a matter of dosage.”

“The Board noted that chemicals considered having high safety margins in the context of controlled pharmaceutical use can have very low safety margins in the context of incapacitants when factors such as uneven dissemination, variability in human response, and the possible need for rapid onset are required.”

SAB S&T report to RC-3, RC-3/DG.1 of 29 October 2012, para. 12

2012 SAB S&T report to RC-3

“In the view of the SAB the **technical** discussion on the potential use of toxic chemicals for law enforcement purposes has been **exhaustive.**”

“The SAB recommends that the Secretariat start preparations for verification activities, relevant to incapacitating chemicals that could be required in an investigation of alleged use (IAU).”

“Such preparations should include developing analytical methods and procedures, as well as collecting analytical reference data for the analysis of such chemicals. The Secretariat should invite laboratories in Member States to contribute to this effort.”


2013 Director-General response to SAB

“Since the Second Review Conference, the SAB has conducted a thorough review of the issue of incapacitating chemical agents.”

“The Director-General would like to draw the attention of States Parties to the SAB’s assessment that the technical discussion on the potential use for toxic chemicals for law enforcement purposes has been exhaustive.”

“Regarding the SAB’s recommendation that the Secretariat ‘start preparation for verification activities’, the Secretariat will pursue efforts to enhance its chemical-analysis capabilities and will work with designated laboratories on this issue.”

2014 SAB advice on RCAs



OPCW **Technical Secretariat**

Office of Strategy and Policy
S/1177/2014
1 May 2014
ENGLISH only

NOTE BY THE TECHNICAL SECRETARIAT

DECLARATION OF RIOT CONTROL AGENTS: ADVICE FROM THE SCIENTIFIC ADVISORY BOARD

1. In accordance with subparagraph 1(e) of Article III of the Chemical Weapons Convention (hereinafter “the Convention”), States Parties are required to declare riot control agents (RCAs), which are defined in paragraph 7 of Article II of the Convention.
2. At its Twentieth Session, the Scientific Advisory Board (SAB) was requested by the Director-General (Annex 4 of SAB-20/1, dated 14 June 2013) to provide technical advice on an initial list of RCAs that had been declared by States Parties, researched, or were commercially available.

List of 17 RCAs provided to States Parties as a point of reference in support of their declarations (Note: Fentanyls do not appear on list)

2015-2016 Further developments

“The TWG also considered the increasing number of facilities that produce DOCs at low production volumes. Products such as highly active pharmaceutical ingredients (HAPI), e.g. powerful opioids used in anaesthesia ... may be highly relevant to the purpose of the Convention”.

SAB's Temporary Working Group (TWG) Report on Verification, June 2015, page 7

“The Organisation will also address the relevance of a broader spectrum of toxic chemicals and their precursors that may fall within its mandate, ranging from toxic industrial chemicals ... to chemicals used for example in medicine and law enforcement, including those acting on the central nervous system.”

Executive Council, Medium Term Plan 2017-2021, EC-83/S/1 of 8 April 2016, para. 13

2017 SAB advice on RCAs



OPCW

Scientific Advisory Board

Twenty-Fifth Session
27 – 31 March 2017

SAB-25/WP.1
27 March 2017
ENGLISH only

**RESPONSE TO THE DIRECTOR-GENERAL'S REQUEST
TO THE SCIENTIFIC ADVISORY BOARD TO PROVIDE CONSIDERATION ON WHICH
RIOT CONTROL AGENTS ARE SUBJECT TO DECLARATION UNDER
THE CHEMICAL WEAPONS CONVENTION**

“42 additional chemicals considered by the SAB might also be provided as a reference list of substances that do not meet the criteria of an RCA (and thus should not be declared as such) but have historically been considered for use as an RCA”

CNS-acting chemical

Effect of a general anaesthetic



Can cause death, temporary incapacitation or permanent harm during or after exposure

Riot control agent

Effect from chopping an onion



Disabling physical effects disappear within a short time after termination of exposure

OPCW Future Priorities and RC-4

Q. “What challenges do you foresee for the verification regime in the next ten years?”

A. “CNS active chemicals are drawing increasing attention; their analytical data should be added to the OCAD database.”

Mr Cheng Tang (SAB Vice-Chairperson), SAB’s Assessment on Verification Issues, Presentation to OPCW Open-Ended Working Group on Future Priorities, 31 January 2017; slides 19 and 20 describe SAB recommendations to include CNS-acting chemical data into the OPCW Central Analytical Database (OCAD).

RC-4. States Parties might consider using RC-4 as an opportunity to further discuss the broader implications of the use of toxic chemicals for law-enforcement purposes.

Conclusions

- CNS-acting chemicals are toxic chemicals
- They are not riot control agents
- Some are as lethal as nerve agents, e.g. sarin
- Their dose cannot be controlled in aerosol form
- None with a sufficient margin of safety identified
- Only BZ is scheduled; not fentanyls or anaesthetics
- Risk of CNS-acting chemicals to the CWC has been raised since RC-1 by SAB and the Director-Generals