

Riot Control Agents

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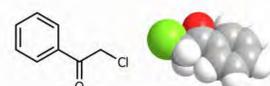
What is the definition of a Riot Control Agent (RCA)?

From paragraph 7, Article II of the Chemical Weapons Convention:

"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."

What are Riot Control Agents?

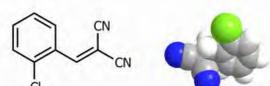
Chemicals that meet the criteria of an RCA include the following:



2-Chloroacetophenone (CN)

Synonyms:
Mace, CAP, Khaf CNB (10% CN, 45% benzene, 40% carbon tetrachloride), CNC (30% CN, 70% chloroform), and CNS (23% CN, 38.4% chloropicrin, 38.4% chloroform).

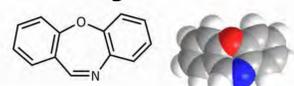
Physical states:
White solid with odour of apple blossom
Melting Point 54-56 °C; Boiling Point 245 °C



2-Chlorobenzyl isocyanide (CS)

Synonyms:
2-Chlorobenzyl isocyanide, 2-chlorobenzyl isocyanide, K62, CS (p.i.), CS1 (95% CS, 5% silica aerogel), CS2 (CS and silica aerogel), CSX (1 g CS, 99 g 14 in acetyl phosphate), CS dissolved in methyl ethyl ketone used in spray devices.

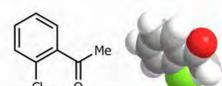
Physical states:
White solid with pungent, overpowering odour
Melting Point 193-195 °C
Boiling Point 210-215 °C



D-benzo, b, f, 1,4, oxazepine (CF)

Synonyms:
CF

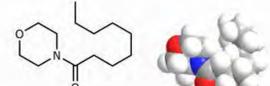
Physical states:
Yellow stable powder
Melting Point 72 °C; Boiling Point 335 °C



2'-Chloroacetophenone

Synonyms:
2'-Chloroacetophenone

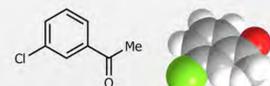
Physical states:
Colourless liquid
Boiling Point 229 °C



4-Nonanoylmorpholine

Synonyms:
MPA, MPK, pelargonic acid morpholide

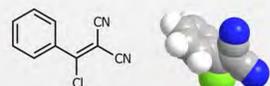
Physical states:
Liquid
Boiling Point 310 °C



3'-Chloroacetophenone

Synonyms:
3'-Chloroacetophenone

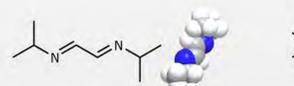
Physical states:
Colourless liquid
Boiling Point 223 °C



2-Chlorobenzyl isocyanide (CS)

Synonyms:
none

Physical states:
White solid
Melting Point 63-70 °C
Boiling Point 210-215 °C



N,N-Bis(isopropyl)ethylenediamine

Synonyms:
Diisiac

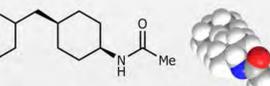
Physical states:
Volatile colourless liquid
Melting Point 43-50 °C



N,N-Bis(isopropyl)ethylenediamine

Synonyms:
none

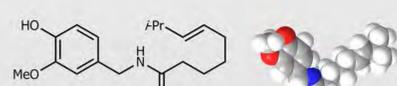
Physical states:
Volatile
Melting Point 39-43 °C



4-Acetylaminodicyclohexylmethane

Synonyms:
none

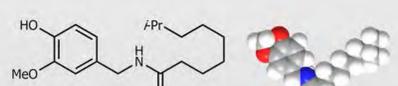
Physical states:
White solid
Melting Point 112 °C



8-Vinyl-N-vanillyl-trans-8-nonenamide

Synonyms:
Capsaicin, M-1, 7-actin

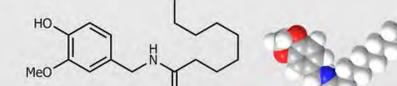
Physical states:
White solid
Melting Point 65 °C; Boiling Point 210-220 °C (0.01 mmHg)



8-Methyl-N-vanillylnonanamide

Synonyms:
Dihydrocapsaicin, DHC

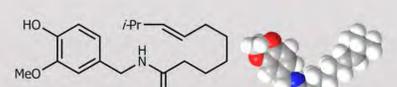
Physical states:
White solid
Physical data unavailable



N-Vanillylnonanamide

Synonyms:
N-(4-hydroxy-2-methoxyphenyl)nonanamide, nonanamide, piperocapsaicin, pelargonic acid vanillyl amide, PAVA

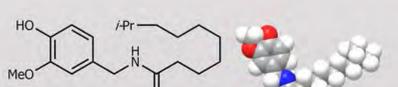
Physical states:
White solid with slight odour
Melting Point 157 °C



N-Vanillyl-9-methyl-7-(E)-nonamide

Synonyms:
homocapsaicin

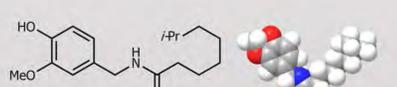
Physical states:
Lipophilic colourless odourless crystalline or waxy solid



N-Vanillyl-9-methyldecanamide

Synonyms:
nonoic hydrocapsaicin

Physical states:
Lipophilic colourless odourless crystalline or waxy solid



N-Vanillyl-7-methyloctanamide

Synonyms:
nonoic hydrocapsaicin

Physical states:
Lipophilic colourless odourless crystalline or waxy solid

Oleoresin capsicum (OC)

This is a mixture containing ≥ 8% capsaicins: capsaicin, dihydrocapsaicin, and nordihydrocapsaicin dissolved in an organic solvent.

How do Riot Control Agents work?

RCA's produce irritation through binding to TRP (Transient Receptor Potential) receptors. This activates some of the same biochemical pathways that are triggered by eating horseradish or hot peppers.

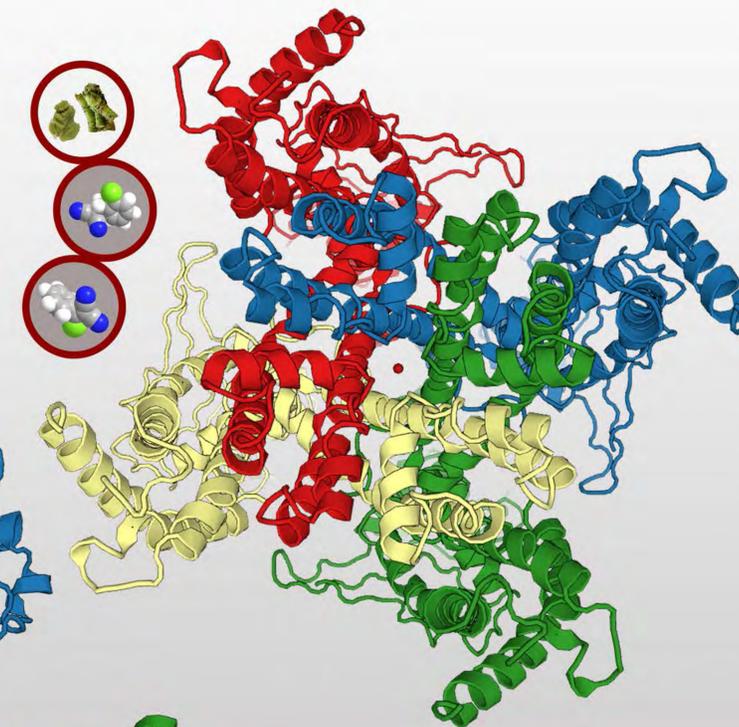
What are TRP Receptors?

TRP receptors are a family of ion channel receptors mainly located on cell membranes of multicellular organisms. TRP receptors are classified into seven subfamilies: TRPC (canonical or classical), TRPV (vanilloid), TRPM (melastatin), TRPA (ANKTM1 homologues), TRPP (polycystin), TRPML (mucolipin), and TRPN (NOMP-C homologues).

TRP receptor functions are diverse; the receptors serve as versatile sensors that allow individual cells and entire organisms to detect changes in their environment. This includes experiencing changes in temperature, touch, taste and other stimuli (including pain).

TRPA1

CS and isothiocyanate compounds bind to the TRPA1 receptor. Allyl isothiocyanate is the main pungent ingredient in wasabi, horseradish, and mustard oil - this chemical also binds to the TRPA1 receptor.



TRPV1

Capsaicin, homocapsaicin, and other related compounds bind to the TRPV1 receptor. These chemicals are naturally found in hot chili peppers.

