

Suicidal Carbon Monoxide Poisoning by Formic and Sulfuric Acid

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The Scene

The body of a 44-year old male is found seated upright in a vehicle at an isolated gravel pit. There is no apparent trauma, but foam is visible around his mouth.

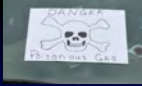

The windows are rolled up and the vehicle is in park, but the radio is playing tranquil meditation music. A laptop is positioned in front of the decedent alongside what appears to be a breathalyzer.

A chemistry apparatus is assembled on the passenger's side floorboard...



Inside the vehicle:



- Separatory funnel
- Large bowl of cloudy liquid
- 2 empty bottles of drain cleaner
- 1 empty bottle of formic acid
- 1 measuring cup
- Rubber gloves
- 1 unopened box of baking soda

 **“Detergent Suicides”** 

- Mixing household products to produce toxic gas, usually hydrogen sulfide or hydrogen cyanide.
- First reported in Japan in 2007, over 2,000 incidents have been reported. Approximately 10-15 per year in the United States, but actual number is unknown¹.
- Pose a lethal threat to bystanders and first responders even with brief exposures.

“Detergent Suicides”



Hydrogen sulfide smells like rotten eggs.

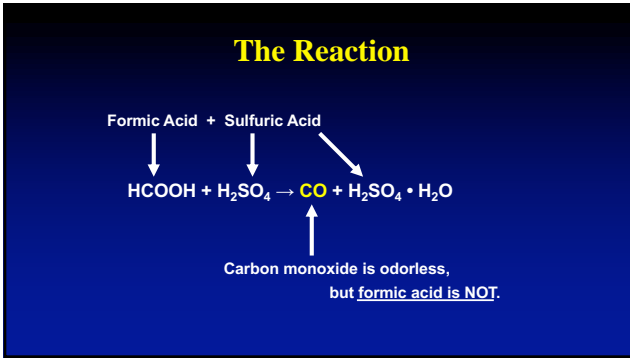


Hydrogen cyanide may smell faintly of bitter almond, but many people cannot smell it.

Odorless does not mean the area is safe!

Which gas was produced by these chemicals?





Chemical Suicides: Similarities and Differences

Hydrogen Sulfide

- Rotten egg odor
- Green lividity

Hydrogen Cyanide

- Bitter almonds or odorless
- Bright or Cherry-Red lividity

Carbon Monoxide

- Odorless or noxious if formic acid was used
- Cherry-Red lividity²



The following day



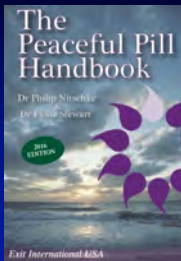
- Partially blanching, cherry-red lividity over the head, upper chest, back, and legs.
- Dark red parenchyma of the lungs, liver, and spleen.
- The lungs were moderately congested and edematous.
- Carboxyhemoglobin level = 83%.
- Remaining toxicology tests were negative.

Suicidal CO Poisonings using formic and sulfuric acids

Year	Location	Demographic	Outcome	Carboxyhemoglobin (COHb)	Site	Additional details recorded at the scene
1987	Germany	33-year-old male	Deceased	80.3-93.4%	Enclosed in a large plastic bag	None
2004*	Indiana	21-year-old male	Deceased	64%	Closet	"Chemical odor"
2007*	Taiwan	26-year-old male	Deceased	No autopsy performed	Bedroom	Father and mother were hospitalized due to gas exposure, but both survived. Father described a "pungent odor" in the room.
2012	Pennsylvania	28-year-old male	Deceased	Unspecified	Tank	Mother and state trooper exposed to gas at the scene, both required medical treatment.
2012*	New York	26-year-old male	Deceased	85% at autopsy	Car	"strong chemical odor"
2013*	Germany	26-year-old male	Survived, GCS 3	20.8% at hospital	Car	Mild nosebleed noted.
2013	Germany	27-year-old male	Deceased	Unspecified	Bedroom	Detailed chemical equations found in home; breathing mask used to inhale carbon monoxide gas.
2015*	Slovakia	29-year-old male	Deceased	76.5%	Bedroom	Double container system was attached to a timer.
2015*	Croatia	22-year-old male	Deceased	30% with possible ingestion	Bathroom	"penetrating chemical smell"
2015*	California	31-year-old male	Survived, GCS 7	36.8% at hospital	Motor room	Foamy secretions around mouth, "last odor of a chemical."
2016	California	28-year-old male	Deceased	61% at autopsy	Car	None
2017	Texas	44-year-old male	Deceased	83%	Car	Foamy secretions around mouth, "ammonia-bleach smell."

*Approximate year based on date of submission rather than date of publication.

Dr. Nitschke's Carbon Monoxide Generator



- 2003 – Dr. Nitschke presents his carbon monoxide generator at conferences in Australia and the United States, attracting media attention.
- 2004 – Second case of suicide recorded involving the use of formic acid and sulfuric acid to generate carbon monoxide. It was unclear how the decedent learned of this method (Prahlow & Doyle, 2005).
- 2006 – Dr. Nitschke co-authors *The Peaceful Pill Handbook* which describes how to make a carbon monoxide generator, specifically mentioning sulfuric acid based drain cleaner and formic acid available for purchase online.
- Today – Numerous pro-suicide websites promote this method as peaceful, efficient, and painless.

A Laptop and CO Monitor...



- The decedent filmed the suicide using his laptop.
- Described each component of his "exit kit" and where he had purchased them online.
- Used a PO box to receive these items.
- Trial run a few days prior produced CO levels of 7,700 ppm.
- Active user of Reddit group r/SanctionedSuicide

Carbon Monoxide Concentrations: Table 17

CO Conc.	Condition and effects of inhalation
0-2 ppm	Normal
9 ppm	Common in polluted cities, higher risk of CHF
100 ppm	Headache, tiredness, dizziness, nausea after several hours
800 ppm	Convulsions within 45 minutes, death within 2-3 hours
1600 ppm	Death within 1 hour
3200 ppm	Concentration inside a charcoal grill, death within 30 minutes
6400 ppm	Thinking impaired before response possible, death within 10-15 minutes
12,800 ppm	Death within 1-3 minutes

Verbally Recorded CO levels



- 1 min 36 sec 1,200 ppm
- 1 min 57 sec 2,000 ppm
- 2 min 11 sec 3,000 ppm
- 2 min 40 sec 4,000 ppm
- 2 min 46 sec 5,000 ppm
- 3 min 26 sec 7,000 ppm
- No further CO recordings
- 4 min Coughing increases, "dizzy", "it burns", sweating, eyes watering, face is flushed.
- 11 min LOC, **seizing**
- 12 min Agonal respirations begin
- 21 min 27 sec Agonal respirations cease

Main Points

- Carbon monoxide is odorless, but formic acid forms a pungent chemical odor. All chemical suicides should be treated with extreme caution.
- Lethal CO poisonings are associated with COHb levels above 40%.¹⁸
- Cherry red lividity may not be immediately evident in the recently deceased, and cherry red lividity is not exclusive to CO toxicity.
- Although less common than hydrogen sulfide suicides, the use of formic and sulfuric acid to generate CO is well-known in pro-euthanasia and pro-suicide communities.
- Detailed information is available online to people without any background in chemistry. It continues to be promoted as peaceful and painless by pro-voluntary euthanasia organizations and pro-suicide websites.

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