

# Ricin

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# Description and Significance

- From the castor bean plant *Ricinus communis*, a highly toxic, naturally occurring protein.
- A dose as small as a few grains of salt can kill an adult.
- The LD50 of ricin is around 22 micrograms per kilogram (1.76 mg for an average adult, around 1/228 of a standard aspirin tablet from injection or inhalation
- UOral exposure to ricin is far less toxic and lethal dose can be up to 20–30 milligrams per kilogram



# Toxicity

- Ricin is poisonous if inhaled, injected , or ingested
- Act is as a toxin by the inhibition of protein synthesis
- Long term organ damage is likely in survivors.
- Ricin causes severe diarrhea and victims can die of shock.
- Death typically occurs within 3–5 days of the initial exposure.<sup>1</sup>
- Deaths caused by ingestion of castor plant seeds are rare, partly because of the indigestible capsule
- The pulp from eight beans is considered toxic for an adult



# Characteristics

- Ricin can be made from the waste material left over from processing castor beans. 
- Castor beans are processed throughout the world to make castor oil.
- Ricin is part of the waste “mash” produced when castor oil is made
- Can be in the form of a powder, a mist, or a pellet, or it can be dissolved in water or weak acid.
- A stable substance under normal conditions, but can be inactivated by heat above 80 degrees centigrade.
- Ricin has been used experimentally in medicine to kill cancer cells

# Signs and Symptoms of Ricin Exposure

## Inhalation

- Respiratory distress, fever, cough, nausea, and tightness in the chest. heavy sweating, pulmonary edema and the skin might turn blue.
- Low blood pressure and respiratory failure may occur, leading to death.

## Ingestion:

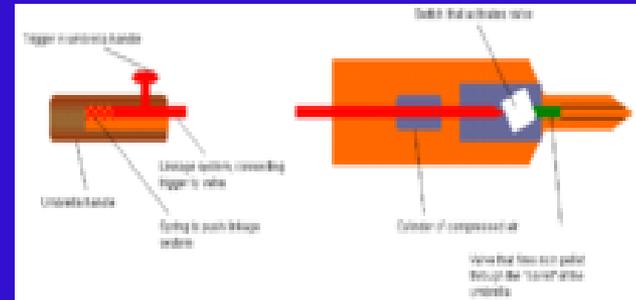
- Vomiting and diarrhea that may become bloody. Severe dehydration
- Low blood pressure.
- Hallucinations, seizures, and blood in the urine.
- Liver, spleen, and kidneys might stop working, and the person could die.

## Skin and eye exposure:

- Unlikely to be absorbed through normal skin.
- Contact with ricin powders or products may cause redness and pain of the skin and the eyes.
- Death from ricin poisoning could take place within 36 to 72 hours of exposure, depending on the route of exposure (inhalation, ingestion, or injection) and the dose received.

# Famous case involving ricin is the assassination Bulgarian dissident Georgi Markov.

- In 1978, Markov was working in London as a British Broadcasting Company (BBC) correspondent. As he was walking across Waterloo Bridge, a man jabbed the tip of an umbrella into Markov's right thigh, murmured an apology and slipped away into the crowd. Markov died four days later. After the collapse of the Soviet Union, the new Bulgarian government admitted that their Secret Service had been responsible for the murder. The KGB produced the murder weapon: an umbrella modified to inject a 1.7 mm platinum pellet filled with ricin into Markov's leg.



# Bioterrorism

- Large number of people who had been close to each other suddenly developed fever, cough, and excess fluid in their lungs.
- Symptoms could be followed by severe breathing problems and possibly death.
- Detected ricin in powders or materials released into the immediate environment by PH , BW testing or law enforcement authorities
- No widely available, reliable medical test exists to confirm that a person has been exposed to ricin. (post mortem ricinine)



# Laboratory Testing

## Powders:

- Real time PCR to detect *Ricinus communis* DNA.
- TRF to detected ricin toxin.

## Clinical specimens:

CT lab can be detected Ricinine in body fluids of persons exposed to Ricin



# Questions?

