

## Plant-Derived Toxins: Identification, Indicators of Acquisition and Manufacture, and Considerations for Response

Terrorists and other illicit actors may consider producing plant-derived toxins (PDTs) to carry out attacks because of their perceived potency, stability, and availability. PDTs can be produced and weaponized clandestinely and may be distributed in a variety of ways. Terrorists have tried to manufacture PDTs from cheaply acquired plant material and have promoted their use as a toxins or biological agents online, posing a potential threat to public safety. The following examples involve illicit actors' use of ricin, abrin, and oleander:

- In September 2020, a Canadian woman allegedly mailed letters containing ricin to the White House and five other law enforcement entities in Texas. She was charged with making threats against the President of the United States.
- In August 2020, a Wisconsin woman received a 90-month sentence for hacking social media accounts to recruit like-minded extremists and plot attacks for ISIS, as well as posting a detailed recipe for making ricin and instructions for making explosives.
- In April 2016, a California man pled guilty to possessing an illegal gun and a biological poison. He was arrested in 2014 after a three-day manhunt. The subject used a dark web marketplace to purchase abrin, which was shipped by mail in two small glass vials concealed inside flashlights.
- In 2000, a California woman killed her husband by lacing his drink with oleander and antifreeze. The San Francisco Supreme Court upheld her death sentence by unanimous vote in 2014.

**SCOPE:** First responders may encounter dangerous PDTs or their precursors during service calls, emergency response, or investigations. Their awareness and recognition of PDTs and their precursors may improve public safety. This product focuses on three PDTs: abrin, oleander, and ricin, which first responders are most likely to encounter during the course of their routine duties.

**NOTE:** 18 U.S.C. Section 175 (a) and the Biological Weapons Anti-Terrorism Act of 1989 impose criminal penalties on individuals knowingly involved in the development, production, stockpile, transfer, acquisition, retention, or possession of any biological agent, toxin, or delivery system for use as a weapon, or knowingly assist a foreign state or any organization to do so.

**WARNING:** Widespread dissemination of PDTs such as abrin and ricin requires more material than a small terrorist cell would be expected to produce, but could be used by a terrorist group in either targeted attacks or as a weapon of "massive disruption" to cause public panic.



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**HAZARDOUS PLANTS**

**RICIN** (*Ricinus communis* plant)



**DESCRIPTION**

**RICIN** is a protein-derived toxin extracted from castor beans, which are identified by their unique brown and black patterned shells. It is highly toxic and exposure may occur via inhalation, injection, ingestion, or eye contact. Symptoms and toxicity vary by exposure pathway. As such, poisoning via ingestion requires far greater amounts of ricin than poisoning via injection. Ricin can be extracted in powder or liquid form. Dried extract can be brownish, yellowish or whitish in color, depending on toxin purity. Ricin is stable under ambient conditions, but inactivated by heat (80°Celsius for 10 minutes). Castor beans are primarily cultivated for castor oil production, but the refined oil does not contain ricin.

**ABRIN** (*Abrus precatorius* plant)



**ABRIN** is a protein-based toxin but far more toxic than ricin. It is derived from the seeds of the *Abrus precatorius* plant, also known as the jequirity pea or rosary pea plant. The plant is valued in various cultures for use in medicines and foods, and is used as an ornamental plant, jewelry beads, weighing units, and for other traditional cultural and religious purposes. Abrin can be rendered in powder or liquid form. Pure abrin is a yellowish-white powder that is a stable substance stored in a wide range of temperatures. Like ricin, it is inactivated by heat.

**OLEANDER** (*Nerium oleander* plant)



**OLEANDER** is an ornamental shrub or small, densely branched tree. All parts of the plant contain cardiac glycosides that are extremely poisonous. Most symptoms of oleander poisoning are cardiac and gastrointestinal in nature and may appear about four hours after ingestion. Accidental exposure may occur via ingestion of plant material or smoke inhalation from burning oleander.

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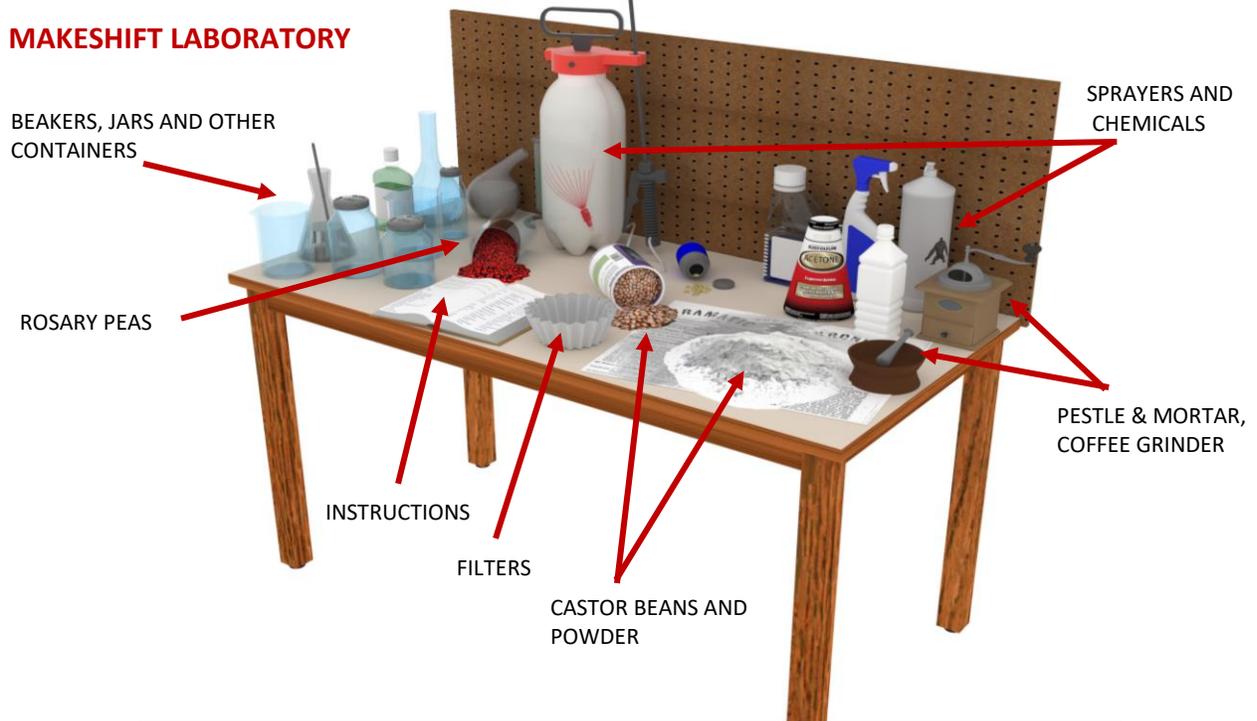


**KEY INDICATORS OF ACQUISITION AND MANUFACTURING:** The following list of acquisition and manufacturing indicators may be innocuous or constitutionally protected activities. Situations without reasonable explanations should be fully evaluated in the totality of the circumstances, additional indicators, or observed behaviors reasonably indicative of terrorism before reporting them as suspicious activities. Incidents that do not rise to the level of criminal activity may be reported to the local fusion center or FBI field office.

**INDICATORS OF PDT PRODUCTION INCLUDE:**

- Presence of large quantities of castor beans or rosary peas
- Presence of literature or instructions for the manufacture of PDTs
- Presence of common equipment, tools, and materials used or stored in an atypical manner, such as mortar and pestle, beakers, battery acid, pH testing paper, coffee grinder, filters, and solvents (heptane, hydrochloric acid, sodium carbonate, sodium sulfate, vinegar, acetone, bleach, carbon tetrachloride, hexane, hydrochloric acid, Epsom salt, sulfuric acid, sodium hydroxide, and sodium carbonate)
- Acquisition and possession of equipment that may be used to disperse PDTs, such as pumps, sprayers, and modified unmanned aircraft systems or other remote controlled devices
- Theft of equipment, tools, or materials that may be used to manufacture or disperse toxins or poisons
- Evidence of animal testing or unexplained animal deaths
- Unusual acquisition and possession of personal protective equipment (PPE) such as aprons, gloves, and face shields

**MAKESHIFT LABORATORY**



**CONSIDERATIONS FOR RESPONSE:** Suspected PDTs should be handled only by hazardous material (HAZMAT) specialists. Personnel should be aware of potential particulate-inhalation and splash hazards. First responders must exercise extreme caution and avoid exposure to suspected PDTs. PPE includes the use of chemical-resistant suits with gloves, air purifying respirators or self-contained breathing apparatus, and eye or face protection; however, HAZMAT specialists, in coordination with incident commanders, may require additional protective equipment. In the event of a possible PDT hazard, such as a letter or package containing a suspected PDT, personnel should consider employing the following actions within the context of existing rules, regulations and operating procedures:

- Turn off the ventilation system (fans or window air conditioners) for the affected area
- Turn off processing equipment that may have handled a suspicious letter or package
- Do not disturb the suspicious substance
- Develop a list of persons who were in close contact with the suspected PDT
- Keep all individuals out of any potentially contaminated areas
- If in physical contact with PDTs or its processing components, personnel must wash the affected area vigorously with soap and water
- Direct others responding to the scene to stage a nearby, alternate location for victim pick-up and transport to the nearest hospital

**CHECKLIST:** Upon identification of a suspected PDT hazard, personnel should consider employing the following actions in the context of existing rules, regulations, and operating procedures:

- *“Don PPE, Evacuate, Isolate, and Contain”*
- Request assistance from HAZMAT personnel and transport victims for medical treatment
- Secure the scene, turn off ventilation systems, and perform field screening for the presence of the suspected PDT substance
- Upon presumptive detection of a PDT substance:
  - Establish a unified command post
  - Notify FBI, law enforcement agencies, the local health department, emergency management agencies, Centers for Disease Control and Prevention, US Health and Human Services, the Federal Emergency Management Agency, and the US Postal Service (if mailed)
  - Transport the suspected PDT to the lab for confirmation
  - Keep the scene locked down while authorities gather evidence

**RESOURCES:**

- **CENTER FOR DISEASE CONTROL AND PREVENTION (CDC):** [www.cdc.gov](http://www.cdc.gov)
  - **The National Institute for Occupational Safety and Health (NIOSH)–Abrin: Biotoxin** [https://www.cdc.gov/NIOSH/ersbdb/EmergencyResponseCard\\_29750000.html](https://www.cdc.gov/NIOSH/ersbdb/EmergencyResponseCard_29750000.html)
  - **Facts About Ricin:** <https://emergency.cdc.gov/agent/ricin/facts.asp>



- **Response to a Ricin Incident: Guidelines for Federal, State, and Local Public Health and Medical Officials:** [https://emergency.cdc.gov/agent/ricin/pdf/ricin\\_protocol.pdf](https://emergency.cdc.gov/agent/ricin/pdf/ricin_protocol.pdf)
- **List of Nationally Notifiable Conditions:**  
<https://c.ymcdn.com/sites/www.cste.org/resource/resmgr/PDFs/CSTENotifiableConditionListA.pdf>
- **DHS NATIONAL BIODEFENSE ANALYSIS AND COUNTERMEASURES CENTER (NBACC):** supports intelligence assessments, preparedness planning, response, emerging threat characterization and bioforensic analysis. <https://dhs.gov>
- **FBI WMD COORDINATOR:** First responders should contact their local FBI WMD Coordinator.
  - To find your local FBI field office: <https://www.fbi.gov/contact-us/field>
  - To report suspicious activity: **855-TELL-FBI (855-835-5324)**
- **FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) CENTER FOR DOMESTIC PREPAREDNESS (CDP):** DHS's WMD training center for emergency response providers. Visit <https://cdp.dhs.gov> or **contact 1-866-213-9553**.
- "Managing the Emergency Consequences of Terrorist Incidents: Interim Planning Guide for State and Local Governments," FEMA, July 2002.  
<http://www.fema.gov/pdf/plan/managingemerconseq.pdf>
- **LABORATORY RESPONSE NETWORK (LRN):** National security asset comprising approximately 141 laboratories and multiple partnerships among government and private organizations. <https://emergency.cdc.gov/lrn/index.asp>
- **US ARMY MEDICAL RESEARCH INSTITUTE OF INFECTIOUS DISEASES (USAMRIID):** The DOD lead for the development, testing, and evaluation of medical countermeasures. It publishes the "Quick Bio-Agents" pocket reference guide and other reference materials.  
<http://www.usamriid.army.mil/education/instruct.htm>
- **US DEPARTMENT OF HEALTH AND HUMAN SERVICES:** Bioterrorism and Mass Casualty Events <https://www.phe.gov/emergency/terroristthreats/Pages/default.aspx>
- **US DEPARTMENT OF LABOR/ OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:**
  - Emergency Preparedness and Response - Chemical Terrorism:  
[https://www.osha.gov/SLTC/emergencypreparedness/chemical\\_sub.html](https://www.osha.gov/SLTC/emergencypreparedness/chemical_sub.html)
  - Ricin: <https://www.osha.gov/ricin>
- **US ENVIRONMENTAL PROTECTION AGENCY:**
  - Contact **EPA/HQ-EOC at 202-564-3850** for Environmental Response Laboratory Network (ERLN) laboratories able to analyze the site-specific samples and consequence management support.
  - **National Response Team Quick Reference Guide—Biotoxins: Ricin, Abrin:** information on the general properties, effects, and decontamination methods of biotoxins.





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ADDITIONAL COMMENTS, SUGGESTIONS, OR QUESTIONS.

WHAT TOPICS DO YOU RECOMMEND?

