

# Deadly Seeds Within: Ricin Poisoning and Homeopathy

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## Abstract

This paper introduces the standard medical diagnosis and treatment of ricin poisoning (RP), specifically using eight cases reported in the medical literature. The SARS CoV-2 2019/COVID 19 pandemic has raised every nation's awareness of potential biological and chemical agents of terrorism. A well-known but less commonly encountered agent of biochemical use is ricin, which comes from the castor bean. In this paper we provide a brief historical review of ricin use and then focus on the symptomatology of ricin poisoning. We then discuss the potential role of using individualized homeopathic care in cases of ricin poisoning.



Two days after being stabbed with what appeared to be a simple ink pen, a spy develops a high fever, twitching, contracting muscles, profuse rice water stools and becomes obtunded and somnolent, before total cardiovascular collapse and death. A prominent politician opens a letter to find a white powdery substance, and immediately, federal agents begin an investigation of an assassination attempt by bio-terrorists. These stories may lead people to think about ricin, the plant alkaloid poison derived from the castor bean plant, which grows like a weed on most every continent in the world. Although there are occasional high profile cases involving ricin injection or inhalation, much more frequent are ingestion poisonings which occur accidentally or intentionally. This paper will introduce the castor bean plant and ricin, present the exposure routes and symptoms of classic ricin poisoning (RP), discuss deaths

and bio-terrorism related to RP, share current methods to diagnose and treat RP, and finally, end with a presentation of the top 10 homeopathic remedies that could be beneficial in treating classic RP.

The hypothesis is that those potentially poisoned by ricin can be treated with homeopathic medicines, which could antidote the potentially lethal poison. If this knowledge becomes available to the health community, various government agencies, and the general public, then acutely poisoned and at risk individuals may not have to suffer or die prematurely. It is practically important to make consumers aware of homeopathic use in accidental ricin poisoning.

The castor bean plant, or the “castor oil plant,” by which it is sometimes referred, is an ornamental annual or perennial, depending on climate, which is widespread on every continent except Antarctica (Halpern 2003). *Ricinus communis* is the scientific name for the castor bean plant and is a member of the Euphorbiaceae or spurge family, which is used commercially for castor oil production from the seeds of the plant (Doan 2004; Thornton, Darracq, Lo & Cantrell 2014). Inside the bean (fruit), there are approximately three seeds that are oblong and light brown, mottled with brown spots. Castor beans yield bland oil weak in acrid properties when it is cold drawn, and a more powerful oil when heated and boiled by decoction (Clarke n.d.). Ricin toxin is contained in the

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substance, which is left over, the ‘meal’ or ‘cake’, after the oil has been extracted from the seeds. If properly prepared, the oil itself should contain no ricin (Clarke n.d.). Although there is no officially established medical use for castor oil in humans (Pamplona-Roger, 1994), it is commonly given orally for its laxative effects (Doan 2004; Clarke n.d.), as a topical anti-inflammatory, as a topical carrier for Lugol Solution and various botanicals, and as eye drops for dry eyes (author experience). The oil has anti fungal properties and its extract undecylenic acid is anti fungal and used in topical antifungal preparations (author experience). Over the years, the castor bean plant has been advocated for various other medicinal purposes: laxative effects, stimulation or initiation of childbirth labor contractions, promotion of lactation, treatment of afterbirth pains, and cases of puerperal or childbed fever (Clarke n.d.). In fact, homeopaths like Constantine Hering noted that when castor oil was used, puerperal fever became less frequent in confined mothers (Clarke n.d.). Non-medicinal uses for castor oil include lubrication oil in jet engines, in high-speed cars, and in industrial machinery, and it is also present in various paints and varnishes as an added ingredient (Mercola n.d.). The oil was also used in World War I for its anti-freeze properties, since it could withstand cold temperatures without freezing (Mercola n.d.).

Ricin is a powerful cell-toxic protein that is either cold or heat extracted from the seeds of the castor bean plant, as described above (Dong et al. 2014). It is akin to other food-related toxins like the glycoalkaloids in potato tubers and leaves, or the poisonous fungus compound aflatoxin (Rasooly, He & Friedman 2012; Friedman & Rasooly 2013). Ricin consists of 2 twochains: Ricin Toxin A and Ricin Toxin B. Toxin B causes the cell wall to be breached, and Toxin A causes the organelles that produce proteins to stop protein production (Dong et al., 2014; Diakite et al., 2015). One ricin molecule reaching the cytosol (cytoplasm) can kill the cell when it stops protein synthesis (Rasooly, He & Friedman 2012). Depending on the extent of the poisoning, and the subsequent crippling of the cell’s protein production, a varying number of cells and organs will be affected (Dong et al. 2014). The toxin ricin is released if the castor bean is crushed as in mastication, chewing or maceration (Audi et al. 2005). Ricin remains in the bean pulp (‘meal’ or ‘cake’) after the oil is separated from the seeds or beans. When the castor oil is removed from the bean by heat extraction, the ricin toxin is inactivated. The purified ricin looks like a white powder that in water is easily inacti-

vated by temperatures lower than 26.7°C (80.6 ° F), according to Audi et al. 2005.

Although ricin is the toxin most commonly associated with castor beans, other toxins also exist within the castor bean, including ricinine and ricin protein agglutinin (Audi et al. 2005). Ricinine cannot be inactivated by heat; it causes hyperactivity, seizures, and death by respiratory arrest (Worbs et al. 2011). It functions in the plant as a strong natural insecticide (Worbs et al. 2011). Ricin protein agglutinin causes red blood cells to clump together in the blood stream and subsequently hemolyze (Audi et al. 2005). Although much of the literature discusses the toxicity of the castor bean in the context of the ricin toxin, it is likely that ricinine and ricin protein agglutinin, and perhaps other toxins, also play roles in the toxicity of castor bean seeds. Being a potent poison it has become easy to produce and its use targeted in bioterroristic acts (Diakite et al. 2015).

The possible routes of exposure to ricin (and other related castor bean toxins) include ingestion, inhalation, injection, ophthalmic, and cutaneous (Bradberry et al. 2003). The route of exposure affects symptoms (Halpern 2003), and the route by which ricin enters the body affects the associated morbidity and mortality (Dong et al. 2014).

- **Ingestion:** This is the most common route of exposure, occurring most commonly when someone ingests castor bean seeds. In order for the toxin to be released from the seed, sufficient mastication is required (Audi et al. 2005). Ingestions may occur accidentally, as in when an unknowing child eats a castor bean, or when a food/water source is contaminated, or intentionally via suicidal or homicidal action. Subjective symptoms include oropharyngeal irritation, abdominal pain, weakness, nausea and flu-like achiness, and muscle cramps; objective symptoms include fever, vomiting and diarrhea (bleeding and bloody discharges arise later), low blood pressure, fast heart rate (secondary to dehydration), fast breathing, sweating, blue fingers and toes (cyanosis). kidney, liver and spleen functions become disrupted secondary to shock and hypovolemia (Bradberry et al. 2003; Schep, Temple, Butt & Beasley 2009).
- **Inhalation:** For inhalational exposure to occur, the ricin toxin must first be isolated and prepared into a powdered or mist form that allows for aerosolization. As

**The effectiveness of the law “likes cures like” may be elucidated in future cases of RP by using more carefully defined mental and emotional symptoms that point-out the differences in one case of ricin poisoning from another within health communities and the multi-national body government.**

such, this type of exposure is typically associated with intentional acts. Subjective complaints include dyspnea/asthma/chest tightness/pain, anxiety when progressing, and arthralgia, while objective symptoms encompass pulmonary edema, conjunctivitis, rhinitis, sneezing, wheezing, and itchy red swollen skin, and cyanosis (Audi et al. 2005; Bradberry et al. 2003).

- **Injection:** Like inhalational exposure, exposure via injection tends to be an intentional act. Local objective symptoms at the site of injection include swelling, bleeding, and dead skin, while systemic subjective symptoms include weakness, nausea, dizziness, headache, a sensation of chest compression, and abdominal pain. Objective systemic manifestations include fever, hyperthermia, multi-organ failure, and coma (Audi et al. 2005; Schep et al. 2009; Knight 1979).
- **Cutaneous:** Cutaneous exposure involves physical contact with a ricin-containing substance. Since this may actually occur via the handling of castor beans or castor bean-derived products, such exposure is typically accidental in nature, although intentional cutaneous exposures may also occur. Objective symptoms include scratching, swelling, and redness, while subjective signs include burning and itching (Audi et al. 2005; Bradberry et al. 2013).
- **Ophthalmic:** Ophthalmic exposure involves contact of a ricin-containing substance on the eye, in situations similar to those described with cutaneous exposures. Objective signs include redness, heat, swelling, and injected sclerae, while subjective symptoms include itching, burning, eye and periorbital pains, and poor vision (Bradberry et al. 2013).

Neurological symptoms may accompany all routes of contact in various degrees: fever, disorientation, drowsiness, confusion, light-headedness, somnolence, constricted pupils, dilated pupils, blurry vision, muscle cramps, hypertonic muscles (Clarke n.d.). Another important point is that there is sometimes a delay in the onset of grave symptom development in ricin poisoning, thus theoretically allowing time to render a diagnosis. Health providers versed in the particularly diagnostic symptoms of ricin poisoning will be better poised to halt the progressive destruction of the poisoning (Halpern

2003). Onset of symptoms can vary based on the route of exposure, as shown on Table 1.

**Table 1. Exposure Route and Onset of Symptoms (Halpern 2003).**

Exposure route	Onset	Death
Inhalation	3 to 18-24 hours	24-48 hours
Ingestion	2-3 hours	36-48 hours
Injection	1 to 12 hours	Variable time

To reiterate, the toxin ricin is released if the bean is crushed as in mastication, chewing or maceration. Most exposures in humans are by accidental ingestion. Animal intoxications have occurred due to incorrectly processed feed containing *Ricinus communis* material in flax seed flour given to cows and horses. Recall that when the ricin “bean cake or meal” is heated, the ricin is deactivated; however in Germany, the heating of crushed fertilizer material was not always thoroughly performed or controlled, resulting in domestic and agricultural animal poisonings and death (Worbs et al. 2011).

In addition to the route of exposure, numerous other variables help to explain the variety of patient responses to castor bean/ricin exposure: the size of the seed, the moisture in the seed, weight of the seed, the region of seed growth, the season and period of growth, the degree of mastication, the stomach contents, age of person, and co-morbidities (Worbs et al. 2011). Dose is also important. The ingestion of one seed is said to result in violent effects, whereas the ingestion of three seeds can eventually cause fatal effects, and the ingestion of 20 seeds produces severe gastroenteritis and death after convulsion and collapse (Clarke n.d.).

It is beyond the scope of this paper to review all cases of ricin poisoning that have been reported in the medical literature. Table 2 provides a synopsis of information provided in a cross-section of case reports published in the literature, including demographic information, a short history, clinical manifestations, and outcome (Knight 1979; Metz Bocher & Metz 2001; Kucukugurluoglu et al. 2005; AL-Tamimi & Hegazi 2008; Coopman, de Leeuw, Cordonnier & Jacobs 2009; Lim, Kim & Cho 2009; Assiri 2012; Grimshaw, Wenneke & Dayer 2013).

**Ricinus proving lacks mental and emotional effects on the prover. Other more well-known remedies may be able to treat the symptoms of ricin poisoning.**

Table 2— Selected Cases of Ricin Poisonings/Exposures from Medical Literature Case Reports—Ricin-Related Deaths and Ricin as a Biological Weapon

Age	History	Route	Symptoms	Sx onset	Treatment	Outcome	Reference
49 M	Stabbed in the posterior thigh by and umbrella with injection device	Trans-cutaneous intra-muscular injection	High fever (hours); local inflammation (next day); hypotension (next day); hypothermia (next day); elevated WBC count	Within a few hours	Support	Death 3 days after injection	Knight
38 M	Landscape gardener for 15 years, developed urticaria & conjunctivitis after exposure to castor-bean-containing organic fertilizers	Cutaneous	Urticaria; Conjunctivitis	10-20 minutes	Anti-histamine	Recovered	Metz
11 M	Ate 4 seeds from a castor oil plant from a neighbor's garden and started to vomit approx. 40 minutes later	Ingestion	Dehydrated; Vomiting; Diffuse abdominal pain & tenderness; Developed explosive watery diarrhea	40 minutes	Gastric lavage; Activated charcoal; IV fluids; support	Recovered	Kucuku-gurluoglu
51 M	Taken to ED by family after ingesting one green fruit of castor bean to treat his cough	Ingestion	Confused; Disoriented; Somnolence; Afebrile; Vomiting; Tachycardia with T-wave inversion à eventual bradycardia; Dry mouth; Mydriasis; Pupils with sluggish reaction to light	3 hrs	Activated charcoal; support	Recovered	AL-Tamimi
49 M	Taken to the ED 24 hours after suicide attempt—injecting himself intravenously and subcutaneously with approx. 10 mL of “self-made” acetone extract of castor beans	Intra-vascular and sub-cutaneous injection	Nausea; Vomiting; Diarrhea; Dyspnea; Vertigo; Muscle pain; Hypovolemia; Severe dehydration; Hypotension; Metabolic acidosis; Liver failure; Hemolysis	Within 1 day	IV fluids; support	Died 9 hours after admission  (injected substance was determined to be of castor bean origin; blood & other samples contained ricinine via LCMS; ricin not tested)	Coopman
56 F	Ingested five pieces of wild castor bean to treat constipation	Ingestion	Severe nausea; projectile vomiting; hypothermia; epi-gastric tenderness after vomiting	Within hours	Activated charcoal; anti-emetics; support	Recovered  (ricin level in blood = 0.06 ug)	Lim
42 M	Presented to ED with a 12-hr history symptoms, after having ingested a herbal medicine preparation 2 days previously for protracted constipation	Ingestion	Epigastric pain; Nausea; Repeated vomiting; Chest tightness; Mild non-productive cough; Eventually; Hematemesis; Respiratory failure; Bleeding tendency; Elevated liver enzymes; Renal failure	Within days	Support	Died 3 days after hospital admission  (herbal medicine evaluated by LCMS: mainly contained ricin powder)	Assiri
32 M	Ingested and chewed 40 castor oil plant seed obtained via the internet in order to commit suicide	Ingestion	Vomiting; Nausea; Profuse brown watery diarrhea with eventual appearance of blood in stool; Cramping abdominal pain; Acute renal failure; Metabolic acidosis; Hypovolemia	5 hrs	IV fluids; anti-emetics	Recovered	Grimshaw

Seventy-five percent of ricin poisoning cases are from ingestion (both accidental and intentional self-harm), and deaths from the poisonings occur in only about two percent of reported exposures (Schep, Temple, Butt, & Beasley 2009). Ordinary castor oil has reportedly caused some fatalities, but greater numbers result from ingestion of the seed (Clarke n.d.). Twelve of the 14 cases of death reported by Schep et al. (2009) happened before 1930, when the medical supportive care was not as influential as it is today (Schep, Temple, Butt & Beasley, 2009).

Some suggest that ricin is easily made into a biological weapon, a liquid mist, or powder cloud, by mashing the castor beans into a grain or meal consistency and salting out the ricin. It's [poison] code name is “Compound W” (Halpern 2003). Worldwide, the harvesting of castor beans, more than one million tons annually, means ricin is more easily made than either anthrax or botulinum, two other potential biological weapons (Doan 2004).

Mass death caused by ricin currently represents more of a theoretical worry than a scientific or historical reality. Although

ricin has been proven to be lethal on a smaller scale, its employment as a virulent weapon of mass destruction has not yet been demonstrated (Griffiths 2011), despite the fact that attempts have been made along these lines. The “successful” implementation of ricin as a biological weapon has occurred within the realm of assassinations. Five of seven people have died as a result of intentional ricin injection, with two of the deaths resulting from homicidal injection, with the others (and the other two survivors) representing self-injection (Schep, Temple, Butt, & Beasley 2009; Crompton & Gall 1980; Targosz & Winnik 2002; Watson et al. 2004; De Paepre et al. 2005).

The following synopsis is gleaned from several sources (Worbs et al 2011; 14 Schep, Temple, Butt & Beasley 2009; Knight 1979; PBS 2014; CNN 2003). The ricin injection death of Georgi Markov in 1978 proved to be one of intrigue. While waiting for a London bus Georgi felt a sting in the back of his thigh and turned around to find a man picking up his umbrella, and speeding away in a taxi. Approximately, 33-35 hours later he died of cardio-pulmonary collapse.

The intrigue is that about two weeks previously Vladimir Koskov also felt a sting in his back while waiting for a Paris metro train. He experienced the same timeline of sickness as Georgi did, but Vladimir recovered. After Georgi’s autopsy it was deduced the previously embedded and drilled jeweler’s watch bearing, may have held a very small amount of purely lethal ricin.

During Georgi’s autopsy a pin-head-sized metal sphere was removed from the back of his thigh: 90 percent platinum and 10 percent iridium (a small watch bearing), with 0.35 mm diameter hole drilled through, and could hold 0.28 cu mm of a moribific agent; it was deduced that ricin powder was the potentate. A subsequent exploration of Kostov’s dorsal sting-spot revealed the exact same metal sphere, only with wax around it. Both men, Vladimir and Georgi, were Bulgarian nationals, who were known for being anti-communists. One recovered from a mysterious illness, and the other died prematurely; now it is highly suspicious that it was ricin powder that poisoned both men.

An attempt to create havoc with ricin powder happened in the fall of 2003, when 36 United States (US) Postal Service Workers in Greenville, SC, were potentially exposed to pure ricin powder in a container in an envelope with a note. That note also threatened to poison the Greenville water supply if demands in the letter were ignored (CNN 2003). In the end, after a 15-day examination and investigation, all the workers were well, and no ricin powder was detected in their postal facility despite the written threat. The US Federal Bureau of Investigation never identified those behind the terrorist attack. The potential routes of exposure in this incident, namely

cutaneous or inhalational, could have caused systemic effects within an hour.

Ricin inhalation is believed to be more virulent than ingestion, but less virulent than injection (Bigalke & Rummel 2005). Another danger in this case was that the powder on the busy postal counter top surfaces could be disturbed and reinhaled quite readily (CNN 2003). Other similar mail-related attacks using ricin (in 2003, letters sent with ricin powder to Congress; in 2013 one letter sent to New York City Mayor Bloomberg) have also occurred (Thornton, Darracq, Lo & Cantrell 2014; Worbs et al. 2011).

The key point is that, although ricin exposure by cutaneous contact or by inhalation was potential in each of these incidents, no one was poisoned. However, the cases highlight the continued risk and necessity of ongoing caution (Schep, Temple, Butt & Beasley 2019; Griffiths 2011; CNN 2003; Kanchan, Atreya & Shekhawat 2016).

Contaminating a community’s water supply with ricin represents yet another potential bio terrorism threat; however, employing the toxin in this manner would require much more ricin than is theoretically feasible for a “successful” mass poisoning (Schep, Temple, Butt, & Beasley 2009). Smearing doorknobs and powdering clothes with ricin dust may cause allergic response to skin and mucus membranes but not the desired effect of mass mortality, as there is not a significant degree of absorption by this route.

Ricin powder, in mist form and inhaled by a massive amount of people is the most worrisome scenario but it is beyond the scope of what the average terrorist would likely be able to produce and deliver (Schep, Temple, Butt, & Beasley 2009). Even though people could be poisoned by ricin through a cold food or beverage additive and could quickly pass into hypovolemic shock when vital fluids are lost, mass casualties could happen easier by aerosolization with a complex dispersal device or by injection (Bradberry et al. 2003).

The United States reportedly focused on ricin weapons and produced them until 1980s. As a result of the known incidents of ricin use as a biological weapon, and the potential risk that exists in utilizing the toxin as a weapon of mass destruction, ricin is a prohibited weapon now. Its purification and possession are strictly regulated by the Organization for the Prohibition of Chemical Weapons (OPCW) (Worbs et al. 2011).

### **Conventional Diagnosis**

The clinical diagnosis of ricin poisoning is made by correlating the circumstantial and etiological history, with the associated symptomatology and clinical presentation. As presented above, the clinical symptoms can be quite unclear and vari-

able, making the diagnosis tricky at best when little or no history is known (Lopez Nuñez, Pizon, & Tamama 2017).

From a laboratory perspective, reliable confirmatory testing for ricin is not readily available at most medical facilities; although testing of blood and/or feces is theoretically possible (Halpern 2003; Chen et al. 2014.). Urinary testing for ricinine is available via the Centers for Disease Control (CDC) and certain reference laboratories, but because of the lengthy turnaround-time for such results (many days to weeks), this testing is not useful for clinical purposes (CDC 2019). Various testing methods, including enzyme-linked immunosorbent assays (ELISA), are available and reliable for identifying the ricin toxin within evidentiary samples, such as powders or other substances (Chen et al. 2014).

### Conventional Treatment

To date there is no human antidote to ricin (Diakite et al. 2015). Treatment of RP is largely considered “supportive,” wherein various therapies are provided which support the body’s natural healing response. These include “washing” the appropriate body’s epithelial surfaces/mucus membranes (eyes, nose, and mouth; gastric and distal colon lavage); providing appropriate fluid and electrolyte support (e.g. vomiting, diarrhea, and bleeding) for sustaining blood pressure to vital organs; respiratory support (after inhalation or aerosolized ricin, or following organ dysfunction from other routes of exposure), including oxygen flush, mechanical respiration, with Positive End Expiration Pressure (PEEP) to keep alveoli open; and corticosteroid administration to reduce inflammation (Chen et al. 2014; Pincus et al. 2011). In addition to supportive therapies, more specific potential treatment options exist, including plasma exchange (Wang et al. 2015), administration of anti-toxin (Dong et al. 2015), vaccination (Pincus et al. 2011, Yermakova & Mantis 2011; Pittman et al. 2015; Vance & Mantis 2016), and use of various binding agents (Rasooly, He & Friedman 2012).

Scientists in China did the first and only reported study of instilling Fresh Frozen Plasma (FFP) to seven children suffering from Castor bean (ricin) ingestion in a procedure called Plasma Exchange (PE). The slowed heart rate normalized and no organs were harmed. The medical reasoning was that the bloodstream and tissues had a better chance of staying healthy with PE than with gastric lavage and colonic hydration alone (Wang et al. 2015). Also, there is experimental evidence in mice that anti-ricin toxin monoclonal antibodies may protect against the effects of the ricin toxin if antibodies are administered intravenously in a timely fashion (Dong et al. 2015). This form of “passive immune therapy” is analogous to antivenom being administered after a snake bite, but this has not yet been applied directly to humans.

In addition to passive immunity, where pre-formed (monoclonal) antibodies are injected into patients suffering from

RP, anti-ricin vaccines have also been developed, where portions of ricin toxins evoke an immune response in order to produce antibodies that bind-to and inactivate the ricin toxin (Pincus et al. 2011; Yermakova & Mantis 2011; Pittman et al. 2015; Vance & Mantis 2016). These vaccinations are still in the developmental stages and would theoretically be available to those persons at-risk for intentional ricin exposure. Milk, specifically powdered milk, has been tested, and seems to have a high binding power to ricin molecules and thus may reduce ricin toxicity (Rasooly, He & Friedman 2012).

### Homeopathic Treatment Options

One fascinating fact is that there is a proving on *Ricinus communis*, the castor bean plant. The remedy is *Ricinus* (abbrev. *Ric*). Clarke’s *Materia Medica* description of *Ricinus* resonated with the overt ricin poisoning that is in the conventional medical review literature. What a miraculous feat of benevolence if Emergency Rooms, Poison Control Centers, and Public Health Clinics could get an understanding of “like cures like” medicine. Of course, it would be even better if clinicians could clinically differentiate between remedies to help save those accidentally or intentionally poisoned by ricin. The following description of *Ricinus* is from Clarke’s *Materia Medica* of the proving *Ricinus communis*, the castor bean (Clarke n.d.):

Mental somnolence, emotional (absent), head vertigo, occiput pain, congestive symptoms, ears buzzing, face pale, mouth twitching, dry, stomach anorexia with great thirst, burning in the upper abdomen (pyrosis), nausea, profuse vomiting, pit of stomach sensitive, abdomen rumbling, rectus abdominus muscles contracting, cramps, (colic), stool incessant diarrhea, rice water type, with purging (gastroenteritis), painless, green, slimy, bloody (dysentery). Extremities painful cramps, fever, general emaciation.

*Ricinus* lacks mental and emotional effects on the prover. Until this information gap is filled-in with clinical experience and provings, other more well-known remedies may be able to better treat the symptoms of ricin poisoning.

### Rubrics

The next part of the discussion provides a repertorization of the reported symptoms associated with RP in the medical literature, as described previously. The rubrics chosen are based upon the cases reviewed, the cumulative symptoms of RP by ingestion, inhalation and injection. These theoretical rubrics represent a type-of cumulative acute RP and a “top 10” list of common remedies to treat these acute cases was produced from a computer-generated repertorization program (Vithoulkas, Compass 2019). Please refer to the rubrics in the accompanying Repertory Chart (Figure 1) and below.

**Figure 1. Repertorization Chart (Vithoulkas, Compass v. 3.2)**

- 1A. FEVER, HEAT IN GENERAL + 1B. FEVER, CONTINUED FEVER, TYPHUS, TYPHOID + 1C. FEVER, CONTINUED FEVER, TYPHUS, TYPHOID, ABDOMINAL + 1D. FEVER, CONTINUED FEVER, TYPHUS, TYPHOID HEMORRHAGIC.
2. COUGH, DRY
3. ABDOMINAL SWELLING, MESENTERIC GLANDS
4. GENERALITIES. WOUNDS
5. ABDOMINAL INFLAMMATION (PERITONITIS, ENTERITIS, ETC.) GASTROENTERITIS
6. GENERALITIES. HEMORRHAGE
7. MIND, STUPEFACTION
- 8A. MIND, FEAR, SUFFOCATION OF + 8B. THROAT, SUFFOCATIVE FEELING
9. STOOLS, RICE WATER LIKE

**Top Ten Favorable Homeopathic Remedies**

The nine rubrics listed above represent the common symptoms of ricin poisonings from various routes in the reviewed literature. The remedies listed below represent the top 10 remedies most similar to the symptomatology of these nine rubrics (Clarke n.d.; Vithoulkas 2019). Any one of the ten remedies could have been utilized to treat the literature cases of RP, from the medical literature review, when the remedy picture matched the acute ricin poisoning expression in the patient. True classical homeopathic prescribing requires strict individualization of the patient as an organism who expresses his own unique disease. The remedy descriptions are highlighting a portrait of disease that could be matched to an individual’s portrait expressing acute RP. This list of remedies makes it theoretically possible for selection and administration of one remedy in future cases of ricin poisoning.

**1) Phosphorus**

MIND “free-floating” anxiety for no identifiable cause. Anxiety for health, though easily reassured; fears what could happen. Fears being alone, dark, death, and thunderstorms. DESIRES COMPANY. HEMORRHAGES: Bright red. Epistaxis. Greyish-white fecal matter, watery and offensive, passed continually. Stomach was freezing. Abdomen sore, distended, very sore to touch. Sensation as if weight was on sternum. Hoarseness. Loss of voice; with or without pain in throat. RESPIRATORY AFFECTIONS of all kinds. Burning pains internally (*Arsenicum*) and along the spine in spots i.e. between the shoulder blades; > by cold (*Ars.* better by warmth) Left sided, cannot sleep on left side. Chilly. Extremities cold. Feet icy cold. Knees cold especially at night. Agg. becoming cold, at twilight, L side lying (*Lachesis*). Change of weather, and warm food aggravate. When cold water gets warm it is thrown up. <Garlic, <Salt. Amel. by short sleep, rubbing, eating, cold drinks. DESIRES COLD DRINKS, ICE CREAM, SALT, CHOCOLATE, sweets, fish Averse: warm food and drinks, fish, oysters.

**2) Arsenicum album**

MIND Insecure, needs support. Nervous, constantly moving, restless, prone to take flight. Remedy for feats of prolonged endurance. Anxious moaning and full of the fear of death. Jerks, starts on falling asleep. Irritable, angry, fury, despair, hopelessness, unutterable misery. Burnings, ulcerative pains of alimentary tract > by warmth; cold and cold drinks < stomach issues. Licking such dry lips. Exhaustion not felt while lying still but as soon as moves, prostration is felt. Stomach, Abdomen, Stools: Frequent excessive nausea with inclination to vomit. While vomiting excessive pains in the stomach; Epigastrium painful to touch. Abdomen is inflated with attacks of colic. Internal sensation of cold and cold sweat; great weakness from diarrhea, after stool. Diarrhea before or during vomiting. Chest: difficult respiration, impossible to lie, for fear of suffocation. spasmodic attacks of suffocation and paroxysms of cough. CHILLY lack of vital heat; wants

REPERTORIZATION			Phos	Ars	Lach	Bry	RhusT	Sulph	PhA c	Apis	Verat	Bap t
Symptoms		Degree	52/10	41/10	40/9	40/7	38/8	35/9	35/8	34/11	33/9	31/6
1a	FEVER – HEAT in general	2	3	3	3	4	3	3	2	3	3	4
1b	FEVER – CONTINUED fever, typhus, typhoid	2	3	3	3	3	3	1	2	1	1	3
1c	FEVER – CONTINUED fever, typhus, typhoid - abdominal	2	3	2		3	3	2	2	1	1	2
1d	FEVER – CONTINUED fever, typhus, typhoid - hemorrhagic	2	3		2							
2	COUGH - DRY	3	3	3	3	3	2	3	3	1	1	
3	ABDOMEN – SWELLING – mesenteric glands	2		2				1				
4	GENERALITIES - WOUNDS	3	2		2		1	1	1	2		
5	ABDOMEN – INFLAMMATION (Peritonitis, Enteritis, etc.) - gastroenteritis	3		1		1	1			1	3	2
6	GENERALITIES - HEMORRHAGE	1	3	2	3	2	2	3	2	2		
7	MIND - STUPEFACTION	2	3	2	1	3	3	2	3	3	3	3
8a	MIND – FEAR – suffocation, of	1	2	1	1			2		1	1	1
8b	THROAT – SUFFOCATIVE sensation	1			3					2	1	
9	STOOL – WATERY – rice water, like	1	2	2					3	1	3	

Figure 1. Repertorization Chart (Vithoulkas, Compass v. 3.2)

warmth; Heat of head (wants head cooled) with coldness of body. Burning pains, burning excoriating stools, and corrosive mucus. Averse: the smell of food; deathly nausea. Desires: frequent sips from great thirst. scratches skin until it bleeds. SRP (strange, rare and peculiar characteristic symptom): Characteristic burning pains. Corrosive mucus and corrosive stools, yet stools can be involuntary and unperceived.

### 3) *Lachesis mutus*

Passionate emotions. Expression of emotions makes better. Delirium from Jealousy. Derangement of time sense; confounds night with day and always making mistakes with time of day. Excessive sensitiveness of the surface with intolerance of touch or constriction. Tremor of the body and hands. Tremor of the tongue, with rapidly alternating states. Tongue catches in the lower lip and teeth when the patient attempts to put it out. > onset of the discharge. < sleep; as soon as falls asleep the breathings stops. Sleeps into an asthma attack, fainting fits and vertigo on closing eyes. Impossible to lie on L side (*Phosphorus*). Aching in Stomach extending to chest. Vomiting bilious green and vomiting pure blood or bloody mucus. Vomiting with diarrhea and obscuration of sight. Disturbances of sight and hearing are numerous. Slight pressure aggravates but Hard pressure ameliorates. Urine is always dark, frequent and foaming; little black dots of 'soot' float in. More frequent to urinate after lying down, and during the night. After stool congestion of blood to head. Loose evacuations after fruits and acids. Alt. constipation and diarrhea. Heat alternating with shivering cold. < hot drinks. > after eating. Dark red eruptions, purple swellings, black and blue marks. Ball or lump sensation in various parts.

### 4) *Bryonia alba*

Averse conversation. Delirium during the night. Ravings about the events of the day. Delusion about being somewhere and wants to go home. Aggravation from motion (*Rhus-toxicodendrum* is agg. by keeping still.). Worst slight movement. Dryness and thirsts. IRRITABILITY with desire to be left alone. Lays on the painful part. KEEPS PART at REST. Headache or neuralgia, > hard pressure. During chill head hot, cheeks deep red, decided thirst for large quantities and long intervals. Serous membranes inflamed (frequent desire to take a long breath in), as are the muscles also inflamed. Hemorrhages, black eye; nosebleeds (3-4am) remedy. Food lies in the epigastrium (stone sensation). Legs swollen. Joints

red swollen and stiff. Pains better by warmth. Desires warm milk.

### 5) *Rhus toxicodendron*

Clouded sensorium, stupefaction muttering delirium, dry tongue TRIANGULAR RED TIPPED TONGUE. Vertigo with tendency to fall on rising. Head bewildered as from intoxication. A NERVOUS INTERNAL UNEASINESS that makes the person wish to move when there is no particular pain. The more he moves the > he is. Agg. by keeping still. (*Bryonia* is agg. by moving.). The greatest rigidity and pain is on first movement. Worse < rest. Worse DURING rest. SPECIFICITY OF SEAT: over-lifting, over-use, inordinate exertions of the muscles, contusions. Bruised and sprain-like pains, "stiffness." Dreams of great exertion, rowing, swimming, working hard at his daily occupation. Stupefaction with tingling in head and pain on motion of limbs. Vomiting after eating. Distention after a meal. Internal shaking in the abdomen. > after stool. Stools bloody with mucus, frothy, gelatinous, perfectly white. Putting a hand out of bed brings on a cough. Tendency to choke when swallowing. Cracking in joints, in jaw, and neck.

### 6) *Sulphur*

Philosophical, Intellectual, Theorizing. Critical, greasy, untidy; appears dirty though is clean, fear of contamination, lazy and indifferent about his appearance. Irregular distribution of circulation—congestion. BURNING SENSATIONS & PAINS. Flushes of heat or coldness (sweat). Redness of orifices with soreness and hypersensitivity. Excretions and discharges are painful. Faint all gone sensation at 11am. <farnacious food and < milk. Defective assimilation. Swollen glands. <heat. <warmth of bed. Acts strongly on the left side; inflammations that are periodic; chills that result from periodic fevers clear with *Sulphur*. Sharp stitching pains in left posterior chest (lung) and back. *Sulphur* for nose to lung tissue inflammation (nose stopped indoors and free outdoors). Has the alternation of asthma and skin affectations. Averse to be washed. Hot head and cold feet. Painless diarrhea after midnight; diarrhea that drives out of bed in the morning. Fear to have stool for the pain of it. Scratching = burning. Desires sweets and fats, spicy, alcohol. Soles can be hot. Critical. Agg. standing, becoming warm, evening, night, left side. Averse: eggs, sour, fish, olives, chicken and cheese.

What a miraculous feat of benevolence if  
Emergency Rooms, Poison Control Centers,  
and Public Health Clinics could get the  
understanding of "like cures like" medicine.  
Of course, it would be even better if clinicians  
could clinically differentiate between  
remedies to help save those accidentally  
or intentionally poisoned by ricin.

### 7) *Phosphoricum acidum*

DROWSY, DEPRESSED, APATHETIC which progresses to the physical level i.e. grief that freezes the individual; life or death unimportant; NOTHING EXCITES -i.e. stares at walls. Prostrated from grief and stupefied—has to reflect before answering, forgets words while speaking. Is easily aroused and then fully conscious while in his stupor. What is long known can only be recalled with difficulty. Rested by short sleep. Illusions of the senses and of the sensorium (sparks seen, bells heard, odors “take away breath,” sees things moving that are outside his peripheral vision). Right pupil became widely dilate so the iris almost disappeared; Left pupil remained normal. Falling of hair; want of juicy things; involuntary biting of tongue in sleep. Persistent painless watery diarrhea with food particles—that does not debilitate. Large amounts of garlic smelling flatus. Great quantity of urine that may turn milky and offensive at once. Weak feeling in the chest from talking, coughing, sitting too long; > by walking legs are weak to control, like the thoughts; SRP that the feet are rising to the ceiling; In general there is a pressure sensation of a crushing weight; a squeezing; running throughout. Passive bleeding and dark hemorrhages. < warm room; > warmth of bed. < drafts; < becoming cold in parts.

### 8) *Apis mellifica*

Burning, stinging, lancinating PAINS with excessive SWELLING. Great sensitiveness of the surface to touch (*Lachesis*); every hair is painful to contact. Great debility as if he had worked hard; compelled to lay down; tired and bruised feeling; restlessness, trembling, jerking and twitching. *Apis* is right sided to left and from above down (*Rhus-toxicodendrum* is left to right). Stiffness of lower jaw extended to tongue and throat-speech unintelligible—stiffness is constriction—aversion to tight things (*Lachesis*), which excites a spasmodic cough; chest can be as if contracted (*Lachesis*)—inspiration can be difficult—with difficulty lying down: a place becomes sore down in the lungs. Throat can be swollen with stinging pains or be painless. (*Baptisia* has painless throat affections that may swell less.) Muscles twitch > hot bath (legs and hands). Burning pains > cold (*Arsenicum* burning pains > heat). Feet swell after walking and are incredibly sore and burning. Tension, swelling and stiffness of limbs. Prostration toward faintness; Paralytic weakness. < touch or pressure; though head is > pressure. < warmth of bed. > cold water. Many symptoms < lying and > sitting.

### 9) *Veratrum album*

MIND overactivity on all levels, hyperactivity (restlessness) desire to tear things, delirium and raging, with open eyes. Loquacity. Fury tears his clothes, she bites her shoes to pieces and swallows the fragments. Cursing. Stamping. Wants to run away. Makes great noise. Swallows his own excrement and has the power to cure one-third of the lunatics in insane asylums (Hahnemann). Copious discharges: Salivation,

Sweat, Stomach, Abdomen, Urination and Stools. Discharges exhaust the vitality and are apt to be green, gushing (violent) and mixed with flakes. Cutting colic, cramps starting in hands and feet and spreading all over. Rapid sinking of vital forces—complete prostration and collapse. Faints easily from emotions, the least exertion, from retching and from stool. Fever: CHILLY as if cold is in the bones. Cold perspiration in its fever, but there is heat and redness of the face and hands. Great thirst for cold drinks with ice. SRP: Tickling all over the inside of chest and throat that promotes a cough. Agg. fruit; Agg. from becoming warm (wraps, applications, room); Amel. continued motion; walking; after perspiration; Desires cold drinks, sour (unripe fruit), salt, salt and lemon, herring, sardines, ice cold drinks.

### 10) *Baptisia tinctoria*

Stupor, falls asleep while being spoken to; confused as if drunk-feeling of wandering in mind. Head feels large; neck feels tired and can't hold head in positions very easily. Besotted countenance, bleary eyes (weight on eyes, eyes sore), sore throat, aches all over the body with profound prostration. Body feels split and each side converses with the other (illusion of being double or body being scattered into ungatherable pieces). Illusion of a “burnt feathers” in nose. Nose pressure from a frontal headache. Flat bitter taste; tongue swollen, feels scalded, is cracked brown; coated white-yellow; constricted, dry esophagus where only water can pass. Nausea, retching, vomiting; dreadful sinking in stomach. Pain in abdominal muscles, liver, gall bladder, spleen, iliac (R), and in groins, with swollen inguinal glands. Fetid exhausting diarrhea and dysentery, esp. in fall and warm weather. Fetid breath. Lumbar and sacral backache as if on hard board. Weakness in limbs. Overall prickling and numbness in parts. < on waking; < on walking; < in open air; < cold wind; < in fall and hot weather.

### Conclusion

This paper has introduced the castor bean plant, its toxic alkaloids, and examples of how it can cause harm. The diagnosis and treatment of ricin poisoning continues to be challenging. In the future, more individualizing symptoms need to be elicited from patients. The rubrics used in this report are based on conventional medical literature write-ups, which are general diagnostic symptoms, and not specific enough to differenti-

To date there is no human antidote to ricin. Treatment of ricin poisoning is largely considered “supportive,” wherein various therapies are provided which support the body’s natural healing response.

ate any subjective or characterizing symptoms. As such this conventional medical review lacks remedy-differentiating symptoms. A composite of these generalities has lead to a top ten list of what could be considered appropriate remedies to give in future cases of RP, not only to prevent premature death but to alleviate tolerable human suffering. The effectiveness of the law “likes cures like” may be elucidated in future cases of RP by using more carefully defined mental and emotional symptoms that point-out the differences in one case of ricin poisoning from another within health communities and the multi-national body government. Using the top 10 remedies put forth in this paper will apply the “like cures like” law to become a more practical tool used to individualize treatment of those suffering the effects of accidental or intentional RP. The reformer of medicine, Christian Frederich Samuel Hahnemann, in his 26th and 27th aphorisms of his 6th edition Organon, explains that in the treatment of any illness (symptom-defined) the healing power of the medicine rests upon its ability to produce similar overpowering illness (symptoms) that will be permanent, rapid and radical to annihilate both physical and moral maladies (Hahnemann in Boericke n.d.)



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