

Poison Ivy

A person “gets” poison ivy when their skin comes in contact with urushiol, a pale yellow oily mixture of compounds; urushiol has two phenolic groups and a long saturated or unsaturated side chain. Figure I indicates the range of urushiol structures in poison ivy and Figure II shows a specific example. Poison ivy urushiol is made up mostly of compounds with 15-carbon side chains, whereas poison ivy and poison sumac also contains compounds with side chains of 13 or 17 carbons. The more unsaturated the side chain and the longer the side chain – the more toxic the compound.[Botanical Dermatology]

Figure I: Four main urushiols in poison ivy.

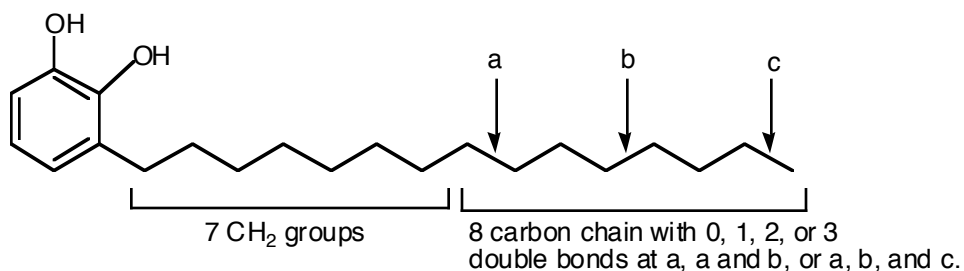
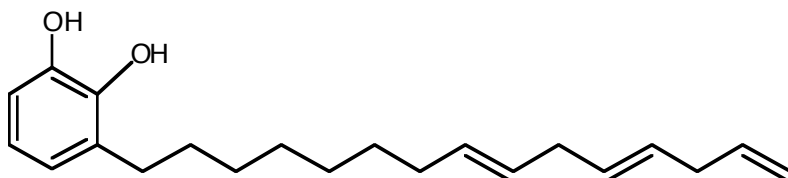
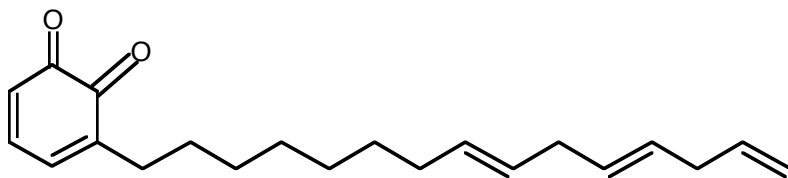


Figure II: One of the components of poison ivy urushiol



Once on the skin, the compounds are oxidized to quinones (Figure III), which bind to proteins in the skin membranes, causing an allergic reaction. The severity of the reaction

Figure III: A quinone formed by oxidation of urushiol



depends on the person's susceptibility, the thickness of the skin that was exposed, and the amount of urushiol the skin came in contact with. The universal symptom once the rash breaks out a day or more after exposure is a horrendous itch. Some people are so allergic that they break out after being exposed to a miniscule amount of the oil, and some even land in the hospital.

Some important information about poison ivy to keep in mind:

- A person can “get” poison ivy any time of year; all that is required is contact of the skin with urushiol through touching, grabbing or stepping on roots and vines, or coming in contact with a leaf which has been damaged so that the sap is exposed.
- Some people are exquisitely sensitive to urushiol. “. . . [T]he amount on a pinhead is sufficient to cause rashes in 500 sensitive people.” [Wayne's World]
- Poison ivy can spread by touching the exposed skin and then touching another part of the body, by petting the dog who has been romping in the plant, touching clothes that have come in contact with it, and by breathing smoke because some neighbor has unwittingly been burning it. Urushiol can last for years on garden tools or unwashed clothing
- The blisters that may form on the skin as a reaction to poison ivy contain water and lymph and no urushiol; therefore poison ivy can not spread through a broken blister. Furthermore, poison ivy is not catching from one person to another unless the sap (and thus the compound) transfers from one to the other.
- A person who has been in contact with poison ivy should wash right away, throw their clothes into the washer and wash the dog. If this is done quickly, the reaction might be mild, or with luck may not appear at all.

Diverse writers report authoritatively and variously that washing must be done anywhere from 10 minutes to several hours after exposure. Clearly this is quite an important discrepancy in advice. An on-line dermatology course cited research that reported that “urushiol can be removed in significant amounts only if washed off very early: “After 10 minutes, only 50% can be removed; after 15 minutes, only 25%; after 30 minutes, only 10%; and after 60 minutes, none of it can be removed.” [Botanical Dermatology]

- There is also mixed information about *how* to wash after exposure. Everyone says to rinse thoroughly with water. Some say that the water should be cold, as warm and hot water would only open pores and spread the urushiol faster; others say

water of any temperature is fine, and others prescribe warm water. Some writers say to use soap, others say that soap only spreads the urushiol around as well as washing off the protective waxy layer of the skin making it more permeable to urushiol. Some say to use a solvent such as rubbing alcohol because urushiol is more soluble in alcohol than in water, but . . . so is the protective layer of the skin. Everyone agrees that rinsing must be prolonged, and cold water seems to be one of everyone's options. Personally, I don't understand this advice, because urushiol is insoluble in cold water. A better possibility might be to rinse with a solution of a moderately strong base such as a detergent that has washing soda (sodium carbonate) in it; urushiol is a weak acid and would be dissolve in moderately strong bases.

- Washing that involves wiping or rubbing spreads the oil and may abrade the skin, increasing the likelihood of a stronger reaction
- Persons who have never gotten poison ivy and think they are immune should not believe it for an instant. People do not get it on first exposure, and some take repeated exposure before they become sensitized. Beware these famous last words: "I don't get poison ivy." Only about 10 - 15% of the population seems to be immune to poison ivy. Some of those who had thought they were in this category end up with reactions that put them into the 10 – 15% of the population that show extremely sensitivity..
- Goats love poison ivy - it is one of their preferred forage plants. I once had a reference that said that urushiol was metabolized and did not show up in the goat's milk, but I can no longer find the reference and am still looking.
- Birds eat the seeds with impunity and thus help spread the plant.
- Other sources of urushiol or close relatives are poison oak, poison sumac, mango rinds, cashew shells and the Japanese lacquer tree. The word urushiol comes from the Japanese word *urushi* meaning lacquer. Ginkgo seeds contain small amounts of a close relative of urushiol.
- Jewelweed is the most commonly recommended herbal remedy for preventing and treating poison ivy but it has been shown to be ineffective. (Long)

Sources:

General information: Information for this essay was taken from many articles and websites easily obtained by plugging key words into a search engine; a particularly thorough source is Wayne's World: <http://waynesword.palomar.edu/ww0802.htm>. (1999)

Jewelweed study: D. Long, NH Ballentine, JG Marks Jr “Treatment of poison ivy/oak allergic contact dermatitis with an extract of jewelweed” *Am J Contact Dermat* 1997 Sep:8(3): 150-3

Botanical Dermatology: <http://www.telemedicine.org/botanica/bot6.htm>

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A widely quoted source: William L. Epstein, MD (chairman emeritus and professor of dermatology at the University of California, School of Medicine.