Botanical Briefs: The Cashew Tree—*Anacardium occidentale* L.

Thomas W. McGovern, MD

Clinical Importance

Cashew-nutshell liquid (CNSL) is used to produce friction dust for brake linings and clutch facings; to make epoxy resins, paints, varnishes, and foundry core oil; and to control mosquito larvae and schistosomiasis vectors.[1] It also has antimicrobial properties. Ingestion or topical contact with CNSL in people sensitive to other Anacardiaceae, such as poison ivy (*Toxicodendron radicans*) or Western poison oak (*Toxicodendron diversilobum*), will induce contact dermatitis.[2-4]

Topical contact with CNSL will induce the same type of reaction seen in individuals exposed to poison ivy. Oral ingestion can lead to stomatitis and pruritus ani (local effects) and even to widespread dermatitis with flexural accentuation (systemic effects). One outbreak of systemic dermatitis in Pennsylvania resulted from bags of cashews containing nutshell portions contaminated with dark CNSL.[2] The cashew tree also contains nonallergenic irritant and vesicant components.[3]

Family

The cashew tree is a member of the Anacardiaceae family. Exposure to this family of plants is responsible for more allergic contact dermatitis than perhaps all other causes combined.

Distribution

The cashew tree is indigenous to northeast Brazil and is cultivated throughout tropical climates worldwide, particularly in the West Indies, India, and parts of Africa.[4,5] However, the tree cannot thrive anywhere in the continental United States.[6]

Dermatitis-Inducing Parts

Any part of the cashew tree, except the roasted nut, can induce dermatitis.[6] Allergic contact dermatitis is generally caused by contact with the oily brown CNSL found in the fenestrated mesocarp (the middle layer of the cashew nutshell)(Figure 1). CNSL causes an immediate vesicant reaction because of the high concentration of phenols contained therein. Cashew wood exudes a yellow gum that is used in the production of varnish, insect repellents, and adhesives. This substance also causes vesicant reactions. The tree bark produces thick resinous latex that turns black on contact with air. It is used to mark clothing in some areas, and visitors often develop blistering reactions on contact.

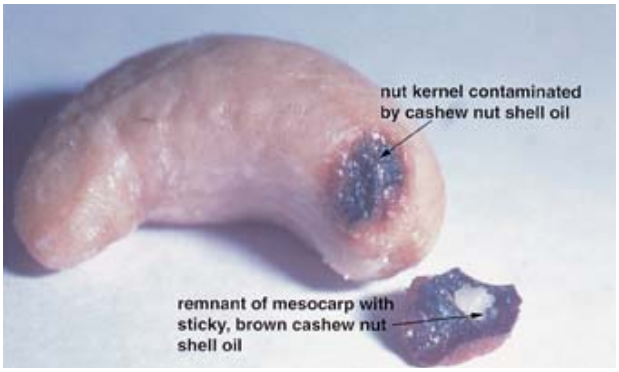

Figure 1. Cashew nut kernel contaminated by cashew-nutshell oil. (Photograph courtesy of COL Dirk M. Elston, MC, USA. This photograph is in the public domain.)

Nomenclature

Anacardium is derived from the Greek and means *similar to a heart* because the fruit of this tree (the cashew apple) was thought to resemble a bird's heart (Figure 2). *Occidentale* refers to the Western Hemisphere; the word *occident* is derived from a Latin word meaning *to fall or go down* (ie, where the sun goes down).

Identifying Features/Facts

The cashew tree is a perennial evergreen that grows to a height of up to 12 m. Unlike its *Toxicodendron* relatives, its 15- to 20-cm leaves are simple and alternate, not compound, and the flowers grow on terminal panicles, not on axillary ones. The cashew

Dr. McGovern is in private practice in Fort Wayne, Indiana.
Reprints: Thomas W. McGovern, MD, Fort Wayne Dermatology, P.C., 1234 E Dupont Rd, Suite 6, Fort Wayne, IN 46825.

Figure 2. Cashew apples and terminal nuts. (Photograph courtesy of Raintree Nutrition, Inc. [www.rain-tree.com].)

apple (hypocarp) is a 4- to 8-cm by 10- to 20-cm, long, yellow or red, pear-shaped, soft, juicy peduncle with a high concentration of ascorbic acid (Figure 2). Although the cashew apple is called a fruit, the 3-cm kidney-shaped nut that grows at the end of the cashew apple is the actual fruit. This nut contains the edible kernel commonly known as the *cashew*.

The cashew nutshell (pericarp) has 3 layers. The outer leathery exocarp and the thin, hard, inner endocarp envelop a honeycombed mesocarp filled with an oily fluid. This juice contains 2 active allergens: cardol and anacardic acid.[3,4] The nuts are processed by heating them in a bath, which accomplishes 3 functions: the shell is more easily removed; the time workers spend removing the shells is decreased; and the risk of contact dermatitis among workers is reduced.[4] The heating process causes the epicarp to burst, releasing the CNSL and simultaneously decarboxylating the anacardic acids into less allergenic cardanols. The nuts are centrifuged in sawdust to remove the endocarp and residual phenols. The endocarp is then removed to yield an edible and hypoallergenic nut.[6]

Allergens

CNSL contains the phenols cardol, anacardic acid, 2-methylcardol, and cardanol. A phenol is a benzene ring with a hydroxy group. The principal allergens contained in CNSL are cardol (a resorcinol) and anacardic acid. The allergens in toxicodendrons are catechols (1,2-dihydroxybenzenes) with an alkyl side chain at position 3. Resorcinols are 1,3-dihydroxybenzenes with an alkyl side chain at position 5. Early oral exposure to resorcinols such as cardol appears to protect against contact dermatitis to catechols (present in poison ivy), whereas early cutaneous exposure to catechols (as in the United States and Canada) predisposes one to an allergic reaction to resorcinols.[7]

The concentration of phenols in the cashew nutshell and bark is so high that contact with them causes an immediate vesicant reaction. Africans used CNSL and cashew bark in ritual scarification and keloid formation, and it has been used for wart removal.[6]

REFERENCES

1. Mitchell JD. The poisonous Anacardiaceae of the world. *Adv Econ Botany*. 1990;8:103-129.
2. Marks JG Jr, DeMelfi T, McCarthy MA, et al. Dermatitis from cashew nuts. *J Am Acad Dermatol*. 1984;10:627-631.
3. Rosen T, Fordice DB. Cashew nut dermatitis. *South Med J*. 1994;87:543-546.
4. Nogueira-Diogenes MJ, DeMorais SM, Carvalho FF. Contact dermatitis among cashew nut workers. *Contact Dermatitis*. 1996;35:114-115.
5. Beaman JH. Allergenic Asian Anacardiaceae. *Clin Dermatol*. 1986;4:191-203.
6. Lampe KF. Dermatitis-producing Anacardiaceae of the Caribbean area. *Clin Dermatol*. 1986;4:171-182.
7. Hurtado I. Poisonous Anacardiaceae of South America. *Clin Dermatol*. 1986;4:183-190.