

Botanical Briefs: Garlic—*Allium sativum*

Thomas W. McGovern, MD, Fort Wayne, Indiana
Steven LaWarre, BS, Grand Rapids, Michigan

Clinical Importance

Garlic is the most frequent cause of fingertip dermatitis in housewives and caterers.¹ Garlic use is increasing as a “natural” topical medicament for fungal infections, insect bites, boils, and skin infections.^{2,3} Because garlic continues to be a popular spice, contact with the cloves is frequent among those who cook with it.

Cutaneous Manifestations

Five clinical pictures may arise from reactions to garlic: (1) Fresh crushed garlic and garlic oil are potent irritants that can cause severe vesicant reactions, especially under occlusion (Figure 1).^{3,5} (2) Type I hypersensitivity can result in urticaria on the hands and forearms of food handlers. (3) After repeated urticaria, eczematous lesions characteristic of protein contact dermatitis ensue.⁶ (4) Most common, those who cut garlic develop a low-grade, hyperkeratotic fingertip dermatitis with fissures on the thumb, index, and middle finger of the non-dominant hand (Figure 2), exactly as seen in “tulip fingers.”^{2,6,7} (5) Uncommonly, some patients who have applied fresh garlic to their skin have developed eruptions that clinically and histologically resemble pemphigus vulgaris.^{8,9}

Family

Garlic is part of the Alliaceae family. In the past, this family of 600 species was included in the Liliaceae family, but botanists now have defined the latter more narrowly.¹⁰

Distribution of Plant

The 450 species of the genus *Allium* are widely distributed throughout the temperate regions of the



Figure 1. Severe vesicant reaction on the scrotum after repeated application of fresh garlic under occlusion for presumed fungal infection (Photograph courtesy of Martin Giandoni, MD).



Figure 2. Typical posture of a nondominant hand holding a garlic clove for cutting.

Dr. McGovern is in private practice in Fort Wayne, Indiana.
Mr. LaWarre is from Meijer Botanical Gardens, Grand Rapids, Michigan.
Reprints: Thomas W. McGovern, MD, Fort Wayne Dermatology, PC, 1234 E Dupont Rd, Suite 6, Fort Wayne, IN 46825.



Figure 3. Garlic bulb and cloves of *Allium sativum*.

Northern Hemisphere, although the plant probably developed in central Asia.¹⁰

Dermatitis-Inducing Plant Parts

All parts of the plant release the potentially irritating and allergenic sap when damaged.

Nomenclature

Allium is the Latin word for garlic. *Sativum* is the Latin word for planted or sown.

Identifying Features and Plant Facts

Members of the genus *Allium* (eg, onions, leeks, chives) are perennial herbs with bulbs or corms. A *bulb* is an underground bud with thick, fleshy scales, such as an onion. A *corm* is a short, solid, vertical underground stem with thin papery leaves. The garlic bulb is made up of a cluster of smaller bulbs called *bulblets* (cloves) (Figure 3) and possesses linear, strap-like leaves that arise from the underground bulb; a sheath covers these leaves at their bases. The flowers are born in small, flat umbels.

Irritants

While the irritants of garlic are not definitively known, some bulbs do contain irritant sulfur com-

pounds, such as benzyl- and isothiocyanates.⁷ The allergens may play a second role as irritants, as well. Because of the severe reactions that can ensue from fresh garlic under occlusion, patch testing to whole garlic should not be performed. The primary allergen is thought to be diallyldisulfide. Alliin (s-2-propenyl-L-cysteine sulfoxide) present in intact garlic is released after plant damage. It breaks down due to the action of alliinase to allicin, which in turn is catalyzed to various sulfur-containing oils and allyl alcohol. These volatile products are responsible for the odor of garlic. Diallyldisulfide is the main constituent of the resulting oil. Allylpropyl disulfide is a secondary allergen. The high molecular-weight protein that presumably leads to urticaria and protein contact dermatitis remains unknown but appears to be different than the low molecular-weight allergens.⁶

REFERENCES

1. Acciai MC, Brusi C, Francalanci S, et al. Allergic contact dermatitis in caterers. *Contact Dermatitis*. 1993;29:48.
2. Delaney TA, Donnelly AM. Garlic dermatitis. *Australas J Dermatol*. 1996;37:109-110.
3. Roberge RJ, Leckey R, Spence R, et al. Garlic burns of the breast. *Am J Emerg Med*. 1997;15:548.
4. Canduela V, Mongil I, Carrascosa M. Garlic: always good for the health? *Br J Dermatol*. 1995;132:161-162.
5. Lahti A. Contact urticaria to plants. *Clin Dermatol*. 1986;4:127-136.
6. Jappe U, Bonnekoh B, Hausen BM, et al. Garlic-related dermatoses: case report and review of the literature. *Am J Contact Dermat*. 1999;10:37-39.
7. Bruynzeel DP. Bulb dermatitis: dermatological problems in flower bulb industries. *Contact Dermatitis*. 1997;37:70-77.
8. Pirogova EP, Katyukhina ZD. Artificial dermatitis caused by garlic. *Dermatologii Venerologii*. 1970;44:53.
9. Brenner S, Ruocco V, Wolf R. Pemphigus and dietary factors. In vitro acantholysis by allyl compounds of the genus *Allium*. *Dermatology*. 1995;190:197-202.
10. Mabberley DJ. *The Plant-Book: A Portable Dictionary of the Vascular Plants*. 2nd ed. Cambridge, Mass: Cambridge University Press; 1997.