

Botanical Briefs: *Capsicum* Peppers

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Capsicum peppers are widespread, both in and out of the kitchen, both nationally and internationally. They contribute to burning and stinging of hands, mouth, and eyes in conjunction with food preparation and ingestion that is often unreported to the medical community. The literature is not abundant on the subject and often is confusing. This article provides brief yet detailed information about this important plant.

Cutis. 2003;72:21-23.

Clinical Information

Chili peppers are well known among amateur chefs and kitchen workers for causing painful red hands and lips. Cases of painful red hands have been described in association with handling wet chili peppers for Asian cuisine (the so-called *Hunan hand syndrome*)¹ and in individuals preparing Mexican cuisine who peel warm roasted peppers.^{2,3}

Nonvesicular erythema on areas of contact—particularly the hands—has been reported.⁴ Burning of the lips and gastrointestinal mucosa is a well-known phenomenon to anyone who has eaten foods containing hot peppers. Those who handle chili peppers and accidentally touch their eyes also may experience burning of the eyes. These scenarios are believed to be irritant contact phenomena. Allergic contact dermatitis to *Capsicum* species appears to be rare.⁵⁻⁷ Patch testing can be done with 1% tincture of capsicum in alcohol.⁸ Red-pepper dermatitis has been reported in infants whose mothers ingested red peppers prior to breast feeding.⁹

Apart from the obvious avoidance of contact, reported treatments include topical application of

lidocaine gel,¹ immersion in 5% acetic acid,¹⁰ topical application of magnesium hydroxide aluminum hydroxide–simethicone suspension,¹¹ topical application of vegetable oil,¹² and a small amount of chlorine or ammonia in water.¹³ The burning mouth can be ameliorated by casein in dairy products or alcohol (eg, beer, vodka).¹³

Plant Information

Capsicum peppers belong to the family Solanaceae, which also includes tomatoes, potatoes, tobacco, and the deadly nightshade.⁵ Nomenclature and classification of peppers has been fraught with confusion and change over the years.¹³⁻¹⁵ Terms like *pepper*, *chile*, *chili*, *paprika*, and *capsicum* are frequently used interchangeably. Currently, the *Capsicum* genus encompasses 5 well-described domesticated species and at least 20 wild species, as well as many hybrids and cultivars. The most common of these is *Capsicum annuum*, which includes the following pepper types: ancho/poblano, bell, cayenne, exotics, jalapeño, paprika, pimiento, piquin, serrano, and others. *Capsicum frutescens* is comprised of mainly the tabasco pepper but also includes *malagueta* and bird pepper varieties. The other domesticated species include *Capsicum baccatum* (ají, ají amarillo), *Capsicum chinense* (habañero, rica red), and *Capsicum pubescens* (rocoto, manzano).^{13,14} *Capsicum* species should not be confused with black or white pepper (*Piper nigrum*) or pimiento (*Pimento dioica*).¹⁴

Capsicum species are perennial plants indigenous to tropical America that produce pungent fruits on a small spreading shrub. The *Capsicum* is oval to oblong with hollow berry-type fruit attached to pedicles and calyxes filled with seeds. The fruit has a wide range of sizes, shapes, and colors (Figure) and is well known for its pungency and often hot taste.^{13,14} Capsaicin is the dominant compound responsible for this pungency and heat. In the food industry, heat levels of peppers are expressed in Scoville units. These levels are based on multiple

Accepted for publication January 3, 2003.

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Various species of *Capsicum*.

tests with high performance liquid chromatography and are intended for comparison purposes. The range is from 0 (mild bell) to 500,000 Scoville units (habañero, African “bird’s eye”). The common jalapeño or serrano peppers are rated at 5000 to 15,000 Scoville units.¹⁶

Capsicum have the earliest recorded culinary history, dating back to 7000 BC. The first known human contact with peppers was discovered in Mexico by archaeologist R.S. MacNeish, who found pepper seeds dating from approximately 7500 BC.¹⁴ Christopher Columbus and accompanying physician Diego Chanca were the first to describe *Capsicum* during Columbus’ second voyage in 1493. They described “. . . bushes like rose bushes which make a fruit as long as cinnamon full of small grains as biting as pepper . . .”¹³ It appears that peppers were subsequently disseminated to Africa, India, the Middle East, the Far East, and Europe via post-Colombian trade routes.¹³ Today, peppers may be the most widely used spice worldwide.^{14,15} In the United States, demand for hot peppers exceeds supply, and many are imported annually.

Medicinal Information

Capsaicin, the active ingredient in *Capsicum* peppers, has been used as a topical medication for pain relief from arthritis,¹⁷ postherpetic neuralgia,¹⁸ diabetic neuropathy,¹⁹ and other painful phenomena.^{15,20} It also has been used in self-defense sprays.¹¹

From a nutritional standpoint, peppers are rich in vitamin A, C, and B-complex and also may contain magnesium, iron, thiamin, riboflavin, and niacin.¹³ In herbal medicine, *Capsicum* are used internally to aid circulation, relieve gas and colic, aid digestion, and prevent infection. External uses include local analgesia and a remedy for cold feet.²¹

The chemical structure of capsaicin is 8-methyl-6-nonanoyl vanillylamide.¹⁵ Additional compounds subsequently identified include dihydrocapsaicin, nordihydrocapsaicin, homodihydrocapsaicin, and homocapsaicin.¹⁵ This should be distinguished from capsicum oleoresin, which is commonly used in over-the-counter topical pain relief products. Neither capsicum oleoresin nor the synthetic capsaicin appears to be as reliably neuropeptide-active as natural capsaicin itself.¹⁵ Capsaicin, when applied

to the skin, induces release of substance P, producing erythema and pain. With repeated application, the substance P is depleted, and the sensory neuron stops producing substance P, leading to diminished pain. This is believed to be the mechanism by which management of certain neurogenic painful conditions (eg, postherpetic neuralgia, diabetic neuropathy) is achieved.^{15,20}

Capsicum species have a rich history and flavor that adds spice and heat to our culinary environment. They extend beyond the kitchen to provide potential medical treatments for painful ailments. If not handled with care, they are responsible for painful red hands and lips.

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