



Ethnobotanical Leaflets

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Red Hot Chili Peppers

By Tom Giesler

A passion for foods from the American Southwest is sweeping through the country. The main component and most popular item of this fad is the chili pepper, an item of tremendous variability and a staple of many people in Central America. In this country, chili peppers were once only found in specialized ethnic stores, but now it is just as likely to be found at the neighborhood Kroger. For most people, however, their knowledge stops here. Through this paper I hope to educate the reader on some other aspects of this intriguing vegetable, such as its history, chemistry, and uses.

There is some confusion over what a "chili pepper" is. To many it is only the hot varieties of pepper, such as the jalapeno or the serrano. Others include the milder varieties, such as the bell pepper. Webster's Encyclopedic Unabridged Dictionary of the English Language defines a chili pepper as "... the pod of any species of capsicum, esp. *Capsicum frutescens*." In this paper, the term "chili pepper" will be used to describe both the hot and mild varieties.

When asked to name the source of chili peppers, most people would name Mexico. However, despite the plant's popularity in that country, it is believed that chili peppers originated in South America, after which it spread to Central America. Pepper remains found in Tehuacan, Mexico, were dated to approximately 7000 B.C., showing that chili peppers were established long before Columbus arrived. In fact, chili peppers were among the first plants to be domesticated, due to its weedy nature and the easy transportability of its seeds (Andrews 1984).

When Columbus arrived in the New World, he mistook the chili peppers for a relative of black pepper, *Piper nigrum*, which is why it is referred to today as "peppers" (Robbins 1992). The first detailed account came from Dr. Diego Alvarez Chanca, who accompanied Columbus on his second voyage. Dr. Chanca described chili peppers as the native's principle food and compared them to the turnip (Andrews 1984).

The seeds of the chili pepper were brought back to Spain, where it was grown in monastery gardens. Portuguese traders then spread the chili peppers to many far flung locations, such as India, Indonesia, and Persia (Andrews 1984).

Chile peppers became popular due to their great variability in size, shape, and color. Unfortunately, this long proved to be a problem for the taxonomists, who frequently had trouble telling the difference between a different variety and a different species. It wasn't until the 1950's that it was decided that there were five main species of chili peppers, and twenty wild ones (Proulx 1985). The five main species are: *Capsicum annum*, *Capsicum frutescens*, *Capsicum chinense*, *Capsicum baccatum*, and *Capsicum pubescens*. However, it is considered impossible to develop a system of classification that would cover all of the chili peppers, due to the great variation among the members of the same species, especially in places such as Mexico (Smith, Villalon, and Villa 1987).

Man's interest in chili peppers has resulted in new varieties, such as the TAM Jalapeno, Hidalgo Serrano, and Numex Big Jim, which have a milder flavor or are more resistant to disease. In order to make chili peppers more palatable to the public, chili pepper breeders are breeding varieties that are less hot, such as the Conquistador, in the hope that people who like the milder varieties will move up to the hotter, more traditional ones (Creasy 1990). These more traditional varieties belong to the *C. annum* species, and include such varieties as bell peppers, jalapenos, and serranos. It can be identified by its white corolla and its single fruits. *C. frutescens* is used primarily in Brazil. It can be identified by its yellow-green corolla and its-paired-fruits. *C. chinense* is known in this country as "bird peppers" (Proulx 1985). It is little used in this country, as are *C. baccatum*, *C. pubescens*, and *C. cardenensii*.

Being a New World plant, chili peppers are found growing wild in North and south America. *C. annum* is found between Florida and Peru, *C. frutescens* between Florida and Brazil, *C. chinense* between Mexico and Argentina, *C. baccatum* all over South America, and *C. pubescens* between Colombia and Argentina (Smith, Villalon, and Villa 1987).

With the increased demand for chili peppers has come farms and industries that grow and process chili peppers. In the United States much of this occurs in New Mexico, its hot days and cold nights being an ideal atmosphere for its 39,000 acres of chili peppers. Since chili peppers cannot be picked by machine, these New Mexican farms are being challenged by the Mexican farms, where the labor is much cheaper (Robbins 1992).

Researchers at New Mexico State University are trying to breed a chili pepper that is loosely attached enough to the plant to allow mechanical harvesting, a development that would make American farms much more competitive (Robbins 1992). Techniques of genetic engineering are being applied to chili peppers as well, which allow more radical changes, quicker testing of new varieties, and greater accuracy (Proulx 1985).

While most people know the chili pepper as a food, it had other uses in ancient times. The pre-Columbian Indians used chili peppers as a medicine, as a punishment for children (inhalation of the smoke of burning chili peppers), and as a kind of tear gas during warfare (chili peppers were burned and the smoke blown by the wind over to enemy lines) (Andrews 1984). Today chili peppers are sometimes used as a sore throat cure (10 drops of Tabasco sauce in a glass of water), as a food preservative because of its strong antioxidant properties, as a safe food-coloring, and as a flavoring for such products as

ginger ale and ginger beer (Proulx 1985). Of course the most common use for chili pepper is culinary, particularly in Southwestern foods. Part of this is due to the good nutritional properties of chili peppers, which are very high in vitamins A and C (100% and 152% of the RDA), and have few calories (15 calories per quarter cup) (Creasy 34).

A more important factor is the heat felt when eating chili peppers, a sensation described well by E.A. Proulx: "Tears streamed from my eyes, sweat broke out on my brow, my nose ran, my lips swelled, and scenes from my life flashed before me." (1985). One culinary critic refers to the eating of chili peppers as "culinary skydiving" (Robbins 1992).

In this country, chili peppers have been put into a variety of foods, including jelly, potato chips, applesauce, and lollipops. In Mexico chili peppers are roasted and wrapped in a tortilla, which allows them to keep well in the hot sun (Robbins 1992).

The substance that produces all of the heat sensation is known as capsaicin. Capsaicin is produced by specialized gland cells found in the cross-walls, or ribs, of the pepper (Rowland, Villalon, and Burns 1983). Capsaicin is actually composed of several different alkaloids, which vary in amounts depending on the species of chili pepper (Proulx 1985). Capsaicin produces the sensations of heat and pain in the mouth by stimulating local heat receptors in the skin and mucous membranes, and initiates several derivatives which have similar effects ("Nutritional Reviews" 1986). Capsaicin can induce sweating, which is why it is popular in hot dry climates; sweating can cool a person down markedly in such a climate (Robbins 51). Capsaicin also stimulates the actions of the muscles of the stomach and intestine, which improves digestion and makes chili peppers an attractive condiment for a food that might upset the stomach (Andrews 1984).

Apparently capsaicin was developed by plants as a way of preventing animals with digestive systems that can destroy chili pepper seeds from eating them, while allowing animals who will pass the seeds to eat them with no ill effects (Robbins 1992). Chili peppers with more capsaicin produce more pain, the "hottest" being the habanero, which, on the Scoville heat index rate a 200,000 (jalapenos rate only a 3500) (Johnson and Johnson 1992).

Capsaicin's pain-producing properties are being utilized by companies that market police and self-defense products; many police departments have replaced their tear gas sprays with ones containing capsaicin, because it is considered to be more effective (Robbins 1992). Capsaicin is even being used in a product designed to protect hikers from grizzly bears (Robbins 1992). Researchers have also found that capsaicin can also act as an expectorant and as a blood clot preventive (Andrews 1984).

Chili peppers have become more common in America, and along with that will come more uses for it and its products. Once considered only appropriate for ethnic Mexican cuisine, it is now used in a wide variety of dishes and is being investigated in laboratories for any medicinal properties. Chili peppers will soon be found almost everywhere in America, and will join the long list of plants that possess limitless properties for the benefit of mankind.

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