When you take family and friends to enjoy Sichuan dishes in a Chinese restaurant, you may be asked, "Can you eat hot food or La Jiao?" You may wonder what this word, "La Jiao," means. In Chinese, "Jiao" means plants that have pungent or hot fruits and seeds, such as chilies (Capsicum), black pepper (Piper nigrum), and Sichuan pepper (Zanthoxylum bungeanum Maxim). Generally, Chinese people call hot chilies "La Jiao" and the sweet bell pepper "Tian Jiao" to distinguish it from hot chilies.

It's believed that chilies were introduced to China in the late 16th century. There are two theories as to how chilies were brought into the country. One theory is that chili peppers were traded along the Silk Road to northwest China, and from there spread throughout the entire country. The Silk Road was the most important trade route for China. The 7,000-mile route spanned China, Central Asia, Northern India, and the Parthian and Roman Empires and connected China's Yellow River Valley to the Mediterranean Sea.

The second theory is that perhaps chile peppers were introduced to Southwest China from Southeast Asia. Yunnan Province, located in the southwest part of China and bordering Southeast Asia, is the center of plant genetic resources in China. Not only have domesticated Capsicum annum been found there, but also semi-cultivated and wild forms of chilies such as 'Xiao Mi La', a wild

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type of *Capsicum frutescens*. 'Shuan La Jiao' and 'Da Shu La Jiao' (*Capsicum frutescens*) also have been found there recently. These are woody, pungent chiles. Local people say that when they use a pod of 'Shuan La Jiao' in a bowl of soup, the soup is too hot to eat.

Today, chile is one of the most important and lucrative vegetable crops in China. The Agricultural Department of China reported that total acreage of peppers in 1995 was 714,600 ha. Total production was more than 12.3 million tons, making China the largest pepper-producing area in the world. Sweet peppers are grown across the country. Hot peppers are produced in Southern China. And Chinese red chile powders are exported around the globe.

People in the northern part of China like bell peppers without pungency. But in the southern area, people prefer mild, pungent bell peppers.

Most hot pepper varieties grown in China belong to the cayenne pod type and the Asian pod type. 'Er Jing Tiao' (double goldenness), a long narrow cayenne type, is a major cultivar in Sichuan Province and is used to produce red chile powder for export. Other cultivars used for making chile powder include 'Niu Jiao Jiao' (bull horn shape pepper) and 'Young Jiao' (sheep horn shape pepper). The most pungent chile cultivated in China is 'Cao Tian Jiao', which also is grown for red chile powders. This chile plant produces multiple fruits set in one node. The attractive, bright red fruits grow straight up.

The F₁ hybrid variety of bell pepper plays an active role in Chinese bell pepper production. After the first F₁ hybrid variety of bell pepper, 'No. 1 Zao Fong', was successfully developed in Nanjing, Jiangsu Province, most bell pepper growers chose F₁ hybrid varieties for bell pepper commercial production. In recent years, a series of sweet pepper varieties has been developed by Chinese chile pepper breeders, including the 'Zhong Jiao' series of cultivars developed by The Vegetable and Flower Research Institute of The Agricultural Academy of China in Beijing. Additionally, the Hunan Pepper Research Institute in Changsa, Hunan Province, has released a series of cultivars, the 'Xiang Yan'. Jiangsu Agricultural Research Academy in Nanjing, Jiangsu Province, developed the 'Su Jiao' cultivars.

Chile peppers are what make traditional Chinese food famous and are deeply rooted in Sichuan and Hunan dishes—two of the four major types of Chinese dishes. Chinese people say Sichuan people like hot food and Hunan people always complain the food is not hot enough. The Sichuan Province is located in the southwest part of China in the upper Yangtze River, and Hunan Province is located in the central south part of the country. These provinces are well known as places where people enjoy eating hot foods.

Without chile peppers, even the most brilliant chef cannot make Sichuan dishes. These dishes are characteristically delicious and pungent. Chiles add a wonderful flavor to Sichuan dishes such as Gongbao chicken, hot and spicy tofu, spicy fish, spicy beef, spicy chicken, and Chongqing Ho Go (Chongqing hot pot). The spicy chicken is a recently developed Chinese dish in Sichuan restaurants and has become a popular home dish. The best chile variety for preparing these dishes is 'Cao Tian Jiao' (*Capsicum annuum*).

Of all Chinese dishes, the famous Chongqing Ho Go (Chongqing hot pot) is the hottest. The characteristics of Chongqing hot pot are its delicious flavor and its extreme pungency. The main ingredient is red chile peppers. A hot pot...
needs about 100–150g of red dried chile pods or powders. Chongqing is a large, industrial mountain city, located near the junction of the Yangtze and Kialin rivers. Like other places in Sichuan, Chongqing is very humid. The annual average relative humidity in this area is between 80% and 90% in spring and summer. The winters are warm and the summers are very hot. Even in the hot summer, when the temperature is more than 100°F, Chongqing hot pot bars are still busy. Consumer analysts think the humidity is the reason people eat this dish. Based on traditional Chinese medical theories, it's thought that eating Chongqing hot pot promotes good health, especially for people living in humid areas because the hot food makes one sweat, reducing some "humidity" from the body and increasing blood function.

Chiles make Sichuan salads and Sichuan pickles taste wonderful. Salad vegetables such as bean sprouts, cucumbers, carrots, and radishes are welcome in China. Like salad, Sichuan pickles are well known for their hot, delicious taste. To make Sichuan pickles, chiles are harvested when the fruit color just begins to change from green to red. The best chile cultivar for making Sichuan pickles is 'Cao Tian Jiao' because of its pungency and high solid content.

The future of Chinese chiles remains bright. The vegetables will continue to be used in the food industry, and also will be used for color extraction and medicinal purposes.

Nankui Tong is a doctoral student in the Department of Agronomy and Horticulture at New Mexico State University. He came to NMSU in 1995 from Sichuan, China. After receiving his Ph.D., he plans to continue working on chile pepper research.

The Chipotle Mystery—Solved at Last!

By Paul Bosland, NMSU chile breeder

Americans who love the smoky taste and fiery bite of chipotles have recently been hit with high prices and a scarcity of product. With prices for these smoked jalapeños reaching $15 a pound wholesale, home growers yearn to smoke their own. But the Mexicans have been fairly secretive about their techniques, and none of the books on chiles describe home smoking. After a trip to Delicos, Mexico, I think I have solved this mystery—but the process takes some dedication.

First, let's look at how the Mexicans do it. They use a large pit with a rack to smoke-dry the jalapeños. The pit, containing the heat source, is underground with a tunnel leading to the rack. The pods are placed on the rack where drafts of air pull the smoke up and over the pods. The jalapeños can be whole pods or pods without seeds. The latter are more expensive and are called "capones," or castrated ones.

It is possible to make chipotle in your own backyard with a meat smoker or Weber-type barbecue with a lid. Wash the grill to remove any meat particles because any odor in the barbecue will give the chile an undesirable flavor. Ideally, the smoker or barbecue should be new and dedicated only to smoking chiles.

The quality of homemade chipotle will depend on the maturity and quality of the pods, the moisture in the pods, the temperature of the smoke drying the pods, and the amount of time the peppers are exposed to the smoke and heat. The aroma of wood smoke will flavor the jalapeños, so choose carefully what is burned. Branches from fruit trees, or other hardwoods such as hickory, oak, and pecan, work superbly. Pecan is used extensively in parts of Mexico and in southern New Mexico to flavor chipotle. Don't be afraid to experiment with different woods.

The difference between the fresh weight of the fruits and the finished product is about 10 to one. So, it takes 10 pounds of fresh jalapeños to produce approximately one pound of chipotles. A pound of chipotles goes a long way, as a single pod is usually enough to flavor a dish.

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First, wash all the pods and discard any that have insect damage, bruises, or are soft. Remove the stems from the pods before placing the peppers in a single layer on the grill rack. Start two small fires on each side of the grill with charcoal briquets. Keep the fires small and never directly expose the pods to the fire or they may dry unevenly or burn. The intention is to dry the pods slowly while flavoring them with smoke. Soak the wood in water before placing it on the coals so the wood will burn slower and create more smoke. Open the barbecue vents only partially, allowing a small amount of air to enter the barbecue and preventing the fires from burning too fast and creating too much heat. Check the pods and the fires hourly and move the pods around, always keeping them away from the fires. It may take up to 48 hours to dry the pods completely. The pods will be hard, lightweight, and brown in color when dried. If necessary, let the fires burn through the night. After the pods have dried, remove them from the grill and let them cool. To preserve their flavor, place them in a plastic zipper-type bag. It’s best to store them in a cool and dry location. If humidity is kept out of the bags, the chipotles will last 12 to 24 months. ¡Buen apetito!

**Chipotle Sauce**

- 2 to 4 dried chipotle peppers
- 2 slices bacon, finely chopped
- 1/4 cup finely chopped onion
- 4 tomatoes, finely chopped
- 1 cup finely chopped carrot
- 1/4 cup finely chopped celery
- 1/4 cup nipped cilantro
- 1/2 teaspoon salt
- 1/4 teaspoon pepper

Cover chipotle peppers with warm water. Let stand until tender, about 1 hour. Drain and chop finely. Cook and stir bacon and onion in oil in 2-quart saucepan until bacon is crisp; stir in peppers and remaining ingredients. 

*Source: Betty Crocker’s, Mexican Cookbook. Recipe by Jose Leopoldo Romero.*

**Easy Access to the World of Chile**

Have you been searching for chile information or literature on the Internet? Look no further than the AgNIC web site. AgNIC (Agriculture Network Information Center) is a network that provides access to agriculture-related information, subject area experts, and other resources. AgNIC is an organization primarily composed of agricultural librarians, but it also includes Cooperative Extension Service personnel and other agricultural information-oriented people.

Tim McKimmie, agriculture and science librarian at New Mexico State University and creator of the Chile Page for the AgNIC web site, says that the goal of AgNIC is to make agricultural literature accessible from one location—sort of “one-stop shopping.” McKimmie created the Chile Page for the AgNIC web site because the group is attempting to devote pages to various specialty crops. The Chile Page includes:

**Publications**
- Capsicum Bibliography
- magazines and newsletters
- chile books and other publications

**Associations, Commercial, and Mega-Sites**
- The Chile Pepper Institute
- Chile Head (UK)
- The Chile-Heads
- Fiery Foods
- Fire Girl
- Mark’s Hot Links
- McIlhenny Tabasco Page
- Pepper World
- The Ring of Fire

**Reference Tools**
- crop statistics

The site address is [http://www.agnic.org/](http://www.agnic.org/). Any questions or comments regarding this page should be sent to Tim McKimmie, University Library Dept. 3475, Las Cruces, NM 88003-0006 or e-mail tmckimmi@nmsu.edu
Member Profile: Edward Greenleaf

Edward C. Greenleaf, M.D. is a cancer physician and amateur pepper farmer in Stockton, Calif. According to Edward, he was introduced to capsicum by his father, Dr. Walter H. Greenleaf, the creator of the 'Greenleaf Tabasco'. In 1970, his father released the variety of Capsicum frutescens at Auburn University in Auburn, Ala. Edward says, “Twenty-eight years later, 'Greenleaf Tabasco' continues to be grown for its outstanding disease resistance, yields, and flavor and is truly one of life's few pleasures.”

Profile: A Tale of Two Seed Companies

After 30 years with the Cooperative Extension Service at New Mexico State University, Alton Bailey continued his agricultural interest by establishing two vegetable seed companies, Bailey Seeds and Enchanted Seeds. The companies were established in 1988. Bailey Seeds produces and markets onion and commercial pepper seeds while Enchanted Seeds produces and markets exotic pepper seeds. Both companies market nationally and internationally. Bailey Seeds and Enchanted Seeds have a staff of four and hire 12 to 15 employees seasonally. For further information, contact Alton Bailey at (505) 644-0449.

Why the Hot Stuff, America?

As publisher and editor of Fiery Foods Magazine and chile connoisseur, Dave DeWitt is frequently asked why the “hot stuff” has been so widely accepted by the United States. DeWitt kept track of the reasons for this phenomenon and lists them in his article, “Why has the U.S. Adopted the Hot Stuff?” Some of his reasons include:

- Ethnic diversity. Immigration patterns have changed and now feature new citizens who bring hot and spicy ingredients and cuisines from Asia, Latin America, and the Caribbean.

- Americans are more knowledgeable now and realize that most chiles and spicy foods won’t hurt them.

- Increasing interest in the hobbies of cooking and traveling.

- The large number of ethnic and hot and spicy cookbooks published since 1978—literally hundreds of them.

- The increasing availability of chiles and fiery foods in mainstream locations, such as supermarkets.

- The publicity generated by the constant media attention. The recent National Fiery Foods Show in Albuquerque, N.M., generated more than 5,000 column inches of coverage in U.S. newspapers.

- Trade and consumer shows and festivals featuring chiles and fiery foods.

- The enormous increase in manufacturing, with thousands of fiery food products now on the market.

DeWitt says that perhaps the most fundamental reason for the boom in fiery foods is a major shift in the way many Americans are eating.

Source: "Why has the U.S. Adopted the Hot Stuff?, Fiery Foods Magazine, July/August 1998."
Chile Powder Prevents Monkey Trouble

Fred Wilkinson, copy editor for The Packer, says, “Tokyo researchers have created a weapon that shoots chile powder into the air to prevent monkeys from eating vegetable crops.” Wilkinson reports that monkeys were blamed for stealing $468,500 worth of produce in 1996. Their favorites are young horseradish, potatoes, turnips, and carrots.

Source: The Packer, 7/13/98.

Commercial Salsa Approved for School Lunches

Corrie Moore, staff writer for The Packer, reports that the U.S. Department of Agriculture considers commercially prepared fresh salsa a member of the vegetable category in school lunches. The recent decision by the USDA came after requests from schools in the Southwest and the West who want to offer more appealing food items for kids.

Sally Speo, food planning supervisor for the San Diego school system, praises the decision. “Including fresh salsa as a vegetable would benefit children and would add more variety to their lunches,” she says.

Phil Shanholtzer, spokes-man for the USDA food and nutrition service, said, even before the approval, when a school blended vegetables to make its own salsa, it could receive credit as a vegetable as long as the whole meal met the USDA requirements. The only major change is now schools can use commercially made salsa. The USDA does have requirements that salsa must pass in order to be considered a vegetable: the minimum amount used must be 1/8 cup and the product must contain all vegetable ingredients, allowing for only minimum additions of spices and flavorings.

Source: The Packer, 7/13/98.

Don’t Worry about Addiction

The power of chiles is enough to inspire mythology and folklore, so it is not surprising that some people believe in its ability to control our minds—or at least our bodies. According to Paul Rozin, Ph.D., a psychologist at the University of Pennsylvania who has done extensive research on the acquisition of chile preference, chile does not meet the criteria for true physical addiction. Symptoms of addiction include:
- Cravings. For chile, this exists to a degree, but it never becomes a physical necessity.
- Loss of control.
- Withdrawal. We miss it, but we don’t get sick without it.
- Tolerance. We do adjust to higher heat levels, but we don’t need increasing amounts just to feel normal.

While people don’t develop a physical addiction, they do become habituated to chiles because of their flavor, stimulating properties, and healthfulness.


Mini Bell Debuts

The “tinkerbell” of bell peppers recently made its debut in the United States. According to Sadie Browning, staff writer for The Packer, “The Greenery hopes a new variety of mini bell peppers is accepted into the mainstream produce world—specifically in the United States.” Brown describes the sweet pepper as measuring 1-1/2 to 2 inches in diameter. The color varies but will mainly be available in reds in the United States.

The mini bell pepper developed by The Greenery is being test marketed in New York and Washington, D.C. by Seminis Vegetable Seed. “So far the response has been wonderful,” said Peter Van Zeijl, manager of produce business for Seminis. “We are feeling very positive that it will catch the eye of consumers around the world.”

Source: The Packer, 7/13/98.
Question: I read on the Johnny Cyberseed website that most varieties of ornamental chiles are poisonous. I cannot find any reference on the Internet to whether or not this is true.—Scott

Answer: There are absolutely no varieties that are poisonous; all peppers are edible. Some ornamentals just do not taste very good, while others are extremely pungent or hot which could contribute to this misconception.

Question: I am interested in growing Chimayo chiles year round. Do you know of any aspects that would affect this project?—EJ

Answer: Chimayo chiles can be grown in a greenhouse. During the winter, the natural light level will be low, so the chiles will take longer to flower and fruit. However, supplemental lighting will help the plants to flower sooner.

Question: Is there a difference between habañeros and Scotch bonnet chiles?—Michael

Answer: They are different pod types with the Capsicum chinense species. To put it in perspective, they are as different as a jalapeño and a New Mexican pod type. Unfortunately, sometimes produce managers call both the same name. The habañero is shaped like a “lantern,” while the Scotch bonnet is shaped like a “tam-o’-shanter.” Sometimes seed lots are not pure, and a mixture of the two are grown in a single field.

Question: I have a small garden comprised of several types of chiles (cayenne, thai, habañero, jalapeño). At one point earlier in the season, my cayenne plants began producing strange pods. Their growth was considerably stunted—they were squat and misshapen, and their texture was rough, almost spiny in some cases. I removed most of them from the plant when I realized there was a problem, but some were allowed to ripen. When I cut one of...
Burning Questions, continued from page 7.

these open, I found that they had developed few, if any, seeds. Is this a fairly common problem? Is there a way to avoid it in the future?—Michael

Answer: The reason your cayennes had pods that were squat, misshapen, and had a rough texture is because of poor flower pollination. When the flower is not fully pollinated, seeds don’t develop along the length of the pods. There seems to be a relationship between the seeds and normal fruit development. The reason for poor pollination could be the weather—too hot, too cold, too wet, etc. It seems in your case, the factor causing poor pollination was cured. There isn’t much you can do to prevent this.

Question: Every year I grow a selection of chiles in pots on my back porch here in Northern Virginia.

I’ve never had a problem with birds until this year when, for the first time, I decided to grow a Chiltepin bush. As my peppers are ripening, a Mockingbird likes to perch on the top of the bush and eat every chile within reach. Luckily the plant is extremely productive and I still have some left. Have you ever heard of such a thing?—Virginia

Answer: If it weren’t for birds, our wild chile species would not have gotten as far as it has. Birds are not capable of feeling or tasting pungency or “heat” from chiles, so they love to eat them—especially the wild chiltepin types because they are the perfect size, color, and shape for a bird’s delight. The wild chile fruit also detaches from the plant very easily.

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