

SICHUAN PEPPERS

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Any Chinese food connoisseur knows that true Sichuanese spiciness isn't just heat – it's that tingling numbness on the lips and tongue which sets the stage for other flavors. That sensation, known in Chinese as *ma*, is produced by chemicals from the Sichuan peppercorn. Understanding this tiny treasure is Tsai Ming-Hsiung's mission: he interviewed chefs and scientists, and traveled to over fifty farms in Sichuan province in order to learn everything he could about the Sichuan peppercorn. He presents us with his findings here, in this beautifully-designed volume.

Find everything you need to know about this jewel of Chinese cooking, defined in scientific terms and displayed in beautiful photographs. Is your mouth watering yet? Start cooking!

Tsai Ming-Hsiung 蔡明雄

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The Science Behind the Spice

From a scientific standpoint, the Sichuan pepper owes its fragrance and flavor to the chemical makeup of its essential oil, known to chemists as a volatile oil, and as part of a larger group of aromatic oils. It is composed primarily of terpenoids and aromatic compounds. The aromatic compounds are themselves quite complicated, and include chemical structures such as linalool, sabinene, β -myrcene, α -pinene, limonene, α -thujone, α -thujene, 4-terpineol, β -pinene, geraniol, α -terpinolene, α -terpineol, nerolidol, linalyl acetate, piperitol, β -thujone, and several other micro-constituents.

The oil's mouth-numbing spiciness (*ma*) is produced by compounds known as sanshools, the building blocks of the infamous hotness-rating scale called the Scoville Scale. Sichuan pepper oil contains α -sanshool, β -sanshool, γ -sanshool, and α -sanshoamide, along with volatile elements such as piperitone and palmitic acid.

These aromatic and flavonoid compounds generally account for 4% to 7% of the weight of an individual pepper.

In the section that follows, we'll be classifying the flavor of the Sichuan pepper under five different headings: pomelo, citrus, orange, lime, and lemon. One may ask, why are they all citrus fruit flavors? The answer is simple: plants of the genus *Zanthoxylum* and genus *Citrus* both belong to the Rutaceae family, and their flavonoid makeups are similar. Differences between them are determined by chemical ratios or made distinct by certain components.

For instance, the essential oils in citrus peel contain limonene, myrcene, α -pinene, β -pinene, α -Terpinene, linalool, and so on. Many of the aromatic components are also found in Sichuan pepper oil. The difference in smell between the two is the result of different compound ratios. Take linalool, a crucial aromatic compound in both oils, for example: Sichuan pepper oil is mostly linalool, and the ratio of linalool to limonene (another important aromatic compound) is nearly 5:1. Citrus peel, by contrast, is mostly limonene; its ratio of linalool to limonene stands around 1:8.

Given this principle, the best way to recognize and classify unfamiliar aromas is to contextualize them in terms of familiar ones.

The same process applies in our quest to better understand the multitude of flavors the pepper provides. After five years of on-site research at pepper farms in Sichuan, I've established nineteen different aromatic/flavor categories that can be recognized comparatively by most of us. These categories should make it much easier to detect and understand the Sichuan pepper's distinctive bouquet.

Flavor and Savor: Comparative Categories

Before we move into comparative classifications of flavor and aroma, we must first identify the fundamental – or “original” – flavor categories into which Sichuan peppers can be separated. By

“original flavor,” I refer to a unique compound flavor that cannot be matched to any single external comparator (orange, lemon, et cetera). We recognize only three original flavors:

West Road Pepper: Rich woodiness, high levels of volatility in the experience. Various degrees of numbness and bitterness are detectable.

South Road Pepper: A much more subtle woodiness that tends toward the aroma of dried wood, with a noticeable cool freshness. Less volatility in the experience. Varying degrees of numbness are paired with a noticeable fresh sweetness or ripe sweetness.

Original Green Pepper: Notes of grass, mint, and ivy. Noticeable volatility. Varying degrees of numbness, bitterness, and acidity.

Nineteen Comparative Aroma/Flavor Categories:

Citrus: The aroma of citrus peel, as from mandarin orange or Chinese honey orange.

Tangerine: The flavor of green or golden tangerines.

Orange: The ripe sweetness of orange peel.

Pomelo Peel: The intense flavor of green and white unripe pomelo peel.

Lime: The fresh, uplifting flavor of green and white lime peel.

Lemon: The fresh, uplifting flavor of green lemon peel.

Dried Tangerine Peel: The aroma of sun-dried tangerine peel.

Fruity: The flavor of many fruits combined.

Sweet: The flavor of candy, cane sugar, or crystallized sugar.

Peppermint: Standard peppermint.

Fresh Grass: The pleasant aroma of morning grass.

Fresh Wood: The aroma of newly-sawn wood.

Aromatic Volatility: Pleasant aromas in the nose or forehead caused by evaporation.

Acrid Volatility: Pungent or unpleasant aromas in the nose or forehead caused by evaporation.

Dried Wood: The aroma of dried (not decayed) wood.

Dried Grass: The aroma of dried (not decayed) grass.

Decayed Wood: The unpleasant aroma of decayed wood.

Fresh Wood: The unpleasant, volatile aroma of freshly peeled wood.

Crushed Ivy: The uncomfortable, sour aroma of crushed wild ivy.

Rancid Oil: The degraded, oxidized aroma of burned or expired cooking oil.

In addition to the abovementioned flavors, which are relatively specific, there are also more subjective flavor sensations that are often used to describe Sichuan peppers. Though harder to define, they do provide information on the characteristics of different kinds of pepper. They are also useful when cooking because they allow one to predict a certain pepper’s influence on the taste of a dish, and thereby avoid choosing the wrong one.

The following are 14 synthetic styles/sensations:

Cool Aromatic: A refreshing, minty coolness in the aroma

Perfumed: A pleasing, comfortable sweetness.

Mouth-watering: Stimulation of the taste buds and desire to eat.

Final Sweetness: A faint sweetness after an initial bitter or astringent taste.

Rough and Raw: Significant gradations or variations in flavor.

Neat: Quickly-changing flavors.

Elegant: A perfectly-paced development of flavor.

Delicate: Subtle development of flavor.

Refreshing: An immediately pleasing or relaxing flavor or sensation.

Invigorating: An immediately energizing sensation.

Pleasantly Cool: A cool, relaxing sensation.

Refreshingly Aromatic: An aromatic effect that promotes relaxation and feelings of happiness.

Herbal: A sensation like one is eating wild greens.

Concentrated Sensation: A powerful, concentrated flavor – not the same as “thick.”

Five Flavors of Good Sichuan Pepper

The area of Chongqing and its environs produces the greatest diversity of pepper varieties in Sichuan province. Sichuan peppers into two main categories by color – red and green. Red peppers are either West Road peppers like the Red Robe variety (*Zanthoxylum bungeanum*), or South Road peppers like the Qingxi variety (*Zanthoxylum bungeanum var. bungeanum*). Green peppers are varieties of the Chinese wild pepper (*Zanthoxylum armatum DC.*), such as the “Jinyang Green” from Liangshan Prefecture, and “Nine Leaves Green” from Jiangjin.

Preserving Flavor: A Race Against Time

Current research has not clearly defined the varieties and characteristics of Sichuan peppers from different production areas. This book, therefore, can only offer a new method of characterization based on limited empirical evidence gleaned through investigation. This method sums up and categorizes the aromas and tastes of Sichuan peppers from various producing areas according to their varying degrees of “edibility.” This standard is applied with the needs of cooking and eating in mind.

Newly harvested Sichuan peppers possess the richest and most highly variable flavor profiles, and my method of classification is most effective when applied to new peppers. Intensive hands-on experience with new peppers along with experiments for preserving freshness (for which there will be a detailed introduction) have told us that the pepper’s flavor changes quickly over time.

Given the Sichuan pepper’s short shelf life, and the relative inconvenience of transportation in earlier generations, we can conjecture that in the past, Sichuan peppers bought at market were probably picked and dried three months earlier. Logistical delay plus rudimentary preservation methods prohibited consumers from developing strong sensitivity to various flavors, and after a lifetime of “relatively wrong” experiences, popular understanding of Sichuan peppers and their uses has remained fairly basic.

The highly changeable flavor profile of the Sichuan pepper means that Sichuan province, located as it is in a transition zone between red and green pepper production environments, offers an incredible diversity of flavor selection; it’s also a reason that Sichuanese cuisine has perennially found new and diverse uses for the pepper in its dishes. In the contemporary age, tasting fresh Sichuan peppers is no longer difficult; the only difficulty facing the consumer is lack of knowledge.

Sense of the Savor – A New Way to Classify Sichuan Peppers

Now that we have a better understanding of how concepts like “flavor” and “sensation” related to our experience of the Sichuan pepper, this section divides top-quality peppers from the Chongqing region into five major flavor categories from Sichuanese cuisine. Red peppers tend to be identified with

pomelo, citrus, and orange flavors; green peppers are identified with lemon and lime.

This is a fairly basic division that allows us to demarcate quality and production area. It is not an absolute principle, however, since deviations in flavor occur even in the same varietal according to production area and pepper quality.

Below is a general descriptive outline for these five basic flavor categories. Later in the book, we'll dive into some deeper analysis and explain the utility and influence of each category on Sichuanese cuisine.

Red: Pomelo Flavor

Exemplified by the Red Robe pepper varietal grown in Maoxian and Songpan in Ngawa Prefecture, and in Kangding in Ganzi Prefecture.

This pepper is known for large, oily seeds; a distinctive flavor of pomelo peel; induces moderate to high level of numbness; strong natural pepper flavor and volatile scents of wood. The pepper provides a “rough and raw” sensation, with a hint of wildness to it.

Red: Citrus Flavor

Exemplified by the Little Pepper varietal grown in Huili and Huidong in Liangshan Prefecture.

This pepper is known for small, tightly-bound seeds and a distinctive citrus peel flavor, accompanied by a faintly sweet aroma, tinged with a woody savor, that resembles the peel of a mandarin orange. It induces a moderate level of numbness.

Citrus-flavored red peppers combine the scent of dried tangerine peel and sweet citrus peel with the savor of a mellow wine. They produce elegant, neat flavor sensations with a touch of the pleasantly cool.

Red: Orange Flavor

Exemplified by South Road Peppers from Ya'an, Hanyuan, Yuexi, Xide, and Yanyuan County in Liangshan Prefecture.

These peppers tend to have compact seeds. They produce a moderate level of numbness, and possess a distinctive citrus flavor, with a noticeable sweetness that bears faint tinges of wood. Strong natural pepper flavors are augmented with notes of orange peel.

One can find flavors of tangerine and sweet orange in this class of pepper, which carries an invigorating, refreshing air to it. It has a pleasant, long-lasting aroma with a touch of sweetness that produces delicate flavor sensations.

Green: Lime Flavor

Exemplified by green pepper varieties from Jinyang in *Liangshan Prefecture*.

The seeds of these peppers stay compact after drying, while their fruit is larger than other green varieties and contains dense oil bubbles. They produce intense levels of numbness. Natural pepper flavors are strong, as is the flavor of fresh lime peel, with notes of fresh grass or crushed ivy still noticeable.

These peppers produce bright, cooling flavor sensations.

Green: Lemon Flavor

Exemplified by the Nine Leaves varietal from Jiangjin District in Chongqing City, and by green peppers from Leibo in Liangshan Prefecture.

Medium-sized fruits that stay compact after drying and carry fairly dense oil bubbles. It produces a fairly high level of numbness. Natural pepper flavors are strong, as is the flavor of fresh lemon peel, with notes of wild grasses and crushed ivy. At a distance, one can also detect a clear floral touch to its aroma.

This type of green pepper produces fresh, bright flavor sensations with floral notes.