We have come to associate licorice as a flavor, at once loved by many and disliked by others. The flavor that conjures "licorice" in our minds is not what it seems. What we have come to associate as licorice flavor is actually anise. Formulations for licorice candies contain anise oil as the primary flavor, with licorice root itself used as a sweetener, a sort of background flavor. Licorice is one of those herbs that crosses the lines among fragrance, flavor and medicinal herb. The source plant is a member of the pea family. 
The most familiar licorice is European licorice *Glycyrrhiza glabra*. On medicinal markets Chinese licorice *Glycyrrhiza uralensis* is also commonly used. It is probably the most abundant species in the American market given that the Chinese commercial licorice root is cheaper than its European counterpart.

**Origins and History**

The genus *Glycyrrhiza* includes about 20 species native to Europe, Asia,
North and South America as well as Australia. The English name licorice is derived from "liquiritia," itself a corruption of the ancient name Glycyrrhiza, which now serves as the scientific generic name for the plant group.

**American licorice**

Only one species is native to the United States, Glycyrrhiza lepidota. Our wild licorice has a broad range from western Ontario to Washington, south to Texas, Mexico and Missouri. Eastward, there are scattered populations. It is a plant of prairies, meadows and the western shore. It has never been developed as a commercial source of licorice. Surprisingly, the plant is little studied. The Teton Dakota used the leaves for treating sores on the backs of horses. The leaves were chewed and applied as a poultice. Toothaches were treated by chewing the root, holding a piece of the root in the mouth. The root was also used for treating fever in children. It has a strong bitter taste, which then becomes sweet. In Texas, it is called amolillo, which refers to the foaming produced by stirring the root in water. In Texas folk tradition, the root tea was used to reduce fever in women after childbirth and to help expel the placenta. Other than a few relatively obscure folk uses of the plant by European settlers and indigenous groups, the plant is little known in the United States.

**European licorice**

European licorice, on the other hand, is a plant with a rich historical tradition. In Europe it is found in dry open habitats in the south and east, and has been cultivated throughout the continent where it is naturalized in almost all countries, except Scandinavia. Licorice was always harvested from the wild until the first European plantings of the herb were established almost a thousand years ago. The first century Roman naturalist Pliny mentions that licorice is native to Sicily. Theophrastus notes the sweet flavor of the roots and says it is used for asthma, dry cough, and all diseases of the lungs. Though not native to Germany, it was well-known there by the eleventh century and extensively grown in Bavaria by the end of the sixteenth century. Cultivation is recorded in Spain by the thirteenth century. Edward the First of England placed a tax on licorice imports in the year 1305 to finance the repair of the London Bridge. Licorice stick is the sweet, earthy- flavored underground stem of the plant, which may travel up to twenty feet from the main root. Cut into sections about 8 inches long, these underground stems or stolons are widely available in the herb market. They can be chewed to
Licorice - Glycyrrhiza glabra

Impart their sweet flavor. Napoleon chewed licorice sticks and that's what is said to have turned his teeth black.

**Chinese licorice**

Chinese licorice mainly comes from *Glycyrrhiza uralensis*. It is found in dry grassy plains, and sunny mountainsides from much of northern China, especially the Asian steppes to the west. Most of the supply comes from northwest China. While it is the main species used in Asia, European licorice also occurs in wild desert regions, dry plains, grassy plains with salty alkaline soil, and fallow wastelands that were once used for producing rice, wheat, and millet in northwest China. These two species along with another Chinese native, *Glycyrrhiza inflata*, are official drug plants in Chinese Pharmacopoeia. The Chinese call licorice gan-cao, which means "sweet herb." An ancient Chinese herb, it is mentioned in one of the earliest Chinese herbals attributed to the Divine Plowman Emperor, Shen Nong, surviving from the first century. The work is known as *Shen Nong Ben Cao Jing*. Virtually all of the important Chinese medicinal herbs of today were mentioned in this important work, which has never been translated into English.

In Chinese medicine, licorice is one of the more widely used herbal drugs. Unlike European herbal medicine, in which herbs are often used alone, in traditional Chinese medicine most herbs are used in prescriptions with 3 or more herbs, sometimes 10 herbs, or even 50 or 100 herbs in a single prescription. According to the theories of traditional Chinese medicine, the prescriptions are separated into the monarch or main drug, minister drugs, assistant drugs, and guide drugs. The monarch drug is the "king" of the prescription and has the primary effect on the health condition. Many "assistant" drugs cooperate with a major ingredient in a prescription to produce a better effect on one particular organ or condition. The minister drug helps to synergistically increase the effect of the monarch drug. The "guide drug" is added to enhance the effectiveness of other ingredients, reduce toxicity or improve taste. Licorice is used in many Chinese herbal prescriptions as a guide drug to enhance the activity of other ingredients, reduce toxicity, as well as improve flavor. It is said that licorice is used in as many as half of all traditional Chinese medicine prescriptions.

**Modern Research**
If we look at use of licorice from a western perspective, we see that its use has changed little over 3,000 years. It is considered demulcent (soothing to irritated membranes), expectorant (loosening and helping to expel congestion in the upper respiratory tract), and stimulates mucous secretions of the trachea. Other well-documented activities include significant antiinflammatory effects, a protectant effect on the liver against toxic substances and antiallergic activity.

As a very important medicinal plant on a worldwide basis, the chemistry and pharmacology of European and Chinese licorice have been well studied. Up to 24 percent of the root weight is glycyrrhizin, the plant's major active component. Glycyrrhizin (also known as glycyrrhizic acid) is an extremely sweet glycoside, which foams in water. Other components called flavonoids are also responsible for some the root's attributed actions. Glycyrrhizin is said to be from fifty to two hundred times sweeter than sugar, hence the sweet taste associated with licorice root. Licorice root itself has a very sweet musty flavor, rather than the "anise" flavor we have come to associate with licorice.

Studies have shown that glycyrrhizin stimulates the excretion of hormones by the adrenal cortex. Some researchers have suggested it as a possible drug to prolong the action of cortisone. Glycyrrhizin has a similar chemical structure to corticosteroids released by the adrenals, and further studies have suggested that it might one day prove useful in improving the function of hormone drugs, or be used as an aid in helping to reduce withdrawal symptoms from dependency on some corticosteroid hormones. Glycyrrhizin has also shown estrogenic activity in laboratory animals, and is experimentally antiinflammatory, antirheumatic, and antibacterial. In China, licorice root is used as an antacid.

**Licorice and ulcers**

One of the better known folk uses of licorice in Europe has been in the treatment of gastric ulcers. Based on this historical use, in European herbal medicine, licorice has been widely used as a treatment for gastric ulcers. Modern use began in 1946, when a Dutch physician, F. E. Revers demonstrated that licorice was the active ingredient in a domestic medicine used in the Netherlands, then reported good results obtained in the treatment of stomach ulcers in 32 patients. In the 1950s new research showed that licorice-derived compounds can raise the concentration of prostaglandins in the digestive system that promote mucous secretion from the stomach, as
well as produce new cells in the stomach lining. It was also shown that licorice prolongs the life span of surface cells in the stomach and has an antipepsin effect. The combined effect leads to the healing of ulcers. A recent study from Iranian researchers used aspirin coated with licorice and found that it helped protect against ulcers induced by aspirin, reducing the size and number of ulcers.

**Licorice - the Down Side**

About 20 percent of patients treated with licorice in the 1950s experienced side effects such as water retention, upper abdominal pain, headache, shortness of breath, and stiffness. At first scientists thought this was an allergic reaction. Treatment with antihistamines brought no relief. The symptoms usually disappeared when the dose was reduced, though sometimes it was necessary to stop licorice use altogether. Similar symptoms have been reported from ingestion of large amounts of licorice-containing candy, as well as by users of tobacco products flavored with licorice. This litany of side effects left medical practitioners with little interest in using licorice in the past thirty years.

More experience has been accumulated in the clinical use of licorice. Recognized side effects of prolonged use of licorice can include hypertension, water retention, sodium retention and loss of potassium. Therefore, the German health authorities warn that licorice should not be used for more than four to six weeks in therapeutic doses, without medical advice. During this period of time, a diet rich in potassium (such as bananas and dried apricots) is recommended. The potassium loss can also produce interactions with other drugs. The water loss-producing effects of conventional thiazide diuretics can be increased. In addition, if the individual is on digitalis glycoside heart medications (derived from foxglove), the potassium loss can actually increase the effect of the digitalis glycoside drugs by up to 50%. Since the toxic and effective doses of digitalis glycosides are in close balance, physicians should be aware of this potential drug interaction. In addition, various European health authorities, including the German and French health agencies warn that licorice should not be used in cases of high blood pressure, potassium deficiency in the blood, or chronic liver inflammation and liver cirrhosis.

According to the German health authorities, the dose of licorice is about 1 teaspoonful of the cut and sifted root (equivalent to 2-4 g), in a cup of boiling water. After the water is poured over the root, it is allowed to simmer for an
additional five minutes. It is then cooled and filtered. One cup of the tea is taken after a meal. Use is limited to four to six weeks without a physician prescribing further use.

**New Potential**

Scientists have shown that licorice has an effect on the adrenals, helping to stimulate glucocorticoid production. In excess, this leads to the side effects now recognized for licorice. Recognizing these effects described for and related to licorice, Riccardo Baschetti of Padova, Italy, sent a letter to the *New Zealand Medical Journal* reporting his own success in treating his own case of chronic fatigue syndrome with licorice root. Citing the work of Dr. Mark Demitrack of the University of Michigan Medical Center who had published a number of papers related to mild glucocorticoid insufficiency in chronic fatigue syndrome patients who don't have symptoms of Addison's disease. Mr. Baschetti, put two and two together. If his theory is correct, it occurred to him that licorice consumption, which potentiates glucocorticoid hormone action, might be useful in chronic fatigue syndrome. His chronic fatigue syndrome had persisted for 20 months with unsatisfactory results with various treatments. He then started taking licorice at a dose of 2.5 g/ 500 mL/d in milk. After a few days of his licorice therapy, his physical and mental stamina returned (though his lymph nodes did not reduce significantly in size). The author warned that the symptoms of depression are similar to chronic fatigue syndrome, and that licorice could be detrimental to depressed patients. Physicians, he warned, should make sure that patients have chronic fatigue syndrome and not depression before trying this regimen. It is important to note that this report is only the experience of one individual and is not a cure for chronic fatigue syndrome. Rather, it provides a significant research lead, and possible approach that other practitioners may wish to monitor in patients using licorice.

Licorice is more than a flavor. While in small doses over a short period of time, licorice can help in reducing ulcers, and is used traditionally as a cough suppressant, expectorant, and other uses, its future perhaps lies in taking what is currently known about the herb, and applying that to new applications. We shall see what the future will bring.

**References**

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