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FILE: · Schisandra (*Schisandra chinensis*)

DATE: December 6, 2000

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RE: AHP Monograph on Schisandra

Roy Upton, ed. Schisandra berry (*Schisandra chinensis*): Analytical, quality control and therapeutic monograph. American Herbal Pharmacopoeia and Therapeutic Compendium, Santa Cruz, CA, 1999, pp. 1–25.

The dried fruits of schisandra (*Schisandra chinensis*) known in Chinese as *bei wu wei zi*, have been highly regarded in Chinese medicine since antiquity. They are presently listed in the pharmacopoeias of China, Japan, South Korea and Russia, and are used as an adaptogen, aphrodisiac, or for liver, urinary and reproductive tract conditions. *S. chinensis* can be distinguished from *S. sphenanthera* by its flowers; berry flavor, size and shape; seed shape; and the presence of calcium oxalate crystals in the mesocarp. *S. sphenanthera* is considered inferior to *S. chinensis* for medicinal purposes. The herb's common name is often written as "schizandra." The Chinese name *wu wei zi* means "five tastes berry. The five tastes—sweet, sour, bitter, salty, and pungent—in one herb give rise to the traditional practice of using schisandra as a tonic, as it presumably displays numerous actions moving in simultaneous directions, according to the energetics theory of Traditional Chinese Medicine (TCM).

Schisandra is native to East Asia, Korea and Japan, growing on slopes or along river banks. It is also cultivated in China, Korea and Europe. Fruits are collected when ripe and are sun-dried. They can be traded without further processing or can be subjected to extraction. Adulteration or substitution with *S. sphenanthera* or any of 13 other *Schisandra* species has been documented; other reported substitutes include: *Kadsura longipendunculata*, *K. japonica*, *Eunonymus* spp. and *Vitis* spp.

The active ingredients most thoroughly researched are the approximately 40 lignans derived from the seed oil. These include pregomisin, nordihydroguaiaretic acid and meso-nordihydroguaiaretic acid. Chinese medicine also considers the organic acids of therapeutic importance. The primary lignans are schizandrol A and B, schisandrin A and B, schisantherin A and B, and gomisin N. The nomenclature for these compounds has not been standardized and the same compound can have different names. The monograph tabulates the various names used for each lignin in various literature sources.

Researchers from various countries tend to agree that *S. chinensis* contains the highest concentration of lignans among the 25 species in the genus, though reported concentrations of both total and individual lignans vary. This may be due to natural variation in populations from different countries. Analysis of the seed oil yields 47 different compounds, including the monoterpenes borneol, 1,8-cineol, citral, p-cymol, α - and β -pinene, and the sesquiterpenes sesquicarene, ylangene, chamigrenal, and α - and β -chamigrene. Lipids include linoleic acid, oleic acid, linolenic acid, lauric acid and plamitic acid. The scent of the oil includes camphorus, woody, spicy and sour ele-

ments. Compounds found in the fruit flesh include: citric acid, malic acid, tartaric acid, vitamins A, C and E, fumaric acid, stigmasterol and resins.

Various analytical methods have been developed for schisandra. The authors caution that because reference standards are confusingly named and of varying purity, additional analytical work is required to verify the nature of the standards. Since schisandrol A and B are found only in *S. chinensis*, these compounds are used to distinguish it from *S. sphenanthera*. Thin layer chromatography (TLC) using a sulfuric acid reagent is used for qualitative analysis. A detailed protocol for TLC analysis, along with pictures and explanations of TLC plates from *S. chinensis* and *S. sphenanthera* viewed under visible and UV light is provided in the monograph. For quantitative analysis, an HPLC method reproduced from the Chinese Drug Monographs and Analysis is presented. HPLC traces of fingerprints for *S. chinensis* and *S. sphenanthera* also are included.

Some pharmacokinetic data exist for schisandra lignans. Both schisandrin A and schisandrol A are readily absorbed in the gut and widely distributed in the body. Schisandrin was found in human plasma up to 8 hours after an oral dose. Many metabolites of schisandrin A were found in the bile, and intact and metabolized forms of both compounds were found in the urine of humans and rats.

Much of the research on the physiological effects of schisandra has been published in Chinese, Japanese or Russian journals. For the most part, it has been performed on purified lignans or lignin extracts, making it difficult to extrapolate the results for whole berries. Major areas of research include hepatoprotective, cardiovascular, anti-inflammatory and adaptogenic effects.

Schisandra lignans have been shown to reduce elevated liver enzymes in humans, even for those continuing on hepatotoxic drugs. Effects were usually seen 20-30 days following treatment. These studies led to a drug developed in China that was derived from schisandrin C and used to treat viral and drug-induced hepatitis. Extensive animal and *in vitro* studies using whole schisandra fruit or schisandrin B have shown a protective effect for carbon tetrachloride and acetaminophen poisoning, and a beneficial effect on the hepatic glutathione antioxidant system. Gomisins A and B were shown to have anticarcinogenic effects in rat livers, while both gomisins A and schisandrin B stimulated regeneration of liver tissue, synthesis of glycogen and protein, and activation of cytochrome P₄₅₀ in rats. Schisandra also protected rat hearts from ischemia-reperfusion injury comparable to vitamin E or N-acetyl-cysteine. Anti-inflammatory effects have been studied only preliminarily. Temperature changes or development of edema in response to skin irritation were alleviated in humans or animals following treatment with schisandra.

Schisandra enjoys its widest use as an adaptogen. Studies on schisandra as an adaptogen have been performed since the 1950s in athletes, telegraphists, airline attendants and soldiers, though the early studies were not particularly well done. Doses of 350-6000 mg of whole berries or 2 g of extract increased stamina and recovery time after exercise, improved the ability to perform concentration-intensive tasks, and decreased fatigue. Numerous studies in race horses reported enhanced physical performance, faster recuperation and improved serum parameters. In rats, tolerance to heat and cold extremes was improved, whether schisandra was administered before or after insult. Sleeping time after administration of sedatives was also reduced.

Other effects reported for schisandra include: antidepressant, anti-convulsive, anti-dysentery, labor-stimulating and visual improvement.

Recommended doses of schisandra are 1.5-6 g/day of powdered product (unclear if this is whole berry or an extract) or 5-15 g/day of a decoction. It is classified as safely consumed by the American Herbal Products Association when used appropriately. Side effects include heartburn, acid indigestion, stomach pain, anorexia, skin rashes and hives. Its use is contraindicated in individuals with ulcers or epilepsy and in pregnancy as it may induce uterine contractions. There are no data on its use during lactation. Schisandra antagonizes the effects of caffeine and amphetamines. Use with vasoconstrictors or sympathomimetics such as epinephrine, ephedrine, methoxamine and phenylephrine may cause severe hypertension. The oral and injected LD50 in rats is 10.5 g/kg and 4.4 g/kg, respectively. Toxicity symptoms include depressed activity, a catatonic state, uncoordinated motor function, seizures and dilation of the pupils.

Schisandra is readily available as an over-the-counter product or dietary supplement in the United States, China, Japan, Korea, Russia and Taiwan.

A TCM Supplement for schisandra is included in the monograph, outlining the characteristics of schisandra when used within the energetics system of TCM. Taste and properties are sour and warm. Channels of entry are lungs, kidneys, heart and liver. Functions include astringent, calming, fortifying qi and kidneys, engendering fluids, securing the exterior, clearing deficiency fire and relieving coughs. Crude berries can be processed by steam treatment with wine or vinegar, or by frying in honey. Schisandra is most often used in combination with other herbs in TCM. It is contraindicated in excess interior and exterior heat patterns and in the early stages of cough and rashes, and is reportedly incompatible with the Chinese herb *Polygonum odoratum* (yu zhu).

—Risa N. Schulman, Ph.D.

Note: Due to the length (25 pp) of the monograph and ABC's strong support of AHP, the editors have not included this monograph with the Herb Clip. The entire monograph may be ordered from ABC for \$19.95 by calling ABC at 1-800-373-7105 or visiting our website at www.herbalgram.org. Ask for Item # 434.

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