

**ΤΕΖΙΑΣ Σ. ΣΩΤΗΡΙΟΣ**

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‘Φαρμακολογία και Θεραπευτική’ (Α.Π.Θ.)**

# **“Schizandra sinensis (chinensis)”**



**ΘΕΣΣΑΛΟΝΙΚΗ 2008**

## **Schizandra sinensis (chinensis)**

Συνήθως καλείται και κινέζικη μανόλια και είναι ένα από τα πιο παραδοσιακά φάρμακα της Κίνας. Φύεται στις ανατολικές περιοχές της Σιβηρίας, Κίνας, Ιαπωνίας και Κορέας. Χρησιμοποιείται κυρίως ο χυμός του και τα φρούτα του ενώ τα αλκοολικά διαλύματα φαίνεται να έχουν τις φαρμακευτικές ιδιότητες. Οι ιδιότητές του είναι κυρίως αναζωογονητικές, τονωτικές και ενδυναμωτικές, ενώ εμφανίζει και ηπατοπροστατευτικές ιδιότητες.

Στις αρχές του 70 είχε δείχτει ότι τα φρούτα του έχουν την ικανότητα να μειώνουν κατά πολύ τα επίπεδα της τρανσαμινάσης του ασπαραγινικού οξέος (AST ή SGOT) και της τρανσαμινάσης της αλανίνης (ALT ή SGPT) σε ασθενείς που έπασχαν από χρόνια ιογενή ηπατίτιδα. Τελευταίες μελέτες, έδειξαν ότι τα κύρια συστατικά της δρόγης έχουν δράση στην οξεία και χρόνια ηπατίτιδα, σε ηπατίτιδα προκαλούμενη από χημικές ουσίες και σε ηπατική κίρρωση. Επιπλέον, μειώνουν την ηπατοτοξικότητα και την καρκινογενετική επίδραση διαφόρων φαρμάκων (π.χ. ακεταμινοφαίνη) και τοξικών ουσιών.

Η δρόγη αποτρέπει την πραγματοποίηση πολλών ιστολογικών μεταβολών όπως είναι η ίνωση, η αποικοδόμηση του λίπους, η ατροφία, η κυτταρική νέκρωση και η διήθηση κυττάρων σε φλεγμονώδεις ιστούς. Αυξάνει την αιμάτωση στο ήπαρ, το βάρος του ήπατος και μειώνει το περιεχόμενό του σε τριγλυκερίδια και λιπίδια. Σε περιπτώσεις χρόνιας ηπατοπάθειας επιταχύνει την αναγέννηση και την επαναφορά των ηπατικών λειτουργιών.

Η χορήγηση της δρόγης επαναφέρει στα φυσιολογικά τα επίπεδα των ενζύμων στο 76% όλων των περιπτώσεων μετά από χρήση για 25 μέρες. Σήμερα, χρησιμοποιείται ευρέως για να βελτιώσει τις ηπατικές λειτουργίες σε ασθενείς με οξείες και χρόνιες ηπατοπάθειες, αλλά και για να προσφέρει ηπατοπροστασία σε ασθενείς που ακολουθούν χημειοθεραπευτική αγωγή ενάντια σε νεοπλάσματα, χωρίς να προξενεί ανεπιθύμητες ενέργειες και παρενέργειες. (Για λεπτομέρειες βλέπε Παράρτημα)

**Δραστικά συστατικά:** Τα κύρια συστατικά είναι οι λιγνάες Σχιζανδρίνες A, B, C, D, E, F, G, N και J. Επίσης, έχουν ταυτοποιηθεί οι Σχιζανδόλες A και B, Σχιζανδρερίνη A και B, Σχιζενόλη, Δεοξυσχιζανδρίνη, σεσκικαρένη, κιτράλη, β-χαμιγρενίνη, στιγμαστερίνη και οι βιταμίνες C και E.

### **Μηχανισμοί δράσης**

***Τονωτική δράση:*** Οφείλεται στο ότι αναζωογονεί, διεγείρει το νευρικό σύστημα, οξυγονώνει, δρα ως ρυθμιστής του ανοσοποιητικού συστήματος, δρα ως αντιοξειδωτικό, αποτρέπει τη δημιουργία προκαρκινικών καταστάσεων, και επιδρά στο καρδιαγγειακό και αναπαραγωγικό σύστημα

### ***Ηπατοπροστατευτική δράση***

1. Διατηρεί την ακεραιότητα των κυτταρικών και ηπατικών μεμβρανών.
2. Αυξάνει τα ηπατικά επίπεδα του ασκορβικού οξέος.
3. Αναστέλλει την οξειδωση του NADPH αυξάνοντας τα επίπεδα του NADPH-εξαρτώμενου κυτοχρώματος και της αντίστοιχης ρεδουκτάσης.
4. Αναστέλλει τη λιπιδική υπεροξειδωση στα ηπατικά μικροσώματα και το σχηματισμό ηπατικής μαλονυλοδιαλδεύδης.
5. Μειώνει τα επίπεδα του μονοξειδίου του άνθρακα στο ήπαρ.
6. Όλοι οι παραπάνω μηχανισμοί εξηγούν τη σημαντική αντιοξειδωτική δράση που προστατεύει από ηπατοτοξικούς παράγοντες.
7. Αυξάνει τα επίπεδα κα τη λειτουργία του μικροσωματικού ηπατικού κυτοχρώματος P-450, κάτι το οποίο εξηγεί την αντιτοξική, αντικαρκινογενετική και ανιμεταλλαξιογόνο δράση του.

8. Αποτρέπει την χολέσταση που προκαλείται από τοξικές ουσίες αυξάνοντας τη ροή της χολής και την κάθαρση των ουσιών αυτών.

**Ρυθμιστής της ηπατικής λειτουργίας:** Μειώνει τα επίπεδα των τρανσαμινασών στο πλάσμα και βελτιώνει τις ηπατικές λειτουργίες, κάτι που υποδηλώνει έμμεση μείωση της ηπατοκυτταρική καταστροφής

#### **Ηπατική αναγέννηση**

1. Διεγείρει το σχηματισμό του mRNA του αναπτυξιακού παράγοντα των ηπατοκυττάρων (FCH) και επομένως την έκφρασή του συμβάλλοντας στη αναγέννηση των συγκεκριμένων κυττάρων.
2. Διεγείρει τη δημιουργία του ενδοπλασματικού δικτύου των ηπατοκυττάρων αυξάνοντας και τον πολλαπλασιασμό των ίδιων των κυττάρων.
3. Αυξάνει τη δράση της αποκαρβοξυλάσης της ορνιθίνης, το μιτωτικό δυναμικό των κυττάρων, τη σύνθεση των ηπατικών πρωτεϊνών και διεγείρει την αναγέννηση του ήπατος.
4. Αυξάνει την αιματική ροή στο ήπαρ.

**Δοσολογία:** Η θεραπευτική δόση είναι 400-500 mg δύο φορές την ημέρα.

**Φαρμακοκινητικές αλληλεπιδράσεις:** Μειώνει τα επίπεδα πλάσματος της Κυκλοσπορίνης Α σε περιπτώσεις μεταμοσχεύσεων νεφρού. Προσοχή πρέπει να δίνεται και στη χρήση άλλων φαρμάκων που μεταβολίζονται από τα ηπατικά κυτοχρώματα καθώς συγχρόνηση της δρόγης θα έχει ως συνέπεια μειωμένες συγκεντρώσεις τους στο πλάσμα και επομένως υποθεραπευτικό αποτέλεσμα.

**Αντενδείξεις:** Να αποφεύγεται η χρήση της σε άτομα με σπασμωδικά σύνδρομα και άτομα που έχουν υποστεί εγκεφαλικά επεισόδια. Επίσης, σε υπέρτασικούς, με συνάχι, πεπτικό έλκος και αυξημένη ενδοκρανιακή πίεση.

**Παρατηρήσεις:** Στην αρχή της θεραπείας με τη δρόγη παρατηρείται αύξηση του ηπατικού μεγέθους που οφείλεται την αυξημένη ροή αίματος.

#### **Βιβλιογραφία**

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**Πίνακας 1:** Φωτογραφίες του φυτού και χημική δομή των δραστικών συστατικών του.  
[www.mdidea.com/.../schisandra/data.html]



**Πίνακας 2:** Ταξινόμηση, ονομασίες, μίσχος και φύλλα, φρούτο, αφέψημα, σπόροι και δραστικά συστατικά. [en.wikipedia.org/wiki/Schizandra\_chinensis]

<p><b>Scientific classification</b></p>	
<p>Kingdom: <a href="#">Plantae</a>            Division: <a href="#">Magnoliophyta</a>            Class: <a href="#">Magnoliopsida</a>            Order: <a href="#">Austrobaileyales</a>            Family: <a href="#">Schisandraceae</a>            Genus: <a href="#">Schizandra</a>            Species: <i>S. chinensis</i></p>	
<p><b>Binomial name</b></p>	
<p><i>Schizandra chinensis</i> (Turcz.) Baill.<sup>[1]</sup></p>	
<p><b>Synonyms</b></p>	
<ul style="list-style-type: none"> <li>• <i>Kadsura chinensis</i> - Turcz.<sup>[1][2]</sup></li> <li>• <i>Maximowiczia chinensis</i> - (Turcz.) Rupr.<sup>[2]</sup></li> <li>• <i>Schizandra japonica</i> - (Siebold. &amp; Zucc. ex A. Gray.) Hance.<sup>[2]</sup></li> </ul>	

**Παράρτημα: Μονογραφία και άλλες πληροφορίες για τη Schizandra chinensis**  
[\[www.mdidea.com/.../schizandra/data.html\]](http://www.mdidea.com/.../schizandra/data.html)

Genus,Species:Schizandra chinensis and Schizandra sphenanthera.

Botanical Source:Schizandra chinensis(Turcz.)Baill. or Schizandra sphenanthera Rehd. et Wils.

Latin: Fructus Schisandrae

Common names:Schizandra chinensis(Turcz.)Baill. name as BeiWuweizi. Schizandra sphenanthera Rehd. et Wils. name as NanWuweizi.

Source of Earliest Record:Shennong Bencao Jing

Part Used & Method for Pharmaceutical Preparations:The ripe fruit is gathered in autumn and dried in the sun.

Properties: Sour and sweet in flavor, warm in nature, it is related to the lung, heart and kidney channels.

Functions:

Astringes the lungs and nourishes the kidneys, promotes the production of body fluid and astringes sweating, seminal emission and arrests diarrhea as well as relieves mental stress.

Magnolia vine fruit is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs. It is an excellent tonic and restorative, helping in stressful times and increasing zest for life. It is considered to be a substitute for ginseng and is said to be a tonic for both the male and the female sex organs.

 **Origin of Schizandra Fruit:**

The very name of Schizandra in Chinese tells us a great deal about the qualities of this herb. Wu Wei Zi means "Five Taste Fruit." Due to the fact that Schizandra possesses all five of the classical "tastes" (sour, bitter, sweet, spicy and salty) and thus possesses the essence of all five of the elemental energies (wood, fire, earth, metal and water), Schizandra is respected as a health-providing tonic in the same class with Ginseng and Ganoderma.

Schizandra is a woody vine with numerous clusters of tiny, bright red berries. It is distributed throughout northern and northeast China and the adjacent regions of Russia and Korea. The fully ripe, sun-dried fruit is used medicinally. It is purported to have sour, sweet, salty, hot, and bitter tastes. This unusual combination of flavors is reflected in schizandra's Chinese name wu-wei-zi, meaning "five taste fruit."

The ripe fruit of Schizandra chinensis (Turcz.) Baill. (Chinese magnolia vine) or Schizandra sphenanthera Rehd. et Wils. (orange magnolia vine), a perennial deciduous woody vine of the family Schisandraceae. Native to east Asia, it is grown in mixed forests, especially on the margins, by streams and brooks, and usually on sandy soils in China, Russia, etc.

The climber grows to about 9 m at a medium rate. It winds around the trunks of trees, covering the branches. It is in flower from April to May. The scented white, pink or yellow flowers are dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and are followed by red berries (the fruits). The clusters of red fruit are the most ornamental trait. The plant will need some sort of support. Grow the plant in full sun except in warmer climates where it will appreciate partial shade. It requires moist soil.

In China, Chinese magnolia vine is customarily called "northern magnolia vine" and is mainly produced in the northeast provinces. Orange magnolia vine is customarily called "southern magnolia vine" and is mainly produced in the southwest and in the provinces to the south of China's Yangtze River Valley.

The berries are picked and harvested when the fruit becomes ripe in autumn. Dry the fruit in the sun for use, or mix with vinegar and honey, steam and dry in the sun for use, or ground to make the powdered medicinal herb.

One of the newer of the old drugs resurrected by the American herbal medicine industry is schizandra, or schizandra, the dried ripe fruit of Schizandra chinensis (Turcz.) Baill. (family Schisandraceae), a vine native to China. Its ancient folkloric use in China was as an antiseptic, astringent, tonic, and the like. During the last decade or so, Chinese doctors began using the drug to treat hepatitis, and a few studies have been done of its potential for liver-protective effects and the nature of its active constituents.

Schizandra ( Schizandra chinensis (Turcz.)) is a woody vine with numerous clusters of tiny, bright red berries. It is distributed throughout northern and northeast China and the adjacent regions of Russia Primorye, Priamurye, Sakhalin and the Kurily islands and Korea.

It grows in mixed forests, on the clearings, along rivers and streams on well-drained humous soils, in felling places and old burnings. Ripens only on light-exposed sites. A woody liana with climbing branches (length up to 10 m, thickness up to 1.8 cm). It flowers in May to June, ripens in August-September. The fully ripe, sun-dried fruit is used medicinally. It is purported to have sour, sweet, salty, hot, and bitter tastes. This unusual combination of flavors is reflected in schizandra Chinese name wu-wei-zi, meaning "five taste fruit."

 **Historical or traditional use of Schizandra:**

As far back as 2697 B.C. Schizandra was classified as superior by Pen-Tsao in the classic Yellow Emperor's Study of Inner Medicine, an encyclopedia of healing plants. In Beng Cao Cang Mu, a great book on pharmacy written by Li Schizheng in the 16th century, schizandra is listed in the highest ranks. It is said to increase energy, replenish and nourish the viscera (internal abdominal organs such as intestines, lungs etc.), improve vision, boost muscular activity and sooth both coughs and digestive upsets.

One of the primary medicinal agents of Chinese herbal medicine since antiquity. The first recorded use of schizandra is found in China's earliest text of herbal medicine, the Divine Husbandman's Classic of the Materia Medica, which is believed to have originated in the first century B.C. In it, schizandra is said to "prolong the years of life without aging," and it is also said to increase energy (called "qi," pronounced "chee"), suppress cough, treat fatigue, and act as a sexual tonic in men.

The classical treatise on Chinese herbal medicine, the Shen Nung Pen Tsao Ching, describes schizandra as a high-grade herbal drug useful for a wide variety of medical conditions~especially as a kidney tonic and lung astringent. In addition, other textbooks on traditional Chinese medicine note that schizandra is useful for coughs, night sweats, insomnia, thirst, and physical exhaustion.

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Schizandra has long been used in the traditional medicines of Russia and China for a wide variety of conditions including asthma, coughs, and other respiratory ailments, diarrhea, insomnia, impotence, and kidney problems. Hunters and athletes have used schizandra to increase endurance and combat fatigue under physical stress.

In Traditional Chinese Medicine, schizandra berries have been used predominantly for the lungs and kidneys as an astringent tonic to arrest mucous

<p>discharges, alleviate spontaneous sweating, and check urinary and reproductive secretions such as in urinary incontinence and spermatorrhea, an involuntary loss of semen.</p> <p>Schisandra is a famous tonic historically consumed by Chinese royalty and by Daoist masters. It is one of the few herbs that contains all three treasures. Schisandra is renowned as a beauty tonic and is considered to be a youth preserving herb. It has been used for centuries to make the skin soft, moist and radiant. It is also said to be a powerful tonic to the brain and mind, and is believed in China to improve memory. It is also said to be an excellent sexual tonic when consumed regularly. It is said to help produce abundant sexual fluids, increase sexual endurance and to strengthen the whole body. It is used in many tonic formulations as an "astringent." Schisandra has a wonderful multi-layered flavor when processed properly.</p> <p><b>Common Uses and Research Application of Schisandra related products:</b></p> <p>More recently, the focus of schisandra research has been on its use in treating diabetes mellitus. Additionally, a protective effect on cardiovascular tissue insulted with chemical agents or ischemia has also been shown in vivo. As well, anti-inflammatory activity has been reported in in vitro, animal models, and clinical studies.</p> <p><b>1. General Tonic:</b> Schisandra is a major tonic herb and acts throughout the body, strengthening and toning many different organs.</p> <p><b>2. Sexual stimulant:</b> Probably best known as a sexual tonic for both men and women, schisandra reputedly increases the secretion of sexual fluids and, in men, it also improves sexual stamina. Treats seminal emission and spermatorrhea due to lack of consolidation of the essence gate as a result of deficiency of the kidneys: The herb can nourish the kidneys to astringe seminal emission. It can be used together with mantis ovum, Cherokee rose fruit (<i>Fructus Rosae Laevigatae</i>), fossil fragments, etc. Schisandra is considered to have "aphrodisiac" qualities, especially when combined with other Kidney tonics. Furthermore, Schisandra is one of the most important astringent herbs used in Chinese herbalism. An astringent herb conserves fluids, and in the case of Schisandra, it tends to contain sexual fluids until the appropriate time of release. Thus, consuming Schisandra for a period of time, one tends to build up sexual fluids. Schisandra is used in sexual formulations to prevent premature ejaculation and to help promote incredible endurance.</p> <p><b>3. Female elixir Booster:</b> Schisandra is said to increase the Water Qi in the Kidney. In particular, it is said to vastly increase the "water of the genital organs," referring to the sexual fluids. Schisandra is said to promote the production of semen. It is famous for its ability to relieve sexual fatigue and for increasing the sexual staying-power in men. Schisandra is also said to increase circulation in and sensitivity of the female genitals. Many women claim increased genital warmth and sensation after using Schisandra for a period of time. The Chinese sexual classics claim that continuous use by a woman will increase the amount of "female elixir," a euphemism for vaginal secretions, during intercourse.</p> <p><b>4. Liver treatment herb:</b> Schisandra has proven benefits for the liver, and is used in the treatment of hepatitis and poor liver function. Research into schisandra has focused largely on the lignans, which have a pronounced anti-hepatotoxic (liver-protective) action. Up to 30 different lignans have been identified in schisandra, which all contribute to this effect. Research from 1972 onward has reported the beneficial action of schisandra on the liver, and one clinical trial indicated a 76% success rate in treating patients with hepatitis, with no side effects being noted.</p> <p><b>5. Generates vitality:</b> Schisandra develops the primary energies of life, and generates vitality and radiant beauty when used regularly for some time. If used for 100 days successively, Schisandra is said to purify the blood, sharpen the mind, improve memory, rejuvenate the Kidney energy (especially the sexual functions in both men and women), and cause the skin to become radiantly beautiful.</p> <p><b>6. Sedative:</b> Although a stimulant, schisandra is used in Chinese medicine to "quiet the spirit and calm the heart." It is given for insomnia and dream disturbed sleep, and is a fine example of how adaptogenic herbs often work in apparently contradictory ways to restore normal body function.</p> <p><b>7. Mental &amp; emotional remedy:</b> In China, schisandra berries have traditionally been prescribed to treat mental illnesses such as neuroses. They are also given to improve concentration and coordination, and are a traditional remedy for forgetfulness and irritability. Schisandra's effectiveness for treating these problems has now been borne out by research.</p> <p><b>8. Respiratory infections:</b> Schisandra is used in the treatment of respiratory infections such as chronic coughs, shortness of breath, and wheezing. Treats prolonged coughing and dyspnea (difficult breathing) of the deficiency type: Astringing with its sour flavor and moistening with its warm nature, this herb can astringe lung-qi in the upper part of the body and nourish kidney-yin in the lower part, so it is indicated for prolonged coughing due to deficiency of the lungs and dyspnea and coughing due to deficiency of both the lungs and the kidneys. a) Prolonged coughing due to deficiency of the lungs: This herb is often used together with poppy shell (<i>Pericarpium Papaveris</i>), e.g., Wuweizi Wan. b) Dyspnea and coughing due to deficiency of both the lungs and the kidneys: This herb is often used together with medicinal cornel fruit (<i>Fructus Corni</i>), prepared rehmannia, yam, etc., e.g., Duqi Wan. c) Dyspnea and coughing due to fluid retention of the cold type: This herb can also be used together with ephedra, wild ginger (<i>Herba Asari</i>), dried ginger, etc., which are ventilating and dispersing with their pungent taste and warm nature.</p> <p><b>9. Balancing fluid levels:</b> Schisandra is used to tone up and strengthen kidney function and to help the body to balance levels of fluid, making it helpful for treating night sweats, thirst, and urinary frequency. Fluid imbalance. Because of its kidney tonic effect, schisandra is useful in treating thirst, night sweats, excessive sweating, urinary incontinence, and the frequent urge to urinate. Sour and sweet in taste, this herb can replenish qi, promote the production of body fluid and quench thirst. a) Hyperhidrosis (excessive sweating) and thirst due to impairment of qi and yin by heat: This herb is often used together with ginseng and ophiopogon root, e.g., Shengmai San. b) Diabetes with thirst and polydipsia (excessive or abnormal thirst) due to yin deficiency and intense internal heat: This herb is mostly used together with herbs that replenish qi and promote the production of body fluid, such as yam, windweed rhizome (<i>Rhizoma Anemarrhenae</i>), Chinese trichosanthes root (<i>Radix Trichosanthis</i>), milk vetch root (<i>Radix Astragali seu Hedysari</i>), etc., e.g., Yuye Tang.</p> <p><b>10. Treats prolonged and incessant diarrhea due to deficiency-cold of the spleen:</b> This herb can also astringe the intestines to arrest diarrhea. It is often used together with malaytea scurfpea fruit (<i>Fructus Psoraleae</i>), evodia fruit, nutmeg, etc., e.g., Sishen Wan.</p> <p><b>11. Treats palpitations, insomnia and dreaminess:</b> This herb can not only nourish and replenish the heart and kidneys, but also relieve mental stress. Therefore it is indicated for palpitations, insomnia,</p>
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dreaminess, etc., due to emotional distress as a result of loss of yin and blood. In addition, it can be selected for use by those suffering from insomnia owing to any other cause.

It is often used together with raw rehmannia, red-rooted salvia root (*Radix Salviae Miltiorrhizae*), wild jujube seed (*Semen Ziziphi Spinosa*), etc.

12. **Nervous system:** Schizandra is known to stimulate the nervous system, increasing the speed of reflex nervous responses and improving mental clarity. The berries are thought to be potentially useful in the treatment of depression, and are known to help improve irritability and forgetfulness. This herb is considered to be one of the premium mind tonics of herbalism. It is used to sharpen concentration, improve memory and increase alertness. Yet, unlike caffeine-like stimulants, Schizandra does not produce nervousness. In fact, some people consider Schizandra mildly "calming" while producing wakefulness and improved focus.

It has been demonstrated that human intellectual activity can be enhanced and work efficiency increased by consuming Schizandra. Various tests have shown that moderate therapeutic doses of Schizandra can improve various activities requiring concentration, fine coordination, sensitivity and endurance. The tests in humans confirming Schizandra's efficacy in these areas range from threading needles to running marathons.

13. **Uterus:** Schizandra stimulates the uterus, strengthening rhythmic contractions.

14. **Adaptogenic herb:** Research has shown that in common with ginseng, schisandra has adaptogenic properties, helping the body to adapt to stress

15. **Treats spontaneous perspiration and night sweat:** This herb can astringe the lungs to arrest sweating. It can be used together with ephedra root, oyster shell, etc.

16. **Skin rashes:** Recently, Chinese herbalists have started to use schisandra to treat urticaria (hives) and other skin problems, including eczema. It is usually given for these conditions in the form of a medicinal wine.

17. **Skin Beautify:** Schizandra is widely used to beautify the skin and to protect the skin from the damaging effects of the sun and wind. Due to the astringent quality of Schizandra, the skin tends to hold its moisture and becomes full and beautiful. It has always been very popular with the wealthy men and women of China because of its youth preserving and rejuvenating effects. I have seen the benefits of this herb with my own eyes hundreds of times in my life. People who start taking Schizandra regularly all change for the better. Their skin virtually glows and becomes clear and fine after several months. For use as a general tonic in China, patients are advised to chew dried schisandra berries daily for 100 days. Skin conditions are usually treated with a medicinal wine formulation.

18. **Improve Vision:** Human studies have also shown that Schizandra can improve vision, even enlarging the field of vision, and can improve hearing. It also improves the discrimination ability of the skin receptors. It has been determined that this increased sensitivity is due to improved function of the central nervous system's ability to analyze data flowing to it from the peripheral sensors.

Eyesight Difficulties: So-called night blindness could be corrected with the use of schisandra. Adaption to darkness was improved. There was a general increased sharpness of vision and a widening of the boundaries of the field of vision after a 10-day course of use of schisandra.

19. **Circulatory disorders:** Schizandra may be used to treat poor circulation and poor heart function.

20. **Fatigue:** Schizandra may help to reduce fatigue, improve endurance, improve work performance, and build strength. It is recommended for persons who need high levels of energy, such as athletes.

21. **Sensory organ failure:** Schizandra has been used to help improve failing sight and hearing. It enhances the sensation of touch.

22. **Neurasthenic Disorders:** Patients with neurasthenic problems were given the schisandra berries and showed a significant improvement in general well-being. Headaches disappeared. Sleep normalized. Appetite improved. Symptoms disappeared completely after the 25th to 27th day. Thereafter, the syndromes of fatigue and exhaustion diminished more rapidly. There was an improvement in mental and physical performance.

23. **Chronic Gastritis:** Patients who suffered from chronic gastritis or thrombocytopenia were given the schisandra berries. There was a balancing of the levels of acidity in the stomach and the intestinal functions were soothed. In hypoaacidic gastritis, a two to three week intake of the schisandra berries brought about a stable improvement.

24. **Additional uses:** Schizandra is used for a wide variety of other physical disorders, including diarrhea and dysentery, as well as to help improve failing sight and hearing.

#### Phytochemicals and Constituents of Schisandra Fruit:

The major active compounds in schisandra are [lignans](#) ([schizandrin](#), [deoxyschizandrin](#), [gomisins](#), and [pregomisin](#)) found in the seeds of the fruit. Modern Chinese research suggests these lignans have a protective effect on the liver and an immuno-modulating effect. At least two human studies in China, one controlled and the other open, have shown that schisandra can help people with hepatitis. Standardized extracts of schisandra fruits have gained popularity for use in racehorses not running well in relation to elevated liver enzyme levels in their blood; further supporting their beneficial effect on the liver. Part of how schisandra lignans appear to protect the liver is by activating the enzymes in liver cells that produce glutathione, an important [antioxidant](#) substance.

[Lignans](#) also interfere with platelet activating factor, a chemical that promotes inflammation in a number of conditions.

Schisandra fruit may also have an adaptogenic and immuno-modulating action, much like the herb Asian ginseng, but with weaker effects. Laboratory work suggests that schisandra may improve work performance, build strength, and help to reduce fatigue.

Main Content: [gamma-schizandrin](#), C<sub>23</sub>H<sub>28</sub>O<sub>6</sub>, (0.286% ~0.317%); [schizandrol](#), C<sub>24</sub>H<sub>32</sub>O<sub>7</sub>, (2.24% ~9.87% for Schisandra Chinensis, 0.004% ~0.790% for Schisandra sphenanthera); [schisanhenol](#), C<sub>23</sub>H<sub>30</sub>O<sub>6</sub>, (0.021% ~0.41% for Schisandra Chinensis, 0.068% ~7.57% for Schisandra sphenanthera); [schizandrol B](#), C<sub>22</sub>H<sub>30</sub>O<sub>7</sub>; etc.

Phytochemicals of SCHIZANDRA - Schisandra chinensis (TURCZ.) BAILL. (Schisandraceae):

Phytochemicals (Plant part):

Fruit: Angeloylgomisin-O, Angeloylgomisin-P, Angeloylgomisin-Q, Angeloylgomisin-O, Argolic Acid, BenzoylisoGomisin-O, [Beta Carotene](#), Chamigrenal, D-Alpha-Ylangene, Epigomisin-O, [Gamma-Schizandrin](#), [Gomisin-A](#), [Gomisin-B](#), [Gomisin-C](#), [Gomisin-D](#), Gomisin-E, Gomisin-F, Gomisin-G, Gomisin-H, [Gomisin-J](#), Gomisin-K-1, Gomisin-K-2, Gomisin-K-3, Gomisin-L-1, Gomisin-L-2, Gomisin-M-1, Gomisin-M-2, Gomisin-N, Gomisin-O, Gomisin-R, [Niacin](#), PreGomisin, [Riboflavin](#), Schisantherin-D, Sesquicarene, [Thiamin](#), Tigloylgomisin-P, [Wuweizisu-C](#).

Other Phytochemicals: schizandrin; schizandrol; deoxyschizandrin; pseudo-gama-schizandrin; gomisin A; gomisin B; gomisin C; gomisin G; gomisin

H;angeloylgomisin H;tigloygomisin H; benzoylgomisin H; gomisin E;gomisin N; gomisin O; epigomisin O; angeloylgomisin Q;gomisin D; pregomisin; gomisin J;(-)-gomisin K1;(+)gomisin K2;(+)gomisin K3;(+)gomisin L2;(Δ)gomisin M1;(Δ)gomisin M2;tigloygomisin P; angeloygomisin P;angeloylgomisin O;angeloyisogomisin O; benzoylisogomisin O; isoschisandrins; gomisin R; gomisin S; gomisin T;benzoylgomisin Q;benzoylgomisin P;benzoylgomisin U;gomisin U;neoschizarrin; meso-dihydroguaiaretic acid.

Schizandra Chinensis also contain: chisantherin A;chisantherin B;chisantherin C;chisantherin D; chisantherin E; wuweizi C.

Content in Volatile Oil:[alfa-pinene](#);camphene;[beta-pinene](#);myrcene;[alfa-terpinene](#);[limonene](#);[terpinene](#);[p-cymene](#); [thymol methyl ether](#); [bornyl acetate](#); [citronellyl acetate](#); [linalool](#); [terpinene-4-ol](#);[alfa-terpineol](#); [geraniol](#); [borneol](#); [citronellol](#); [benzoicacid](#);[beta-elemene](#);[alfa-ylangene](#);cuparene; sesquicarene;[beta-chamigrene](#);[alfa-chamigrene](#);[shamigrenol](#);[beta-bisabolene](#);[ethyl benzylether](#);[alfa-santalene](#); clovene;[beta-caryophyllene](#);[beta-selinene](#); [thyjopsense](#);[santalol](#);[alpha-santalol](#); [nonylphenol](#);2-(p0cyclohexyl-phenoxy)ethanol; 1-methyl-4-methylethylcyclohexene; [phenyl-2-propanone](#); [isolongifolene](#),etc.

#### Monograph on Schizandra:

Schizandra is native to East Asia, 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 *Schizandra* species has been documented; other reported substitutes include: *Kad-sura 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, schisandrins A and B, schisantherin A and B, and gominsin 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 high-est 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 α'-pinene, and the sesquiterpenes sesquicarene, ylangene, chamigrenol, and α- and α'-chamigrene. Lipids include linoleic acid, oleic acid, linolenic acid, lauric acid and palmitic acid. The scent of the oil includes camphor, woody, spicy and sour elements. 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 schizandra. 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.

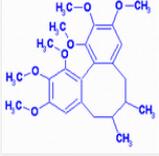
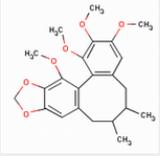
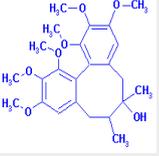
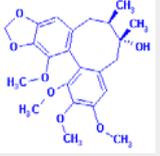
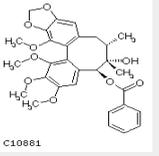
#### Phytochemical info of Schizandra Extract:Schisandrins

Product Name:Schizandra Fruit Extract. Schisandrins

Synonym:Schisandrins

Definition:Schisandrins from Schizandra Fruit Extract are Lignans majorly composed of Schizandrin A, Schizandrin B, Schizandrol A, Gomisin A, Schisantherin A.

Chemical information disclosed as following table:

Phytochemical Name:	Schizandrin A.	Schizandrin B.	Schizandrol A.	Gomisin A.	Schisantherin A.
Molecular Photo:					
M.F.&M.W:	C24H32O6. 416.514	C23H28O6. 400.189	C24H32O7. 432.513	C23H28O7. 416.470	C30H32O9. 536.205
Synonyms:	Deoxyschizandrin	Gamma-schisandrins Deoxygomisin A.	Schizandrin	Schizandrol B	Gomisin C
CAS.No.:	61281-38-7	61281-37-6	7432-28-2	58546-54-6	58546-56-8

#### Schizandra 12 Major compounds:

12 compounds were obtained and identified as wuweizisu C (1), ganwuweizic acid (2), nigranic acid (3), catechin (4), 2 alpha,24-dihydroxyursolic acid (5), 3 beta-O-acetylursolic acid (6), ursolic acid (7), slyceryl 26-hydroxyhexacosanoate (8), slyceryl hexacosanoate (9), fat acids (10), beta-sitosterol (11), daucosterol (12), respectively.

#### How much is usually taken?Suggestions of Schizandra.

Use of schizandra fruit ranges from 1.5-15 grams per day. The tincture, in the amount of 2-4 ml three times per day, can also be used.

Are there any side effects or interactions? Side effects involving schizandra are uncommon but may include abdominal upset, decreased appetite, and skin rash.

Certain medications may interact with schizandra. Refer to the drug interactions summary for a list of those medications. It is recommended you discuss the use of schizandra and your current medication(s) with your doctor or pharmacist.

Within Healthnotes Online, information about the effects of a particular supplement or herb on a particular condition has been qualified in terms of the methodology or source of supporting data (for example: clinical, double blind, meta-analysis, or traditional use). For the convenience of the reader, the information in the table listing the supplements for particular conditions is also categorized. The criteria for the categorizations are: Primary indicates there are reliable and relatively consistent scientific data showing a health benefit. Secondary indicates there are conflicting, insufficient, or only

preliminary studies suggesting a health benefit or that the health benefit is minimal. Other indicates that an herb is primarily supported by traditional use or that the herb or supplement has little scientific support and/or minimal proven health benefit.

#### 🔴 Safety and Acute toxicity:

##### ▶ Schizandrin A:

Chemical Name: Dibenzo(a,c)cyclooctene,5,6,7,8-tetrahydro-6,7-dimethyl-1,2,3,10,11,12-hexamethoxy  
CAS: 61281-38-7. Molecular Formula: C<sub>24</sub>H<sub>32</sub>O<sub>6</sub>. Weight: 416.56  
Synonyms: Deoxyschisandrin

**Acute toxicity(LD50):** LDLo-lowest published lethal dose. Intraperitoneal. Rodent-mouse. 1gm/kg

Toxic Effects: Behavioral-altered sleep time(including change in righting reflex)

Reference: *CMJODS Chinese Medical Journal(Beijing,English Edition),(China International Book Trading Corp., POB 2820,Beijing, Peop,Rep.China) V.1-1975- Adopted vol.no.92 in 1979. Volume(issue)/page/year: 93,41,1980.*

##### ▶ Schizandrin B:

Chemical Name: Benzo(3,4)cycloocta(1,2-f)(1,3)benzodioxole,5,6,7,8-tetrahydro-1,2,3,13-tetramethoxy-6,7-dimethyl-,stereoisomer  
CAS No.: 61281-37-6; 64121-95-5. Molecular Formula: C<sub>23</sub>H<sub>28</sub>O<sub>6</sub>. Molecular Weight: 400.51  
Synonyms: Deoxygomisin A, Gamma-schisandrin; Schisandrin B; gamma-Schizandrin; Schizandrin B; Wuweizisu B.

**Acute toxicity(LD50):** LD50-Lethal dose,50 percent kill. Intraperitoneal. Rodent-mouse, 2gm/kg.

Toxic Effects: Behavioral-altered sleep time (including change in righting reflex)

Reference: *CMJODS Chinese Medical Journal (Beijing,English Edition),(China International Book Trading Corp., POB 2820,Beijing, Peop,Rep.China) V.1-1975- Adopted vol.no.92 in 1979. Volume(issue)/page/year: 93,41,1980.*

##### ▶ Schizandrol A:

Chemical Name: Benzo(a,c)cycloocten-6-ol,5,6,7,8-tetrahydro-6,7-dimethyl-1,2,3,10,11,12-hexamethoxy-,stereoisomer  
CAS No.: 7432-28-2. Molecular Formula: C<sub>24</sub>H<sub>32</sub>O<sub>7</sub>. Molecular Weight: 432.56.  
Synonyms: Schisandrin; Schizandrin; Schisandrol A; Schizandrol A; Wuweizi alcohol A; Wuweizichun A

##### 🔴 Acute toxicity(LD50):

LD50-lethal dose,50 percent kill. Oral. Rodent-mouse: 1448mg/kg.

Toxic Effects: Autonomic Nervous System-smooth muscle relaxant (mechanism undefined, spasmolytic)

Lungs, Thorax, or Respiration-other changes.

Nutritional and Gross Metabolic-body temperature decrease.

LD50-Lethal dose,50 percent kill. Intraperitoneal. Rodent-mouse. 518mg/kg

Toxic Effects: Autonomic Nervous System-smooth muscle relaxant (mechanism undefined, spasmolytic)

Lungs, Thorax, or Respiration-other changes.

Nutritional and Gross Metabolic-body temperature decrease.

LD50-Lethal dose,50 percent kill. Subcutaneous. Rodent-mouse. 1861mg/kg.

Toxic Effects: Behavioral-sleep.

Behavioral-somnolence (general depressed activity)

Nutritional and Gross Metabolic-body temperature decrease.

Reference: *Journal of Pharmacy.No.1-1981-Volume (issue)/page/year: 101,1030,1981.*

##### ▶ Gomisin A(Schizandrol B):

Chemical Name: Benzo(3,4)cycloocta(1,2-f)(1,3)benzodioxol-6-ol,5,6,7,8-tetrahydro-6,7-dimethyl-1,2,3,13-tetramethoxy-,stereoisomer  
CAS No.: 58546-54-6; 61281-39-8. Molecular Formula: C<sub>23</sub>H<sub>28</sub>O<sub>7</sub>. Molecular Weight: 416.51  
Synonyms: Gomisin A; Schisandrol B; Schizandrol B; Wuweizi alcohol B; Wuweizichun B.

##### 🔴 Acute toxicity(LD50):

LD50-Lethal dose,50 percent kill. Oral. Rodent-mouse. 777mg/kg.

Toxic Effects: Behavioral-sleep

Behavioral-somnolence (general depressed activity)

Nutritional and Gross Metabolic-body temperature decrease.

LD50-Lethal dose,50 percent kill. Intraperitoneal. Rodent-mouse. 390mg/kg.

Toxic Effects: Behavioral-sleep

Behavioral-somnolence (general depressed activity)

Nutritional and Gross Metabolic-body temperature decrease

LD50-Lethal dose,50 percent kill. Subcutaneous. Rodent-mouse,500mg/kg.

Toxic Effects: Behavioral-sleep

Behavioral-somnolence (general depressed activity)

Nutritional and Gross Metabolic-body temperature decrease.

Reference: *Journal of Pharmacy.No.1-1981-Volume (issue)/page/year: 101,1030,1981.*

#### 🔴 Indications & Combinations of Schisandra.

#### 🔴 Common Actions:

adaptogen, analgesic, anhidrotic, antibacterial, antidepressant, antidiarrheal, antifatigue, antihyperglycemic, antihypertensive, antioxidant, antiseptic, antituberculous, antitussive, aphrodisiac (stimulates semen production), astringent, cardiotonic, choleric, circulatory stimulant, CNS stimulant, demulcent, expectorant, helps the body manage stress, hepatic, immunostimulant, improves endurance, improves mental performance, improves physical performance, kidney alterative, liver protectant, cardiac tonic, sedative, stimulant, tonic, urogenital tonic, uterine stimulant, vasodilator

#### Traditional use:

amnesia, anxiety, asthma, cancer, chronic diarrhea, cough, diabetes mellitus, difficulty breathing, dropsy, dysentery, excessive perspiration, excessive thirst, headache, heart palpitation, hyperglycemia, hypertension, impotence, indigestion, infertility, insomnia, nervous exhaustion, neuralgia, neurasthenia, night sweats, nocturnal emission, nonicteric hepatitis, polyuria, premature ejaculation, seminal emissions, spermatorrhea, stridor, tuberculosis

Chronic cough and asthma due to rebellion of lung qi caused by deficiency of the lungs and kidneys manifested as cough with scanty sputum and asthma aggravated by slight exertion. Schizandra fruit (Wuweizi) is used with Dogwood fruit (Shanzhuyu), Prepared rehmannia root (Shudihuang) and Ophiopogon root (Maidong) in the formula Baxian Changshou Wan.

Deficiency of qi and body fluids manifested as spontaneous sweating, night sweating, thirst, palpitations, shortness of breath and deficient and forceless pulse. Schizandra fruit (Wuweizi) is used with Ginseng (Renshen) and Ophiopogon root (Maidong) in the formula Shengmai San.

Diabetes manifested as thirst, preference for excessive fluid intake, shortness of breath, lassitude and deficient and forceless pulse. Schizandra fruit (Wuweizi) is used with Astragalus root (Huangqi), Fresh rehmannia root (Shengdihuang), Ophiopogon root (Maidong) and Trichosanthes root (Tianhuafen) in the formula Huangqi Tang.

Seminal emissions and nocturnal emissions caused by deficiency of the kidneys. Schizandra fruit (Wuweizi) is used with Dragon's bone (Longgu) and Mantis egg case (Sangpiaoxiao).

Chronic diarrhea caused by deficiency of the spleen and kidneys. Schizandra fruit (Wuweizi) is used with Nutmeg (Roudoukou) and Evodia fruit (Wuzhuyu) in the formula Sishen Wan.

Deficient yin and blood of the heart and kidneys manifested as palpitations, irritability, insomnia, dreamful sleep and forgetfulness. Schizandra fruit (Wuweizi) is used with Fresh rehmannia root (Shengdihuang), Ophiopogon root (Maidong) and Wild jujube seed (Suanzaoren) in the formula Tianwang Buxin Dan.

Dosage: A daily dose of schizandra fruit ranges from 2-6 grams. The tincture, in the amount of 2-4 ml three times per day, can also be used. Recommended doses of schizandra 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. Schizandra 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 in 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 pu-pils.

Possible Side Effects: Side effects involving schizandra are uncommon but may include abdominal upset, decreased appetite, and skin rash.

#### Scientific Studies of Schizandra:

##### Liver Protector Schizandra Fruit Extract:

Schizandra Protecting the liver - Schizandra contains a number of compounds, including essential oils, numerous acids, and lignans. Lignans (schizandrin, deoxyschizandrin, gomisins, and pregomisin) are found in the seeds of the fruit and have a number of medicinal actions. Modern Chinese research suggests that lignans regenerate liver tissue damaged by harmful influences such as viral hepatitis and alcohol. Lignans lower blood levels of serum glutamic pyruvic transaminase (SGPT), a marker for infective hepatitis and other liver disorders.

Research into schizandra has focused largely on the lignans, which have a pronounced anti-hepatotoxic (liver-protective) action. Up to 30 different lignans have been identified in schizandra, which all contribute to this effect. Research from 1972 onward has reported the beneficial action of schizandra on the liver, and one clinical trial indicated a 76% success rate in treating patients with hepatitis, with no side effects being noted.

Studies in animals and humans suggest that schizandra or its extracts might increase stamina and speed and improve mental concentration.

Animal studies suggest schizandra may protect the liver from toxic damage, improve liver function, and stimulate liver cell regrowth. These findings led to its use in human trials for treating hepatitis. In a Chinese study of 189 people with hepatitis B, those given schizandra reportedly improved more rapidly than those given vitamins and liver extracts.

In China, crude schizandra berries, their preparations, and individual constituents are widely used for progressive hepatic degeneration due to viral hepatitis or chemical challenge--indications for which schizandra is well documented.

In the 1970s, trials in China on patients with hepatitis resulting from either viral infection or chemical exposure reported schizandra preparations lowered elevated levels of serum glutamic-pyruvic transaminase (SGPT), an enzyme found primarily in the liver that is released into the bloodstream as the result of liver damage. This research focused on the antihepatotoxic effects of lignans isolated from the unhydrolyzed fraction of the seed oil. At least 13 of these lignans have been reported to enhance the hepatic glutathione antioxidant system and have been reported to be beneficial in treating viral- and chemical-induced hepatitis and liver cancer.

In 1986, Chinese researchers reported more than 5,000 cases of various types of hepatitis have been treated with schizandra preparations, resulting in the reduction of elevated liver enzymes. According to researchers, elevated SGPT values returned to normal in 75 percent of patients treated after 20 days of taking an unspecified schizandra preparation. In subjects with elevated SGPT attributed to drug toxicity, SGPT levels returned to normal in 83 out of 86 cases after one to four weeks of treatment.

Schizandra 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 schizandrin C and used to treat viral and drug-induced hepatitis. Extensive animal and in vitro studies using whole schizandra fruit or schizandrin B have shown a protective effect for carbon tetrachloride and acetaminophen poisoning, and a beneficial effect on the hepatic glutathione antioxidant system. Gomisin A was shown to have anticarcinogenic effects in rat livers, while both gomisin A and schizandrin B stimulated regeneration of liver tissue, synthesis of glycogen and protein, and activation of cytochrome P450 in rats. Schizandra also protected rat hearts from ischemia-reperfusion injury comparable to vitamin E or N-acetylcysteine. 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 schizandra.

A controlled study was conducted in China with 189 chronic viral hepatitis B patients with elevated SGPT levels. 8 Tablets prepared from an ethanol berry extract containing 20 mg of lignans and corresponding to 1.5 g crude herb were administered to 107 of these patients. The control group of 82 patients was given liver extracts and vitamins. Normal SGPT levels were observed in 73 patients, or 68 percent, in the schizandra-treated group, with a four-week average time needed for normalization. In the control group, normal SGPT levels were observed in 36 patients, or 44 percent, with an average recovery time of eight weeks. Improvements in SGPT were reported to be temporary in the schizandra group because levels tended to rise again 6 to 12 weeks after treatment was discontinued. Relapse rates were highest (46-69 percent) in this time among those with chronic persistent hepatitis, elderly patients, and in those receiving long courses of treatment with hepatotoxic drugs. Most patients responded to resumption of treatment with a return to their previously reduced SGPT levels.

These reports and other studies led to the development of the antihepatotoxic drug dimethyl-4,4'-dimethoxy-5,6,5',6'-dimethylene dioxybiphenyl-2,2'-dicarbonate (DDB) derived from schizandrin lignans. DDB promotes a marked improvement in liver functions, including lowering elevated SGPT levels, bilirubin, and an alpha-fetal protein that results in subjective improvement of patient symptoms. This drug is widely used for treating chronic viral- and drug-induced hepatitis in China.

#### Schizandra Fruit Adaptogenic herb:

Schizandra enjoys its widest use as an adaptogen. Studies on schizandra 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 schizandra was administered before or after insult. Sleeping time after administration of sedatives was also reduced.

Adaptogenic herb - Research has shown that in common with ginseng, schizandra has adaptogenic properties, helping the body to adapt to stress. Schizandra's traditional use as a tonifier in TCM led to research for this effect, predominantly in the former Soviet Union, where it was defined as an "adaptogen." Although generally not an accepted category of therapeutic substances in modern medicine, adaptogens are substances believed to reinforce the nonspecific resistance of the body against physical, chemical, or biological stressors. Primarily, they are considered to enhance the body's general physiological adaptive responses.

Schizandra's use as an adaptogenic tonic has been the subject of numerous studies since the 1950s. There is a significant amount of evidence, in conjunction with its long-standing traditional use as a tonic, that it is effective in this role. The majority of this earlier adaptogenic research, however, is marred by poor study design and insufficient data.

The ability of an extract of the dried fruit to increase mental and physical activity in humans was reported in numerous studies conducted in the 1950s. In these studies, improvement was seen in activities that required concentration, coordination, and endurance. As an example, a study of telegraphists demonstrated that a dose of 5-10 mg/kg body weight schizandra was able to prevent tiredness and increase the correctness of telegraphic transmission and reception by 22 percent.

Other researchers reported the effect of schizandra on 59 airline flight attendants aged 22-29. The effects of nonstop seven- to nine-hour flights, as measured by several stress parameters, were evaluated before and after the flights with and without treatment with 0.5 g schizandra extract. Control subjects displayed an increase in heart rate from 76 beats per minute (bpm) to 88 bpm and blood pressure from 112 to 119, while those administered the schizandra preparation exhibited no changes.

Schizandra appears to be free of toxicity when administered orally within its recommended dosage range. Individuals with high gastric acidity or peptic ulcers may experience increased acidity. Those with abnormally high intracranial pressure or with epilepsy should avoid use. Based on the limited information available, schizandra should be avoided or used with caution by pregnant women.

In one mouse study, the lignan schizandrol A was reported to significantly prolong sedative-induced sleeping times, enhance the sedative effects of drugs, and antagonize the stimulatory effects of amphetamines and caffeine on spontaneous motor activity.

In the United States, schizandra is popularly used as a general tonic for decreasing fatigue, enhancing physical performance, and promoting endurance due to its effects and reputation as an adaptogen. In China it is widely used for various liver conditions. Among TCM practitioners, it is similarly used as a tonic and is also prescribed according to the principles of TCM.

Cautions & Contraindications: This herb is contraindicated in the early stage of cough or rubella and in excessive internal heat with unrelieved exterior syndrome.

#### ◉ Physiology of Schizandra:

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Schizandra is known for its ability to increase levels of nitric oxide which is an important component of erection physiology. In a cascade of events that starts with erotic thoughts and/or physical sensations nitric oxide is released from nerve endings in the penis. Nitric oxide acts as a relaxant that allows blood vessels to dilate, supplying increased blood flow and swelling of the tissues. This increase in the flow of blood also creates an increased tension on the blood vessel wall which activates the release of more nitric oxide. The increased release of nitric oxide further allows the blood within the penis to dilate, increasing both the length and girth of the penis.

#### ◉ Clinical Studies:

Research has indicated that the supplemental use of Schizandra increases the nitric oxide in the circulation. In a recent study published in *Phytomedicine* 1999 Mar;6(1):17-26, standardized extracts from Schizandra and Bryonia alba roots were applied to several groups of athletes in a placebo-controlled double-blind study. The study revealed that those individuals treated with Schizandra chinensis and Bryonia alba extracts increased the concentration of nitric oxide and cortisol in blood plasma and saliva. As mentioned above nitric oxide is an important chemical in erection physiology.