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Antioxidant Effect of *Schisandra Chinensis*

Surab Mohammed*

Department of Pharmacology, College of Pharmacy, Beihua University, Fengman District, Jilin-132013, China

*Corresponding author: Mohammed S, Department of Pharmacology, College of Pharmacy, Beihua University, Fengman District, Jilin-132013, China, Tel: +86-130-5841-8445; E-mail: smfi6363@gmail.com

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Abstract

Natural products are the biggest source of food and nutrition in human history; the people were feeding the products from the nature as long as the life was in existing. People also used the natural products as medicine. *Schisandra chinensis* (Turcz.) Baill. is famous element that is useful in Chinese traditional medicine and recognized by western herbal medicine. I aimed this script to demonstrate the antioxidant effect of *Schisandra chinensis*. After carefully reviewing an enormous number of researches about *Schisandra chinensis* and its antioxidant effect, I found that *Schisandra chinensis* is enriched with many essential chemicals that can be used as the remedy of different ailments. Beside the polysaccharides found in *Schisandra chinensis*, also it was underlined that schisandrol A, schisandrol B, schisandrin B, schizandrin, schisantherin B, schisantherin A, schisanhenol, deoxyschizandrin are the key elements of *Schisandra chinensis*'s antioxidant effect. Basically *Schisandra chinensis* shows its antioxidant effect by helping the natural intracellular protection against radical attacks. In this era the quantity of incurable diseases are high, while another more diseases can be cured with huge cost or their curative period take too long. So, in order to find an ultimate solution for current medical problems, we need to study more about *Schisandra chinensis*.

Keywords: Hepato-protective; Antioxidant; *Schisandra chinensis*

Introduction

Natural products are the biggest source of food and nutrition in human history; the people were feeding the products from the nature as long as the life was in existing. People also used the natural products as medicine. Because of its copious pharmacological effect Chinese traditional medicine is widely used around the world [1-4]. *Schisandra chinensis* (Turcz.) Baill. is famous element that is useful in Chinese traditional medicine and recognized by western herbal medicine [1,5]. Recent researches about *Schisandra* related issues are encouraging the usage of *Schisandra* derived products for both as medicinal and as diet [6-11].

Oxidative stress is a pathologic process emerged from the disproportion between the productions of free radicals and detoxifying the free radicals in the body. Generally unstable atoms cause free radicals, by either dropping (oxidants) or gaining (reductants) electrons; it can be either from oxygen species or nitrogen species, oxidative stress is oxygen species, it's well known as Reactive Oxygen Stress (ROS). Oxidative stress has double effect (harmful and beneficial) on human health; it's scientifically proved that it can cause neurodegenerative diseases, on-contrary it can be used for the management of some cancer problems. Antioxidant is the process of interfering oxidative stress caused by the free radicals. The number of antioxidant molecules found in nature is copious; they can be used as food stuff [12-17].

Multi-Advantages of *Schisandra Chinensis*

It has been proved that *Schisandra chinensis* can help the body to maintain or increase its ability of antioxidant, anti-inflammatory, anti-diabetic and anti-apoptotic [8,9]. It can also help pulmonary system [18-22]. Also, it is valuable medicine for age related diseases such as sarcopenia and osteoporosis; it can also handle aging-associated neurodegenerative diseases. That is the reason why it is used as anti-aging remedy. Some other *Schisandra chinensis* derivatives can be used as anti-allergic [23-27].

The product of *Schisandra chinensis* is beneficial in aspect of Osteoarthritis, and is preferable curative substance for neurologic diseases included Alzheimer's disease, it can prevent dementia and improve memory by supporting the brain derived neurotrophic factor (BDNF) [28-37]. Schisandrol A, schisandrin A, schisandrin C and gomisin N are acknowledged as the leading anti-hypertensive of *Schisandra chinensis* [38]. *Schisandra chinensis* acidic polysaccharide has anti-diabetic effect [39].

Schisandra chinensis can treat myocarditis and can protect against myocardial ischemia this is because of its Schizandrin component. *Schisandra* component called Benzoylgomisin H can manage acute myocardial infraction (AMI), its useful remedy for cardio-vascular disease [40-44].

Schisandra chinensis can prevent DNA damage and at the same time can be used for the management of apoptosis; this is because of alleviation effect of Schisandrin A on H₂O₂.

Schisandrin A also has anti-cancer effect that have being seen on xenograft mouse model experiment, it was underlined that Schisandrin A can impede MDA-MB-231 and BT-549 cells. Schisandrin A can prompt body's autophagy mechanism [45-47]. Because of its adjusting influence on the NRF2 and PGC-1 α signaling pathway anwulignan from *Schisandra* is considered as anti-fatigue substance [48]. Schisantherin A is an anti-inflammatory agent found in *schisandra chinensis*, its anti-inflammatory mechanism is mentioned as barring IL-1 β -stimulated chondrocytes, and this will negatively affect NF- κ B and MAPKs signaling pathways [49]. Schizandrin A (Sch A) might support Gefitinib to prevent cell tumor, so it's beneficial for anti-tumor medications [50].

Antioxidant Effect of *Schisandra Chinensis*

Although oxidative stress can be solution for some diseases like melanoma cancer cells but it can cause more diseases [51]. Because of the high oxygen demand of the brain there are a lot of neurological related diseases caused by oxidative stress [52]. Oxidative stress can be either the primary cause or aggravating factor of several ailments included Alzheimer's disease, cancer, Parkinson's disease, diabetes, hypertension, asthma, and inflammatory diseases. To acquire more confirmation about these issues and avoid any controversial information further researches are really compulsory [53-71].

Schisandra chinensis contains more effective chemical integrant, included acids likewise: quinic acid, d(-)-tartaric acid, l(-)-malic acid, and protocatechuic acid, chlorogenic, cryptochlorogenic, gallic, neochlorogenic, protocatechuic, salicylic, syringic and vanillic, and two flavonoids: kaempferol and quercitrin [72,73]. However, the key antioxidant constituents of *schisandra chinensis* are included: Schisandrol A, schisandrin B, schizandrin, schisandrol B, schisantherin B, schisantherin A, schisanhenol, deoxyschizandrin [74,75].

Schisandrin B (Sch B) which is one of *schisandra chinensis* components can improve CCl₄-induced liver fibrosis, which can relieve liver damage in the rats. Schisandrin B (Sch-B) can also be used for handling the autoimmune diseases, because of its regulation effect on IFN- γ and IL-17 cytokines and its maintenance effect on the function of T cells. Also it has the potential ability to solve epithelial-mesenchymal transition (EMT) related fibrotic diseases by regulating transforming growth factor (TGF)- β 1 [76-78].

Schizandrin B has hepato-protective activity by preventing cell-injury caused by endoplasmic reticulum (ER) strain. It can also attenuate fatty liver problems; furthermore it can help the body to heal drug-induced hepatic damage, it's predicted the mechanism is modifying cytochrome P450 enzyme function [79-82].

The more interesting matter is the mechanisms of action of these integrant are almost similar, for example: for bettering the oxidative stress in rats, Schisandrin B (SchB) and Schisandrin C (Sch C) both inhibit Keap1, which is a protein in the body that assists oxidative stress [83,84]. *Schisandra chinensis* ease oxidative stress by assisting body's ordinary antioxidant mechanism, it supports superoxide dismutase (SOD) and

glutathione peroxidase (GSH), and it also maintains antioxidant reaction of Nuclear factor erythroid 2-related factor 2 (Nrf2). On the other hand it moderates factors that aggravate oxidative stress including: alanine aminotransferase (ALT), aspartate aminotransferase (AST), tumor necrosis factor- α (TNF- α), interferon- γ (IFN- γ), interleukin-1 β (IL-1 β) and interleukin-6 (IL-6), malonaldehyde (MDA). Furthermore *Schisandra chinensis* diminish A β level. It can also impede p38MAPK, ERK1/2, TGF- β 1, TBK1/IRF3 and NF- κ B p65 pathways. It supports heme-oxygenase-1. Schisandrin B (Sch B), *Schisandra chinensis* polysaccharides (SCP), Gomisins N (GN) and Anwulignan are examples for elements that act in this way [85-102].

Schisandra chinensis acidic polysaccharide SCAP shows its anti-oxidant capacity by dropping the level of triglyceride (TG) and malondialdehyde (MDA) and encumbering the countenance of CYP2E1 protein [103]. Ethanol extracts from *Schisandra chinensis* fructus fruit (EESC) has positive effect on serum lipid and antioxidant manners of the body [104].

α -Cubebenoate which is extracted from *schisandra chinensis* fruit has an antioxidant effect because of its negative impact on the generations of nitric oxide synthase (iNOS) and cyclooxygenase 2 (COX-2) and on the formation of Nitric Oxide (NO) and prostaglandin E₂ (PGE₂) [105,106]. *Schisandra chinensis* can heal oxidative impairment caused by Tert-Butyl hydroperoxide (tBHP), it also has positive effect on mitochondrial dysfunction [107].

Conclusion

Schisandra chinensis has a lot of beneficial traits to human health; it can solve a number of ailments. Even though it have been used since thousands of years in the world, but last several decades the scientists discovered some of its most important active ingredients and their mechanism of action. It has been reported by different sources that anti-oxidative activity of *schisandra chinensis* is trustful. In this era the quantity of incurable diseases are high, while another more diseases can be cured with huge cost or their curative period take too long. So, in order to find an ultimate solution for current medical problems, we need to study more about *schisandra chinensis*.

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