

# *The Discussion of “Qin Medicine” Salvia Miltiorrhiza in Cardiovascular Diseases’s Progress*

Ning Zhang<sup>1</sup>, Liqin Zhi<sup>2</sup>

<sup>1</sup>*Shaanxi University of Chinese Medicine, Xianyang, Shaanxi, 712046, China*

<sup>2</sup>*Cardiovascular Department of Shaanxi University of Chinese Medicine Affiliated Hospital of Integrated Traditional Chinese and Western Medicine, Xi'an, Shaanxi, 710000, China*

**Keywords:** Qin medicine, Salvia miltiorrhiza, Cardiovascular disease, Chemical composition, Pharmacological research, Modern application

**Abstract:** Shaanxi Province is known as “the land of Qin has no idle herbs”, and Shangluo Salvia miltiorrhiza is one of the “ten medicines of Qin”. Salvia miltiorrhiza, its taste is bitter, slightly cold sex. Returning to the heart, the liver meridian, activating blood and regulating the meridian, clearing the heart and removing trouble, cooling blood and eliminating carbuncle, nourishing the blood and calming the god. Salvia miltiorrhiza contains many kinds of chemical constituents, and its pharmacological action and modern application are extremely extensive. Clinically, it can treat coronary heart disease, angina pectoris and other cardiovascular diseases, and has achieved remarkable curative effect. This paper summarizes the ancient books from the Abstract, chemical composition, pharmacological action, modern application and so on. To provide reference for further exploration of the application of salvia miltiorrhiza in the treatment of cardiovascular diseases. To promote the inheritance and development of traditional Chinese medicine by effectively applying the methods of integrating traditional Chinese and Western medicine in clinical practice.

## 1. Introduction

Shaanxi, or “Shaanxi” or “Qin”, straddles the Yellow River and the Yangtze River, spanning three climatic zones: temperate, warm temperate and northern subtropical, rich in species resources. Known as “Qin free grass,” said. Chinese medicinal materials produced, known as “Qin Medicine.” In 2018, the Chinese Medicine Association of Shaanxi province selected the “Top Ten Qin medicines” and the “Taibai seven medicines”. Shangluo Salvia miltiorrhiza is one of the “Ten Qin medicines”. Salvia miltiorrhiza is the dry root and rhizome of Salvia miltiorrhiza, also known as cleft cicadas, red ginseng, Muyang, purple salvia miltiorrhiza, red root, red red ginseng, purple codonopsis and so on. Mainly produced in Sichuan, Shandong, Shaanxi, Hebei and other places, mining in the spring and autumn season. Remove silt and dry. Slice thick, raw or broiled. First published in the Shennong Ben Cao Jing. It is classified as top grade. Salvia miltiorrhiza bitter taste, slightly cold nature. To the heart, the liver, there are blood-regulating meridian, heart-clearing trouble, cooling blood carbuncle, nourishing blood and calming the spirit of the work. Since ancient times, it has been used in the treatment of cardiovascular diseases for thousands of years.

Cardiovascular Disease (CVD) is a collective term for diseases of the circulatory system, which are diseases of organs and tissues in the human body that transport blood. Cardiovascular disease mainly includes heart, arteries, veins, capillaries, etc. It can also be divided into acute and chronic diseases, and is generally associated with atherosclerosis. Nowadays, salvia preparations are still widely used in cardiovascular diseases in clinical practice, and this paper provides a brief review on the application of salvia in cardiovascular diseases.

## 2. Summary of Ancient Texts

Shennong Ben Cao Jing: “(Salvia miltiorrhiza) is used to treat evil energy in the heart and abdomen, intestinal tinnitus like walking water, accumulation of cold and heat, breaking up the symptoms and removing obstruction, and stopping annoyance and fullness<sup>[1]</sup>” Salvia miltiorrhiza is good at promoting blood circulation, eliminating symptoms and dispersing nodules, and is widely used in many kinds of blood stasis evidence, and is an important medicine for activating blood circulation and resolving stasis. It is good for treating blood stasis and blockage in treating stabbing pain in the heart and abdomen, and can be used together with sandalwood and sandalwood, such as Dan Shen Drink (Medical Gold Needle). This formula uses Dan Shen as the ruling herb to resolve stasis and relieve pain without injuring Qi and Blood. The emphasis is on resolving blood stasis, so that the stasis will be dissolved and the pain will be cured. It is a commonly used formula in the clinical treatment of “pains in the heart and abdomen” in Chinese medicine, and was first published in Chen Xiuyuan's “Song Zu Zu Zuo” in the Qing Dynasty[2] .

Dian Nan Ben Cao (Dian Nan Ben Cao): “(Dan Shen) tonifies the heart and fixes the will, calms the mind and tranquilizes the heart. It is used to treat forgetfulness and palpitations, and sleeplessness.” Salvia miltiorrhiza is slightly cold in nature, enters the heart meridian, and has the function of clearing the heart and removing irritation and tranquilizing the mind. For palpitations and palpitation, insomnia and dreaminess caused by deficiency of heart yin and blood and internal disturbance of deficiency fire, it is often used together with Dihuang and Sour Jujube, such as Tianwang Tonic Heart Dan (Secret Anatomy of Regimen). In this formula, Salvia miltiorrhiza nourishes the heart blood and has the function of activating the blood, so that the heart blood is easily generated if it is tonified without stagnation. Studies have shown that Tianwang tonic heart elixir has improved cardiovascular function, which was first published in the Secret Anatomy of Regeneration in the Ming Dynasty [3].

## 3. Chemical Composition

The chemical constituents of Salvia miltiorrhiza bunge can be divided into two kinds: water-soluble and fat-soluble.

### 3.1 Water-Soluble Constituents of Salvia Miltiorrhiza Bung.

Salvianolic acid A, B, C, D, E, F, G, I, J, L, T, u, Y, and original shikonic acid, shikonic acid B, shikonic acid, shikonic acid and their esterified derivatives, salts and esterified derivatives<sup>[4-5]</sup>, there are also less sugar compounds such as glucose, galactose, fructose, raffinose and so on<sup>[6]</sup>. Studies have shown that these compounds have anti-tumor, anti-depression, anti-inflammatory response, anti-coagulation, coronary artery dilatation and other effects.

### 3.2 Fat-Soluble Constituents of Salvia Miltiorrhiza Bunge.

Tanshinone I, IIA, IIB, V, VI, cryptotanshinone, isocryptotanshinone, tanshinone, tanshinol,

salviol, salvianolic aldehyde, salvianthin a, propyl, B and so on<sup>[4-5]</sup>. Studies have shown that these compounds have anti-tumor, anti-inflammatory, radiochemical sensitizing, neuroprotective and anti-cardiovascular effects.

#### **4. Pharmacological Effects**

Modern research[7] found that this product has the effects of dilating coronary arteries, increasing coronary flow, improving myocardial ischemia, etc.; it can also dilate peripheral blood vessels and improve microcirculation; it has the effects of anticoagulation, promoting fibrinolysis, inhibiting platelet coagulation and inhibiting thrombosis; it also has the effects of enhancing immunity, hypoglycemia, antitumor, antibacterial, anti-inflammatory, antipyretic, sedative, antiallergic, anti-HIV, anti-ulcer, cholesterol-lowering The total extract of *Salvia miltiorrhiza* has certain anti-fatigue effects.

##### **4.1 Improving Myocardial Ischemia**

Myocardial ischemia is a pathological state of the heart, which is caused by the decrease of blood perfusion and oxygen supply. Water-soluble compounds of *Salvia miltiorrhiza* have anti-myocardial ischemia effect [8].

###### **4.1.1 Effect of Salvianolic Acid an on Myocardial Ischemia.**

Yang Xiuying et al. [9] were used in the experiment of myocardial ischemia/reperfusion arrhythmia model in rats and hypoxia-reoxygenation model in neonatal rat cardiomyocytes, conclusion salvianolic acid A has protective effect on myocardial ischemia/reperfusion injury.

###### **4.1.2 The Role of Salvianolic Acid B in Improving Myocardial Ischemia.**

Zhoudan [10] et al. Through the experimental study on the rat model of myocardial infarction, it was found that salvianolic acid B could promote the angiogenesis of ischemic myocardium. Li [11] et al induced primary cultured mouse cardiomyocytes by I-R, salvianolic acid B, MIR-30A mimetic or MIR-30A inhibitor co-culture, the results showed that salvianolic acid B could protect myocardium from I-R injury by MIR-30A through PI3K/Akt signaling pathway.

#### **4.2 Anti-Atherosclerosis**

Arteriosclerosis (As) is a type of arteriosclerosis that involves the deposition of lipids in the arterial wall, forming plaques that restrict blood flow. When these plaques rupture, they can clot, causing a blockage in the blood supply to the arteries. Is the basis of heart cerebrovascular disease.

##### **4.2.1 Danshensu is Arteriosclerosis, Arteriosclerosis**

Zeni, et al. [12] through the experiment of the effect of danshensu on arteriosclerosis and its mechanism, it is concluded that danshensu attenuates arteriosclerosis in a dose-dependent manner by inhibiting the activation of TLR-NF- $\kappa$ b pathway, and lower the arteriosclerosis. Based on previous experimental literature, it can be concluded that danshensu inhibits the formation of activated monocytes and foam cells by reducing the release of pro-inflammatory factors, to inhibit the proliferation of Vascular smooth muscle cells and other arteriosclerosis [13].

#### 4.2.2 Salvianolic Acid B Acts as an Arteriosclerosis

Zhu Jingbo et al. [14] made the model of 60 SD rats and used the method of intraperitoneal injection. The levels of high-sensitivity c-reactive protein (HS-CRP) in the salvianolic acid B group were significantly lower than those in the arteriosclerosis model group. Salvianolic acid B arteriosclerosis by lowering blood lipids and hs-CRP levels in the blood. Lee[15] et al found that salvianolic acid B exerts its arteriosclerosis effect by inducing HO-1 through NRF2 activation, which inhibits vascular cell proliferation, migration and inflammation.

#### 4.3 Anti-Thrombosis

Thrombus is a solid mass formed in the human heart and blood vessels by coagulation of blood or coagulation of certain organic fractions of blood, consisting of insoluble fibrin, deposited platelets, accumulated leukocytes and red blood cells. Salvia increases fibrinolytic enzyme activity, prolongs bleeding and clotting time, and prevents thrombosis.

##### 4.3.1 Application of Danshensu in Antithrombotic Therapy

Cui Guozhen <sup>[16]</sup>etal. conducted an experimental study using immunoprecipitation and found that 10  $\mu\text{mol-L}^{-1}$  and 100  $\mu\text{mol-L}^{-1}$  danshenin inhibited thrombin-induced platelet aggregation in a time-dose dependent relationship ( $P < 0.05$ ). It was concluded that salvinorin has an anti-thrombin-induced platelet aggregation effect.

##### 4.3.2 Application of Salvianolic Acid an in Antithrombotic Therapy

Fan Huaying [17]found that salvianolic acid A has anti-thrombotic, anti-platelet aggregation and improved blood rheology effects. The antithrombotic activity of salvianolic acid A was investigated by establishing an arteriovenous bypass thrombosis model in rats. It was also found to be antithrombotic and antiplatelet at the same time, without affecting the coagulation system.

### 5. Modern Application

Modern clinical often with this product-based, with evidence, it can treat coronary heart disease, angina, cerebrovascular disease, traumatic intracranial hematoma, hepatosplenomegaly, chronic persistent hepatitis, endometriosis, dysmenorrhea, Thromboangiitis obliterans, respiratory diseases, diabetes and other diseases. There are many preparations containing salvia miltiorrhiza in clinical treatment of cardiovascular diseases. Such as Salvia miltiorrhiza tablet, Salvia miltiorrhiza tablet, Salvia miltiorrhiza tablet, Salvia miltiorrhiza tablet, Salvia miltiorrhiza tablet, Salvia miltiorrhiza injection, Salvia miltiorrhiza injection and other pharmaceutical preparations <sup>[18]</sup>. This article discusses the application of this product in cardiovascular field.

#### 5.1 Treatment of Coronary Heart Disease

Coronary arteriosclerosis heart disease (CHD) is an arteriosclerosis disease of the coronary arteries that causes stenosis or obstruction of the arteries and leads to myocardial ischemia, hypoxia or necrosis. Salvia miltiorrhiza has the function of promoting blood circulation, removing blood stasis and relieving pain. It can increase the blood supply of coronary artery, reduce the blood viscosity and increase the blood and oxygen supply of cardiac muscle, so as to relieve the symptoms of coronary heart disease.

### **5.1.1 Compounding with Evidence, Application of Salvia Miltiorrhiza in Treatment of Coronary Heart Disease**

Hao Chenwei<sup>[19]</sup> et al. summarized the common compounding pairs in clinical practice, such as Danshen-Sanchu, Danshen-Astragalus, Danshen-Rafflesia, Danshen-Chuanxiong, Danshen-Geotian, etc., for the treatment of coronary heart disease. All of them have achieved good efficacy in clinical practice. In addition, Liao Peasdan<sup>[20]</sup> et al. verified the effect of Danshen-Geranium in the treatment of coronary heart disease by randomized grouping. The data obtained were statistically significant when 420 patients with coronary angina were divided into a control group (Western medicine group) and a treatment group (given 15 g each of Danshen formula granules and Pueraria formula granules on top of Western medicine), and the study showed that Danshen-Gueraria formula granules were more effective in the treatment of coronary angina than Western medicine alone.

### **5.1.2 The compound salvia miltiorrhiza preparation and the compound salvia MILTIORRHIZA preparation have the effect of promoting blood circulation and removing blood stasis, relieving pain by activating qi, and have obtained good effect in clinic**

Liu Xiaodong<sup>[21]</sup> studied the active ingredients of Salvia miltiorrhiza and Panax notoginseng, and found that the active ingredients play an important role in anti-thrombosis, coronary heart disease, improvement of hemorheology abnormalities, and improvement of myocardial ischemia, it is concluded that compound salvia miltiorrhiza plays an important role in the treatment of angina pectoris, coronary heart disease and cerebral infarction.

## **5.2 Treatment of Hypertension**

Hypertension is a cardiovascular syndrome characterized by elevated systemic arterial pressure. Salvia miltiorrhiza can help lower blood pressure by dilating peripheral blood vessels.

### **5.2.1 Astragalus-Salvia Miltiorrhiza. Application of Salvia Miltiorrhiza in the Treatment of Hypertension**

Han Cong<sup>[22]</sup> et al reviewed the role of Astragalus-salvia miltiorrhiza drug pairs in the development of hypertensive renal damage. The Astragalus-salvia miltiorrhiza drug pairs and their active components can regulate multiple signal transduction pathways during various stages of hypertensive renal damage, it can regulate blood pressure, lower urine protein, protect renal tubules, protect glomerular filtration barrier, improve renal Hemodynamics and improve renal function, thus lowering blood pressure and improving renal function.

### **5.2.2 Compound salvia MILTIORRHIZA preparation, Compound Salvia miltiorrhiza preparation has the effect of promoting blood circulation and removing blood stasis, relieving pain by promoting Qi, and has achieved good effect in clinic**

Liu Yongcheng<sup>[23]</sup> and others searched databases for Chinese and English literature on the therapeutic effects of compound Salvia miltiorrhiza dropping pills on essential hypertension, the results showed that compound salvia miltiorrhiza dropping pills were effective and safe in the adjuvant treatment of essential hypertension.

## **6. Conclusion**

Shangluo Salvia Miltiorrhiza has a long history, starting from the “Shennong Ben Cao Jing,” the

history of materia medica has been recorded, that is, the so-called “Present-day Suizhou River east Shaanxi province-level both (Salvia Miltiorrhiza). Has obtained the National Geographic Mark Certification. It is one of the original sources of Salvia miltiorrhiza. From ancient times to now, Salvia Miltiorrhiza has been widely and effectively used in clinic in blood deficiency and blood stasis syndrome. The application of Salvia Miltiorrhiza in cardiovascular disease has also been more in-depth medical research. This paper summarized the application of Salvia miltiorrhiza in cardiovascular disease from the aspects of ancient books abstract, chemical composition, pharmacological action and modern application. But the clinical application of Salvia miltiorrhiza still needs further development. We should read and study more ancient books to study how Salvia Miltiorrhiza was used in clinic at that time. With the help of modern knowledge of chemical composition and pharmacological action of Salvia miltiorrhiza, the clinical therapeutic effect of Salvia miltiorrhiza can be brought into play more effectively. In clinical application, integrated traditional Chinese and Western medicine is used to promote the inheritance and development of traditional Chinese medicine.

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