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A Medicinal and Edible Plant *Crocus sativus* L. and Its Therapeutic Effects on Cardiovascular and Cerebrovascular Diseases

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Abstract This paper introduces the biological characteristics, medicinal value, chemical component, and pharmacological effects of *Crocus sativus* L., and explores its therapeutic effects on cardiovascular and cerebrovascular diseases such as angina pectoris and coronary heart disease.

Key words *Crocus sativus* L., Cardiovascular and cerebrovascular diseases, Medicinal value, Therapeutic effect

1 Introduction

Crocus sativus L. is a kind of perennial herb, belonging to *Crocus* L. of Iridaceae. It originated in ancient Persia, and was introduced into Tibet of China through India and then into other areas of China. Its flowers are red, and it comes from western China, hence it is called *C. sativus* L. In Uyghur language, it is called "Zapar". *C. sativus* L. is also a type of flower and a spice plant. Its earliest artificial cultivation was by the Greeks, which was introduced to China during the Ming Dynasty. It has been planted in Zhejiang, Xinjiang and other areas of China and is a precious and endemic species commonly used in Xinjiang ethnic medicine. Traditional Chinese medicine generally uses the roots, stems, and leaves of plants as medicine, while Uyghur medicine focuses on using the flowers, fruits, kernels of plant medicinal materials. Uyghur people have a long-standing hobby of eating sauce of roses, pomegranate flowers, and *C. sativus* L. From the analysis of plant nutrition, flowers, fruits and kernels are obviously the essence of plants.

2 Biological characteristics and medicinal value

C. sativus L. has a diameter of about 2.5 - 3.5 cm, with a flattened spherical bulb and a yellow brown membranous coating on the outside; leaves basal growth, 9 - 15 pieces, bar shaped, gray green; 1 - 2 flowers, fragrant, with an orange red style and a variety of colors including red, blue, white, and light purple. Due to its short stem that does not protrude from the ground, *C. sativus* L. has two flowering periods: spring (February to March) and autumn (late October to mid November). The capsule is elliptical in shape, about 3 cm long.

C. sativus L. is a famous and precious traditional Chinese medicine, widely used in clinical practice of traditional Chinese medicine (Uyghur medicine). Its main medicinal part is the stigma. Flowers contain carotenoid compounds, and their main active ingredients are crocin, picrocrocin, crocetin dimethyl ester, and volatile oil. In the Uyghur language family, it is known as the "King of Medicine". According to literature records, nearly half of the prescriptions for Uyghur medicine contain *C. sativus* L., and many Uyghur compatriots in southern Xinjiang drink *C. sativus* L. as tea. This is enough to demonstrate the importance of *C. sativus* L. in the healthy lifestyle of Uyghurs. The *Compendium of Materia Medica* records: "when the heart is filled with worries and stagnation, and the breath is not relieved, *C. sativus* L. could stimulate blood circulation. Its long-term consumption brings joy to the heart and also treats palpitations". According to ancient Uyghur medical texts, "in ancient times, officials used this medicine to treat illnesses such as heart pain, palpitations, and dyspepsia". It can be seen that *C. sativus* L. has the effects of treating heart disease, nourishing the skin, protecting the liver, opening qi stagnation, dissipating wind, promoting liver and spleen meridians, generating fluids, and strengthening the body.

3 Chemical component and pharmacological effects

3.1 Chemical component *C. sativus* L. contains approximately 150 compounds, but chemical structure of its compounds is not yet fully understood. The main chemical components are crocin, triterpenoid saponins, chlorogenic acid, isochlorogenic acid, flavonoids, alkaloids, volatile oils, and carotenoid compounds.

3.2 Pharmacological effects Research has shown that crocin has a certain therapeutic or preventive effect on hypertension, hyperlipidemia, and other cardiovascular diseases. It also has health benefits such as preventing and treating various geriatric diseases and anti-aging.

3.2.1 Enhancing physical fitness and protecting the heart. *C. sativus* L. has an excitatory effect on respiration, which reduces the damage to myocardial cells caused by intense exercise and has a protective effect on the heart to some extent. Under hypoxic conditions, it can enhance intracellular oxygen metabolism and improve the heart's ability to withstand hypoxia.

3.2.2 Preventing common geriatric diseases. Modern pharmacological research has shown that *C. sativus* L. has an inhibitory effect on heart contraction and can effectively prevent and treat

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common diseases such as cerebral thrombosis, myocardial infarction, and neurasthenia in middle-aged and elderly people.

3.2.3 Regulating the liver, reducing cholesterol, and promote bile flow. *C. sativus* L. has the effects of clearing heat and detoxifying, protecting the liver and reducing jaundice, promoting the elimination of hepatitis viruses, and reducing the burden on liver function. In addition, *C. sativus* L. improves fatty liver symptoms by enhancing fat metabolism. The crocetin component in *C. sativus* L. has a certain lipid-lowering effect, while promoting bile secretion and excretion.

3.2.4 Nourishing blood and beauty. Modern medicine believes that most common diseases in women are caused by endocrine disorders. *C. sativus* L. is one of the best blood nourishing and blood activating drugs, and nourishing blood is the best way to regulate endocrine function. So most women use *C. sativus* L. to beautify themselves through its blood nourishing and activating functions.

4 Therapeutic effects of cardiovascular and cerebrovascular diseases

Currently, cardiovascular disease has become the second leading killer among middle-aged and elderly people, second only to malignant tumors. According to incomplete statistics, the number of cardiovascular disease patients in China has approached 300 million. Currently, 2 out of 10 adults suffer from cardiovascular disease, and this proportion will continue to increase in the future. There is also a trend of onset of cardiovascular diseases in younger people.

4.1 Manifestations of cardiovascular and cerebrovascular diseases Cardiovascular and cerebrovascular diseases can be divided into four stages based on the progression of the condition: early, middle, late symptoms, and typical symptoms. The main manifestations of early symptoms are dizziness, headache, elevated blood pressure, poor sleep, and general fatigue. Early symptoms of cardiovascular and cerebrovascular diseases can be relieved by resting and adjusting mood. The main manifestations of mid-term symptoms are dizziness, worsening headache, chest pain, and physical and language disorders. Rest can partially alleviate the condition. Late-stage symptoms: angina pectoris, consciousness disorders, organ dysfunction, *etc.* Typical symptoms: worsening chest pain, difficulty breathing, palpitations, shortness of breath, chest tightness, headache, vomiting, cold hands and feet, *etc.*

4.2 *C. sativus* L. and cardiovascular and cerebrovascular diseases *C. sativus* L. can improve blood circulation and has significant therapeutic effects on coronary heart disease and angina pectoris. It also has anti thrombotic, cholesterol lowering, and blood viscosity reducing effects, with significantly lower adverse reactions compared to other drugs. *C. sativus* L. can enhance the body's endurance, improve immune function, resist bacteria and inflammation, promote blood circulation and remove stasis, thereby strengthening the body's immune system. It plays a role in regulating the circulation of qi and blood and balancing yin and yang in the body. It can also prevent myocardial ischemia and protect nerve cells. Professor Hu Weiqin, a renowned Chinese medical expert and healthcare physician who has served both domestic and foreign leaders, stated that in addition to large coronary artery blockages, many microvascular functions may also be affected in patients with cardiovascular diseases. Western medicine can basically solve large vessel obstruction, but for microvessels below 200 μm, the efficacy of "promoting blood circulation and removing blood stasis" by traditional Chinese medicine is more significant. Dietary therapy is a characteristic of traditional Chinese medicine treatment, and *C. sativus* L. has anti convulsive, anti depressive, and anti anxiety effects. Its long-term consumption can also improve memory disorders.

5 Prospects

C. sativus L. mainly has functions such as promoting blood circulation and removing blood stasis, nourishing blood, replenishing blood, and regulating blood. It is known as the "divine herb for treating all diseases" and is a holy food in traditional Chinese medicine for preventing and treating cardiovascular diseases, promoting blood circulation, and removing blood stasis. Cardiovascular and cerebrovascular diseases are mainly caused by qi stagnation and blood obstruction, so *C. sativus* L. has good medicinal value in the prevention and treatment of cardiovascular and cerebrovascular diseases. Through in-depth research on the active ingredients and therapeutic effects of different parts of *C. sativus* L., it is believed that new drugs for treating cardiovascular and cerebrovascular diseases will be developed in the near future, creating certain social benefits and economic value.

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