

Chemical Composition and Pharmacology Research Progress of Shenlingbaizhu Powder

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Abstract: Shenling baizhu powder is song dynasty official texts the clearing damp square, in the pharmacopoeia and agent by white hyacinth bean, lotus seed, atractylodes, poria cocos, yam, coix seed, radix glycyrrhizae, radix platycodi, ginseng, amomum villosum of ten herbs, with spleen and stomach, profit lung gas, used in the spleen and stomach weak, eat less loose stools, shortness of breath, coughing, weakness of limbs tiredly, eating into, more trapped less force, filled with the new choke, palpitations asthma, vomiting, diarrhea, and typhoid fever cough etc. In this paper, the composition, pharmacological action and pharmacological action of each flavor of shenling baishu powder are reviewed, which provides reference for the further application of this prescription.

1. Introduction

Shenlingbaizhu Powder is a famous dampness removal medicine in the official book "He Ji Ju Fang" of the Song Dynasty. It consists of medlar, yam, coix seed, white lentils, lotus seeds, atractylodes, licorice, platycodon, ginseng and Amomum. The doctors of the past generations believed that this side has the effect of replenishing the spleen and stomach and benefiting the lungs. It is used for the treatment of spleen and stomach weakness, eating less stool, shortness of breath cough, fatigue of limbs, poor appetite, less sleepiness, suffocation, palpitations, vomiting, diarrhea, typhoid and cough. In recent years, through clinical research, the application of this party has been expanding. It is used in the treatment of various chronic diseases such as gastritis, colitis, nephritis, diarrhea, otitis media, gastrointestinal disorders, gastrointestinal side effects caused by radiotherapy and chemotherapy, pediatric malnutrition, central serous chorioretinopathy, etc. ^[1] Domestic and foreign scholars have carried out various experimental researches on Shenlingbaizhu Powder, involving chemical components, pharmacological effects and mechanisms, and pharmacokinetics. This paper summarizes the literature research as follows, laying the foundation for the study of the efficacy of Shenlingbaizhu Powder.

2. Research of the Composition of Shenlingbaizhu Powder

The prescription of this prescription is ginseng, atractylodes and medlar. The main effect is to strengthen the spleen and stomach. Ginseng has a sweet smell and a human form. It is mainly used to supplement the five internal organs. Atractylodes has a lot of fat, which can relieve the dryness of the spleen and treat the cold and dampness. It is an essential medicine for reconciling the spleen. It grows under the roots of ancient pines in the mountains and gathers the essence of pine and rustic. "The wood is tempered and pivoted, and it is rustic and safe." It helps the spleen and stomach to rotate inside and outside, and traffic up and down; Chinese herb is yam, lotus seed, white lentils, and coix seed. They help the medicinal herbs to strengthen the spleen and replenish qi and infiltrate the spleen and stomach, and the spleen and stomach cannot be transported by water in time to be infiltrated and diarrhea; Chinese herb adjuvant is a fragrant amomum, which can awaken the spleen, good appetite, warm spleen and diarrhea; The prescription is made of fried platycodon grandiflorum and fried licorice. The platycodon is known as the "drug of the drug". It can "put the medicine

without sinking", and the lungs are good for gas, the water channel is tuned, and the licorice is sweet. It can strengthen the spleen and the middle, and reconcile the various medicines in the prescription.^[2]

3. Chemical Research of Shenlingbaizhu Powder

3.1. Chinese Herbal Medicine Research.

3.1.1. Radix Ginseng.

Radix Ginseng is the dried roots and rhizomes of *Panax ginseng* C. A. Mey., which is more than autumn harvested, washed and dried or dried. Cultivated products are commonly known as "Gardens", and they are planted in the wild state of the forest. They are called "Linxia Mountain Ginseng" and are called "seed sea"^[3]. The main chemical components of ginseng include sugars, volatile components, saponins, nitrogenous compounds, peptides, flavonoids, organic acids and their esters, enzymes, proteins, sterols and their glycosides, lignin, inorganic elements and vitamins. Studies have shown that its main active ingredients are ginsenosides and ginseng polysaccharides. Ginseng has a variety of pharmacological effects such as enhancing memory, improving immunity, improving cardiovascular, delaying aging and anti-tumor.

3.1.2. Rhizoma Atractylodis Macrocephalae.

Rhizoma Atractylodis Macrocephalae is a dried rhizome of the *Atractylodes macrocephalae* Koidz. In the winter, when the lower leaves are yellow and the upper leaves become brittle, the excavation is carried out, and the sediment is dried or dried to remove the fibrous roots.^[3] The main chemical constituents of Rhizoma Atractylodis Macrocephalae include atractryrone, Rhizoma Atractylodis Macrocephalae lactone I, Rhizoma Atractylodis Macrocephalae lactone II, Rhizoma Atractylodis Macrocephalae lactone III, Rhizoma Atractylodis Macrocephalae lactone, Rhizoma Atractylodis Macrocephalae lactam, Juniper brain, β - Acetic acid fragrant alcohol acetate, β -ester sterol, dandelion sterol acetate, γ -quinone sterol, uridine, and the like. Rhizoma Atractylodis Macrocephalae has a variety of pharmacological effects such as spleen and qi, dampness and dampness, antiperspirant, and fetus.

3.1.3. Poria.

Poria is the dried sclerotium of the Polyporaceae fungus *Poria cocos* (Schw.) Wolf. It is harvested from July to September. After excavation, the sediment is removed, and the sweat is piled up and spread to dryness. "Sweat", repeated several times to the current wrinkles, the internal moisture is mostly lost after the shade; or cut the fresh Poria Cocos into different parts and dry it to make a Poria Cocos block and a Poria Cocos piece.^[3] Poria Cocos is rich in chemical constituents, including triterpenoids, diterpenoids, sterols, ethyl- β -D-glucopyranoside, L-uridine, trimethyl citrate, (R) - Malic acid dimethyl ester, carotenoid, polysaccharide, and the like. Poria has pharmacological effects such as immune regulation, diuresis, liver protection, anti-oxidation and anti-viral tumors.

3.1.4. Rhizoma Dioscoreae.

Rhizoma Dioscoreae is the dried rhizome of *Dioscorea opposita* Thunb. In the winter, after the stems and leaves are withered, the roots are removed, washed and the outer skin and fibrous roots are removed, dried to make the Maoshan tablets, or the outer skin is removed and the fresh slices are dried to make a mountain tablet. Or choose the dried Rhizoma Dioscoreae that is fat and straight, put it in clear water, soak it in no water. After suffocating, cut both ends into a column with wooden boards, dry and light, and make light Rhizoma Dioscoreae.^[3] The main components of Rhizoma Dioscoreae include fatty acids, proteins and amino acids, esters and other components, polysaccharides, glycoproteins, trace elements, choline, mannan, phytic acid, 3, 4-dihydroxyphenylethylamine, Rhizoma Dioscoreae, Polyphenolase and the like. Rhizoma Dioscoreae has the pharmacological effects of improving immune function, improving digestive

function, lowering blood sugar, lowering blood fat, anti-oxidation, delaying aging, anti-tumor, anti-mutation, promoting kidney regeneration and repairing acid-base balance.

3.1.5. Semen Coicis.

Semen Coicis is a dry mature seed of the genus *Coix lacryma-jobi* L. var. *mayuen* (Roman.) Stapf. When the autumn fruit matures, the plants are harvested and dried, and the fruits are dried and dried, and the outer shell, yellow-brown seed coat and impurities are removed, and the kernels are collected. [3] The main chemical components of Semen Coicis include esters, unsaturated fatty acids, sugars and lactams. Among them, esters are the first to be found to have antitumor activity and are the most reported chemical components. Semen Coicis has antipyretic, analgesic, anti-inflammatory, anti-oxidant, anti-tumor, hypoglycemic, hypolipidemic, immune-enhancing effects, promote ovulation, inhibit osteoporosis, anti-ulcer, antidiarrheal, and abortion pharmacological effects.

3.1.6. Fructus Amomi.

Fructus Amomi vulgaris is a dry mature fruit of the ginger family *Amomum villosum* Lour., the green shell sand *Amomum villosum* Lour. var. *xanthioides* T.L.Wu et Senjen or the Hainan sand *Amomum longiligulare* T.L.Wu. [3] Harvested in summer and autumn when the fruit is ripe, dried or dried at low temperature. The main components include volatile oils, saponins, flavonoid glycosides, organic acids, trace elements and the like. *Amomum villosum* has pharmacological effects such as anti-ulcer, anti-diarrhea, promotion of gastric emptying and gastrointestinal propulsion, choleric, analgesic, anti-inflammatory, anti-platelet aggregation and prolonged clotting time.

3.1.7. Radix Platycodonis.

Radix Platycodonis is the dried root of *Platycodon grandiflorum* (Jacq.) A.DC. In the spring and autumn, the excavation is carried out, and the roots are washed and removed, and the outer skin is peeled off or the outer skin is not peeled off and dried. [3] The main chemical components of Radix Platycodonis include total saponins of platycodon grandiflorum, polysaccharides, sterols and their glycosides, fatty oils, fatty acids and the like. *Platycodon grandiflorum* has a wide range of pharmacological activities such as expectorant, antitussive, anti-inflammatory, blood pressure lowering, blood sugar lowering, weight loss, anti-tumor, and human immunity.

3.1.8. Radix Glycyrrhizae.

The Radix Glycyrrhizae is the dry root and rhizome of the leguminous plant *Glycyrrhiza uralensis* Fisch, *Glycyrrhiza inflata* Bat. or *Glycyrrhiza glabra* L. It is excavated in the spring and autumn seasons, and the roots are removed. [3] The chemical composition of Radix Glycyrrhizae is complex, mainly flavonoids and saponins. *Glycyrrhiza* has adrenocortical hormone-like effects, anti-peptic ulcer, antispasmodic, anti-inflammatory and immunosuppressive effects and detoxification, antiviral, antitussive, anti-tumor, antibacterial, liver damage prevention, anti-aging, anti-arrhythmia, It inhibits the pharmacological effects of airway smooth muscle cell proliferation, hypolipidemic and anti-atherosclerosis.

3.2. Research Progress of Shenlingbaizhu Powder's Chemical Components.

In recent years, researches about the chemical constituents of Shenlingbaizhu Powder have focused on the determination of the content of ginsenosides. Shenlingbaizhu Powder works on the mass of matter in the square, which is essentially a collection of several chemical components. Wang Wei [4] and other tested the content of ginsenoside Rg1 in Shenlingbaizhu Powder; Liu Ning [5] and others determined the aflatoxin G2, G1, B2, B1; Wang Mengmeng [6] et al. measured the content of camphor, borneol and borneol acetate in this prescription. At present, the chemical composition of Shenlingbaizhu Powder is limited to in vitro assays, and there is still a lack of in vivo pharmacokinetic studies for Shenlingbaizhu Powder.

The pharmacokinetic study of traditional Chinese medicine compound has become a difficult point in research due to the diverse chemical composition and complex mechanism of action in the

compound. Pharmacokinetics focuses on the material basis and in vivo processes of clinical efficacy of drugs. Pharmacokinetic parameters can be used to guide clinical drug use, evaluate drug safety, and promote the development of new drugs. The pharmacokinetics of traditional Chinese medicine combined with pharmacokinetic methods, pharmacological methods and analytical techniques to study the in vivo metabolic kinetics of traditional Chinese medicines and their compounds is to reveal the essential properties of traditional Chinese medicine big data. And a powerful method to characterize its action law is of great significance for the guidance of clinical rational drug use.

At present, there are few studies on the pharmacokinetics of Shenlingbaizhu Powder at home and abroad. The pharmacokinetic analysis of the whole compound is still blank, and there is a lack of in-depth systematic research, which is urgent for further study.

4. Research into Shenlingbaizhu Powder's Pharmacological Effect

4.1. Study on the Efficacy of Shenlingbaizhu Powder.

4.1.1. Radix Ginseng.

Radix Ginseng has enhanced memory, improved hemodynamics, improved learning disabilities, and improved pharmacological activity such as hyperlipidemia, protection of myocardial tissue structure, improvement of myocardial function after ischemia, and anti-arrhythmia; Studies have shown that ginsenoside Rb has a significant central sedative effect, while Rb1, Rb2, and Rc mixed saponins have significant stability; Rg has central stimulating effects. Studies have confirmed that ginsenosides have a large dose of inhibition in the center, a small dose of excitatory effects. At the same time, studies have confirmed that ginseng crude neutral saponin has both calming and calming effects, as well as analgesic, muscle relaxation and cooling effects; Ginseng infusion can counteract convulsions caused by strychnine, cocaine and pentylenetetrazol, and reduce convulsion mortality.

4.1.2. Rhizoma Atractylodis Macrocephalae.

Rhizoma Atractylodis Macrocephalae is mainly used for tonifying spleen. Its medicinal properties are mild, with spleen and qi, dampness and dampness, antiperspirant and fetus. It is often used for spleen deficiency, edema, spontaneous sweating, bloating, diarrhea, fetal movement, sipping, dizziness, etc. In the digestive system, it has the functions of strengthening the spleen and replenishing qi, regulating the gastrointestinal movement, acting on the immune system to have anti-inflammatory, anti-tumor and anti-oxidation effects; acting on the urinary system has diuretic effect; at the same time, it has hypoglycemic effect.

4.1.3. Poria.

Poria is a commonly used traditional Chinese medicine, which has the effects of moisturizing, spleen and spleen. It is often used for edema, oliguria, dizziness, spleen deficiency, diarrhea, restlessness, convulsions and insomnia. Modern pharmacological studies have proven that Poria has the effect of reducing water swelling, liver protection, anti-tumor and immune regulation.

4.1.4. Rhizoma Dioscoreae.

Rhizoma Dioscoreae has the effects of nourishing yin and nourishing yin, replenishing spleen and lung Modern pharmacological research has proved that it has anti-oxidation, blood sugar lowering, and lowering blood fat. It has protective effect on renal ischemia-reperfusion injury, has protective effect on liver injury, and has immunoregulation, anti-tumor and anti-mutation effects.

4.1.5. Semen Coicis.

Semen Coicis has the functions of strengthening the spleen and dampness, clearing away heat and removing pus, removing phlegm and stopping diarrhea. Clinically, it can be used for the treatment of edema, athlete's foot, wet phlegm, spleen diarrhea, dysuria, lung sputum, intestinal fistula, flat warts and other diseases. Modern pharmacological studies have proved that it has anti-tumor effect, regulation of blood sugar and blood lipids, anti-coagulation, analgesic and

anti-inflammatory, plays a certain role in cellular immune function, and resists arterial thrombosis. Studies have been conducted to treat rat tissue in vitro by water-soluble extract of Semen Coicis. The results demonstrate that it has the ability to inhibit osteoporosis in rats and may be a health food that is beneficial for the prevention of osteoporosis.

4.1.6. Fructus Amomi.

Fructus Amomi has the effect of treating wind, cold and dampness, warming and relieving pain. In the digestive system, it can inhibit the gastric acid secretion and enhance the gastric mucosal defense factor to play the role of gastric protection, gastric emptying, increase the contraction amplitude of gastrointestinal movement and dependence on concentration, diarrhea and other effects; at the same time, it is reported that Amomum villosum has analgesic and anti-inflammatory effects.

4.1.7. Radix Platycodonis.

Platycodon grandiflorum is often used to treat cough, chest tightness, sore throat, dumbness, lung phlegm and pus, sore pus. It has high edible and medicinal value, can be antipyretic, anti-inflammatory, lowering blood sugar, lowering blood fat, antitussive, anti-tumor, and improving immunity. At the same time, it has been reported in the literature to be anti-fatigue and anti-obesity.

4.1.8. Radix Glycyrrhizae.

Radix Glycyrrhizae has been used as a top-grade medicine for reconciling various medicines, and its pharmacological activity has been continuously studied. The pharmacological activity of licorice is summarized as anti-inflammatory, anti-tumor, and can reduce the free radicals in the process of stroke to achieve brain protection. At the same time, it has anti-aging, antibacterial, immune regulation, anti-allergy and other effects.

4.2. Shenlingbaizhu Powder's Full-effect Study.

The doctors of the past thought that Shenlingbaizhu Powder has the functions of tonifying the spleen and stomach, benefiting the lungs, and can be used for spleen and stomach weakness, eating less stools, eating less, less sleepy, shortness of breath, coughing, fatigue, palpitations, vomiting, vomiting, vomiting and diarrhea, and typhoid cough and so on. In recent years, the application of this side has been continuously expanded through clinical research. It can treat various chronic diseases such as gastritis, colitis, nephritis, diarrhea, otitis media, gastrointestinal disorders, gastrointestinal side effects caused by radiotherapy and chemotherapy, pediatric malnutrition, central serous chorioretinopathy, etc. .

Li Xiaobing et al ^[7] studied the immune regulation of intestinal regulatory T cells in mice with ulcerative colitis. The results showed that the side can exert intestinal mucosal immune function by increasing the number of CD25+, CD4+, and Foxp3+ regulatory T cells in the intestine; Bi Dianyong et al ^[8] explored the effects of this prescription on the expression of IL-1, IL-4 and p38MAPK gene proteins in rats with spleen-deficiency and ulcerative colitis. The results showed that it can regulate the expression level of the above gene and play a role in protecting the colonic mucosa; Jin Ling et al ^[9] studied the effects of this prescription on the nuclear factor E2 related factors in liver tissue of rats with nonalcoholic fatty liver disease induced by high fat diet and studied its influence on related signaling pathways. The results showed that this prescription can significantly improve liver fat metabolism disorder in rats with non-alcoholic fatty liver disease induced by high-fat diet, and at the same time reduce liver lipid accumulation; Liu Yuhui et al ^[10] studied the effects of this prescription on the damage of intestinal crypt epithelial cells induced by lipopolysaccharide and its mechanism. The results showed that it can inhibit the intestinal epithelial cell damage induced by LPS by inhibiting the activation of p38MAPK, phosphorylated ERK1/2 pathway protein and TNF; Zhang Guangxia et al ^[11] compared the effects of different spleen prescriptions including the prescription on water and salt metabolism and water transport in rats with spleen deficiency. The results show that this side has the strongest effect on the imbalance of water and salt metabolism.

At present, the pharmacological effects of Shenlingbaizhu Powder are still being further studied. With the further study of pharmacology of this side, the clinical research and new drug preparation research will be further promoted.

4.3. Prospect.

Shenlingbaizhu Powder on the regulation of nonalcoholic fatty liver disease, immune function, intervention of Chinese medicine spleen deficiency syndrome, gastrointestinal motility and intestinal flora. This indicates that Shenlingbaizhu Powder can regulate the expression of related mRNA and functional proteins, thereby preventing the occurrence and development of NAFLD; regulate the function of related immune cells, improve the body's immune function; increase or decrease the number of corresponding intestinal bacteria, restore the balance of intestinal flora, and protect intestinal mucosal tissues; it can improve gastrointestinal motility in both directions, treat gastric motility or diarrhea, and provide guidance and reference for related Chinese medicine research.

At present, scholars at home and abroad have conducted a comprehensive study on the pharmacological effects of Shenlingbaizhu Powder, mainly for the study of gastrointestinal diseases. At present, there are still studies that prove that it has a certain effect on other diseases related to the spleen and stomach. It has been applied to the treatment of more and more diseases and has opened up new fields. This will provide important academic value for the basic research of Shenlingbaizhu Powder, further promote the application of this party and make corresponding contributions to the development of Chinese medicine.

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