Modern Research and Analysis of Notoginseng Flower

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Abstract. Notoginseng flower has the effect of tranquilizing and allaying excitement, anti-inflammatory and analgesic, reducing fat and reducing pressure and enhancing immunity. It has good curative effect on hyperlipidemia, hypertension and insomnia. With the confirmation of its efficacy, there are more and more medicinal products and health products of Notoginseng flower in the market. The chemical composition of Notoginseng flower is similar to that of Notoginseng, which can replace Notoginseng as medicine to a certain extent, which meets the needs of consumers. In order to further promote the development of Notoginseng flower, it is necessary to discuss the medicinal value of Notoginseng flower.

Introduction

The Notoginseng flower is the dried flower of Panax Notoginseng(burk.), which is rich in nutrients and functional ingredients. The flower is also known as tianqi flower, which is one of the herbal medicines to reduce blood pressure and fight cancer. As a drug, it is selected in yunnan herbal medicine. Recent studies have shown that the content of saponins is abundant in the Notoginseng flower, which is the high content of saponins in the whole plant. Therefore, compared with the dry root and stem of Notoginseng, the prevention and treatment of cerebrovascular diseases has more medicinal significance. Clinical application shows that Notoginseng flower has good effect on hyperlipidemia, hypertension, sub-health state insomnia, dizziness, tinnitus and other diseases. Due to the limited use of the area, the economic value of the medicinal materials is not fully utilized, so the research is also weak. Based on the main chemical composition, pharmacodynamics and clinical application of Notoginseng flower, this paper discusses its development and utilization value, and provides reference for the further research and development of Notoginseng flower.

Chemical Composition

Saponins

Saponins are widely found in natural products, and they are the main physiological active ingredients of most Chinese medicinal herbs. As an effective component of the anti-hypertension of Notoginseng flower, the enrichment and purification of total saponins from Notoginseng flower has been well developed. Using D101 macroporous adsorption resin, the total saponins were purified with a concentration of 25.01 mg·ml⁻¹[3]. There are more than 20 kinds of saponins in the Notoginseng flower, which mainly include Notoginseng saponin, ginsenoside, gynogenin, etc[4]. However, the medicinal value of the Notoginseng flower has not been fully explored. With the continuous deepening of the research on the Notoginseng flower, the new saponins are extracted, separated and identified. Six glycosides I, six glycosides and acetyl Rb1 are the newly discovered glycosides. High performance liquid chromatography (HPLC) was used to detect the variety of saponins, the two kinds of saponins with high content in the panax are ginsenoside Rb1 and Rb3, which may be the main active ingredient[5].
Volatile components

The method of extraction, separation and identification of volatile oil is also relatively mature, such as gas phase chromatography and temperament combination. But the volatile component extraction is relatively difficult, the wall of easy adsorption is the content of loss, resulting error in the determination of the composition and content. In the light of the difficulty of trace oil collection, some scholars used the simultaneous distillation extraction plant to extract the volatile components of the Notoginseng flower, and analyzed the composition of the composition by gas chromatography-mass spectrometer. The volatile components of the Notoginseng flower are mainly terpenes and their oxygen-containing derivatives, followed by long chain fatty acids and their esters, which have potential medicinal development value[6].

Flavonoid compounds

Due to the high content of saponins, saponins have a good practical basis for cardiovascular and cerebrovascular diseases. Therefore, there are relatively few studies on the flavonoids in Notoginseng flower. However, in a variety of studies and reports, the pharmacological action of flavonoids in Chinese medicine is widely used, and it is the basis of the pharmacodynamic material that plays an important role in the treatment of various herbs. The extraction, isolation and identification of flavonoids were also developing in the new phase. Different extraction methods, extraction solvents and ultraviolet spectrophotometric determination showed that the total flavonoids contained in the Notoginseng flower were 1.43%, second only to the leaves of the Notoginseng[7]. However, the identification of the flavonoids in Notoginseng flower was still in the content determination stage of total flavonoids, and there was little literature on the isolation and identification of flavonoids alone. Therefore, the in-depth study of flavonoids in the Notoginseng flower will become an indispensable step in the comprehensive utilization of Notoginseng flower.

Others

There are a variety of sugars in the Notoginseng flower, extraction and identification showed that the polysaccharide compounds of the Notoginseng flower were composed of monosaccharides, such as arabinose, glucose, rhamnose, galactose, xylose and mannose[8]. Phenolic compounds have many antioxidant activities, and the polyphenols contained in Notoginseng flower are higher than those of Notoginseng root. The extraction process of the polyphenol was optimized by response surface method, and the extraction amount was 58.95 mg/g.

Pharmacological Effects

Analgesia and Anti-inflammatory

Notoginseng flower is rich in saponins. The analgesic and anti-inflammatory pharmacological effects of saponins have been studied since the 1970s and 1980s. Verification documents, Notoginseng flower saponins concentration within a certain range (50-100 mg/kg) has obvious inhibitory effect on the model of rat foot swelling caused by carrageenan, 5-hydroxytryptamine and kaolinide, inflammatory model of mouse ear in mice caused by croton oil and changes in capillary permeability caused by bradykinin, 5-hydroxytryptamine and histamine[9]. Notoginseng flower total saponins of water gel can improve the rat acute skin wound model of wound healing rate and reduce wound infection, promote wound inflammatory exudate absorption and hyperplasia of epidermis, showed significant anti-inflammatory effect[10].

Expand blood vessels and lower blood pressure

Hypertension is related to the imbalance of potassium ions inside and outside concentration of a cell. Moderately dilated blood vessels and inhibitory vascular motor centers can lower blood pressure to a certain extent, relieve the discomfort symptoms of hypertension patients and delay the occurrence of related complications. The hypotensive effect of the Notoginseng flower originates from folk's empirical application, but it lacks the exact function and mechanism support. The
validation of pharmacodynamics can clarify the effect of Notoginseng flower and provide theoretical basis for its further application in clinical practice. In vitro pharmacological studies have shown that total saponins of the Notoginseng flower have a diastolic effect on the preshrunk rat isolated thoracic aorta caused by high concentration $K^+$ and phenylephrine precursors[11]. In vivo animal experiments showed that the total saponins of Notoginseng flower could reduce the systolic and diastolic blood pressure in spontaneously hypertensive rats without changing the heart rate, and there was an obvious quantitative relationship[12]. Several experimental studies have provided relevant evidence for the application of Notoginseng flower, and it is beneficial to the exploration of its mechanism of action.

**Invigorate blood circulation and promote angiogenesis**

The change of blood viscosity and microblood flow plays an important role in the development of cerebrovascular diseases. The treatment of these diseases of Notoginseng flower is derived from folk experience. Now the animal experiments show that Notoginseng flower ingredients like saponin can reduce spontaneous hypertensive rats plasma viscosity, whole blood low shear viscosity, whole blood high shear viscosity and erythrocyte rigidity index, increase the RBC deformation index, increase its erythrocyte deformation index, and then improve the effect of hemorrheology. The study suggested that the Notoginseng flower may have the effect of activating blood circulation[13]. The lack of angiogenesis is the common factor that most diseases are difficult to cure and progress slowly, and the research on promoting angiogenesis drugs is of great significance to the prevention and treatment of related diseases. Based on the efficacy of Notoginseng flower for activating blood circulation and removing blood stasis, this paper studies its effect on promoting angiogenesis in zebrafish model. The results showed that the total saponins of Notoginseng flower had the effect of promoting angiogenesis and protecting blood vessels, and the efficacy was significantly higher than that of Notoginseng total saponins[14].

**Others**

The Notoginseng flower has many pharmacological effects. Oxidative stress, free radical damage is driving force in the development of a variety of diseases, with increase of Notoginseng flower polyphenol content and DPPH free radical clearance rate is higher, shows that Notoginseng flowers have antioxidant effects[15]. Notoginseng flowe capsule can shorten the sleep latency of mice and prolong the sleep time of mice, suggesting that it has the function of improving sleep function and tranquilization[16]. In addition, Notoginseng flowe also has the function of protecting the heart[17] and inhibiting the expression of proto-oncogene[18].

**Clinical Application**

As a famous Chinese medicine and high quality food and health care products, Notoginseng flower is commonly used in folk medicine to treat diseases such as dizziness, tinnitus, laryngitis and hypertension. With the continuous discovery and confirmation of the pharmacological action of Notoginseng flower, the scope of it in clinical application is also expanding.

The incidence of high blood pressure is high, often accompanied by a variety of organic disease, effective control of blood pressure and maintain normal activity of plasma factor is of great significance to prevent the development of hypertension complications. The control of blood pressure and the change of plasma factor level were used as the evaluation indexes for the treatment of hypertension. Compared with Jane chrysanthemum antihypertension tablet, Notoginseng flower can significantly improve the patients’ blood plasma fibrinolytic enzyme original activators (t-PA) level, reduce the original plasma tissue fibrinolytic enzyme inhibitor (PAI), blood vessels false willebrand factor WF (v) levels, and have the advantage of incidence of adverse reactions[19]. One of the most prominent features of subhealthy people is insomnia, and sub-health does not cause serious injury to the body. It is an intermediate state between health and disease state. However, the lack of sleep can aggravate the mental burden of sub-health patients, which can lead to organ disease and low immune function. The pharmacological experiments confirmed that the sanqi
flower had a good sedative effect. The pharmacological experiments confirmed that the Notoginseng flower had a good sedative effect. Making the assens insomnia integral and TCM syndrome score as the evaluation index of the symptom relief of patients with insomnia (liver qi stagnation) in the patients. Compared with orally glutamate, Notoginseng flower can significantly improve patients, TCM syndrome points, assens insomnia points and single symptom integrals to improve the sleep quality of patients.[20].

Prospect

Notoginseng flower is a traditional Chinese medicine, which contains a variety of chemical and functional components. It has analgesic anti-inflammatory, dilated blood vessels, lower blood pressure, promote angiogenesis and antioxidant and other pharmacological effects. Notoginseng flower contains a variety of trace elements, and K, Na, Ca, Mg, P and S are essential elements of human body to maintain the supply of human nutrition. Fe, Zn, Cu and Ni are trace elements, which play an important role in human biological effects. However, Notoginseng flower is mainly used as tonic in the field of health care and health care, and there is less convenience in the treatment of diseases. Notoginseng flower contains the same active ingredient as the Notoginseng, thus, they should both has the similar pharmacological action and clinical application range.

Notoginseng flowers were applied in the field of folk medical treatment and health care, chemical composition and pharmacological effects of notoginseng flower research more concentrated in saponins, and the sum of other components is far less than that of saponins. In addition to the studies on the identification of saponins and volatile oils, the components of flavonoids, polysaccharides and polyphenols were not alone extracted, isolated and identified. Although the extraction, separation, and content determination of saponins from Notoginseng flowers are more than that, their application in clinic is far from consistent. In the process of inquiring into the related literature of Notoginseng flowers, it was found that the Notoginseng flowers was only limited to the clinical application of hypertension patients. Few literatures have been used in the prevention and treatment of pharyngitis, tinnitus, dizziness and other diseases. This indicates that the Chinese medicine field has not made full use of the Notoginseng flowers. We should devote our efforts to the development of clinical new drugs related to Notoginseng flower, expand its application in disease, and develop new dosage forms and drugs.

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Reference


