Research Progress on Chemical Constituents and Pharmacological Effects of Atractylodes Chinensis

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Abstract: Atractylodes chinensis is a kind of crude drug in traditional Chinese medicine, mainly distributed in Heilongjiang, Liaoning, Jilin, Inner Mongolia, Hebei and other places, with a variety of chemical components and pharmacological effects. This paper reviews the research progress of chemical constituents and pharmacological effects of Atractylodes chinensis, providing a theoretical basis for the follow-up research and clinical rational drug use of Atractylodes chinensis.

1. Introduction

The chemical composition of Chinese herbal medicine is relatively complex, but it is these complex chemical components that directly affect the clinical efficacy. Therefore, the systematic analysis and research on the chemical composition and pharmacological effects of Chinese herbal medicine is of great significance for the better use of Chinese herbal medicine in clinical practice.

Atractylodes was included as dry rhizome of Atractylodes lancea (Thunb.) DC. or Atractylodes chinensis (DC.) Koidz. in Pharmacopoeia of the People's Republic of China (2020 Edition), mainly used to dry dampness and invigorate spleen, dispel wind and disperse cold, and clear eyes. It is also used to treat dampness obstructing the center burner, abdominal distension, diarrhea, edema, flaccidity of feet, rheumatism, cold, night blindness, and blurred eyes [1]. Atractylodes chinensis is mainly distributed in Heilongjiang, Liaoning, Jilin, Inner Mongolia, Hebei and other places, and the content of atractylodin in Atractylodes chinensis produced in Chengde is better than that in Inner Mongolia and Liaoning [2].

2. Chemical Constituents of Atractylodes Chinensis

The main chemical constituents of Atractylodes chinensis are terpenoids, polyene alkynes, steroids and acyl sugarcane. In addition, it also contains phenylpropanopyrans, benzoquinones, coumarins, phenolic acids, furaldehyde, alcohol glycosides, nucleosides and other derivatives.

2.1 Terpenoids

According to modern research reports, the chemical constituents of Atractylodes chinensis are mainly terpenoids, including eucalyptus sesquiterpenes, guaiacane sesquiterpenes, vetiverspirane sesquiterpenes, menthol type sesquiterpenes, oleanol pentacyclic triterpenes, ursolic pentacyclic triterpenes, betulinan pentacyclic triterpenes, and irimophene type sesquiterpenes [3].

2.2 Polyene Alkynes

It has been reported that many polyene alkynes in Atractylodes chinensis are 4,6-diynes, which can be divided into C10 enyne, C13 enyne, C14 enyne, furan ring polyene and thiophene ring polyene.
2.3 Steroids

The reported steroids in Atractylodes chinensis are relatively few. Ding and some others isolated two steroids from the acetone extract of Atractylodes chinensis [4].

2.4 Acyl Sucrose

Tanaka and some others analyzed and studied the water extract of Atractylodes chinensis by liquid chromatography-mass spectrometry, and obtained 6 chromatographic peaks of acyl sugarcane derivatives. After separation and purification by column chromatography, three new chemical components of acyl sucrose were identified and resolved [5].

2.5 Other Constituents

In addition, in Atractylodes chinensis, the chemical constituents reported also include lignans, coumarins, alkaloids, glycosides, nucleosides and other derivatives.

3. Pharmacological Effects of Atractylodes Chinensis

3.1 Effects on Digestive System

Zhang Mingfa and some others found that the main pharmacological effects of Atractylodes chinensis on digestive system include anti gastric ulcer, promoting gastric emptying, regulating gastrointestinal propulsion movement, anti-diarrhea, cholagogic and liver protection, and improving digestion and absorption function [6].

Zhao Chunying and some others found that the alcohol extract of Atractylodes chinensis could inhibit the formation of ulcer in mice by gavage in mice with 5 g / kg and 15 g / kg of Atractylodes chinensis [7].

3.2 Effects on Liver Protection

Atractylodes chinensis in clinical application of traditional Chinese medicine generally does not need raw products. It is used for clinical application after stir frying with bran. Modern pharmacological studies have found that volatile oil of both Atractylodes chinensis and stir fried Atractylodes with bran had pharmacological effects on liver protection, and after bran frying, the liver protective effect of volatile oil is enhanced [8]. Tasis and some others found that both water extract and volatile oil of Atractylodes chinensis showed positive effect on liver protection, and the effect of volatile oil is stronger than that of water extract [9].

3.3 Effects on Antibiocical and Anti-Inflammatory

Through research, Zhang Mingfa and some others found that the 75% alcohol extract of Atractylodes chinensis can inhibit the ear swelling caused by xylene and the toe swelling caused by carrageenan [10].

3.3 Effects on Cardiovascular and Cerebrovascular System

Chen Hongyuan and some others reported that the water extract of Atractylodes chinensis after extraction with petroleum ether, ethyl hexanoate and acetone showed obvious inhibitory effect on angiotensin inhibitory enzyme [11]. Xu Yongjun and others found that the ethyl acetate extract of Atractylodes chinensis can promote the recovery of EEG amplitude after ischemia, reduce the content of MDA and intracellular Ca²⁺ concentration in brain cells, improve the activity of serum SOD, and reduce the pathological changes of brain tissue, showing that the extract has protective effect on cerebral ischemia-reperfusion injury, and the mechanism may be related to anti oxygen...
free radicals and inhibition of calcium overload [12].

3.4 Other Pharmacological Effects

In addition to the above pharmacological effects, Atractylodes chinensis also shows other pharmacological activities, such as antitumor, analgesic, immunomodulatory, diuretic and so on.

4. Conclusion

To sum up, modern pharmacological studies show that Atractylodes chinensis has positive pharmacological activities in gastric peristalsis promotion, anti-gastric ulcer, liver protection, anti-inflammatory, anti-cardiovascular and cerebrovascular diseases, hypoglycemic and other aspects. At present, the research on chemical constituents and pharmacological activities of Atractylodes chinensis is not enough, and the research on the mechanism of effective components needs to be further strengthened. Therefore, it is of great significance for clinical rational drug use and scientific development of traditional Chinese medicine resources to further combine and study the effective ingredients and pharmacological mechanism of Atractylodes chinensis.

5. Acknowledgment

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