Analysis of Medicinal Value of Gardenia Flowers

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Abstract. Purpose: To explore the chemical composition, medicinal value and edible value of gardenia flowers, and make rational use of traditional Chinese medicine resources. Methods: Through consulting the literature and relevant information to understand the chemical composition, medicinal and edible value of gardenia flowers, and summarized, actively respond to the "Modernization of Traditional Chinese Medicine Research" focus on the special call, the development of traditional Chinese medicine resources. Results: Gardenia flowers contain volatile oil, gardenia yellow pigment, amino acids, vitamins and trace elements, which have high medicinal and edible value. It should be further developed to lay the foundation for the development and clinical use of traditional Chinese medicine. Conclusion: Gardenia flowers is a kind of medicinal and edible plants, the analysis of gardenia flowers, fully embodies the recycling of traditional Chinese medicine "Non-Medicinal parts", the future should be in-depth study on its pharmacology and clinical aspects, give full play to the application value of gardenia flowers.

Introduction

Gardenia flowers are an ornamental, edible and medicinal plant of gardenia of Rubiaceae, which has high development and utilization value. Has the effects of purging fire, relieving restlessness, clearing away heat and promoting urination, cooling blood and removing toxic materials, and belongs to common Chinese medicinal materials. Gardenia in fruit, flowers, leaves, roots and other parts of the practical application of there are great differences. Fructus Gardenia fruit is used as medicine in Chinese pharmacopoeia. Gardenia pigment in gardenia fruits is a new natural pigment, which has a wide development prospect in the world \cite{1}. In recent years, there are few reports on gardenia flowers, leaves, roots and other parts of the study, its flowers, leaves, roots also exist in a variety of chemical components, has different pharmacological effects. In this paper, through the analysis of effective components in gardenia flowers, summed up its nutritional and health care and medicinal value, actively respond to the "Modernization of Traditional Chinese Medicine Research" focus on the special call, strengthen the "non-medicinal parts" of traditional Chinese medicine potential pharmacodynamic ingredients discovery, pharmacodynamic active ingredients research, comprehensive development of a variety of gardenia flowers natural safety products, has important practical significance.

Chemical Composition

At present, we have extracted the chemical constituents from the flower parts of gardenia, including iridoid, gardenia, flavonoids, diterpenoids, triterpenoids, organic acids, phenolic acids and so on\cite{2-3}. Feng Ning\cite{4} using macroporous adsorption resin, silica gel column chromatography and high performance liquid chromatography (HPLC) method to separate from the gardenia flowers and 10 compounds were identified, among them, the kaempferia galanga phenol 3-O-β-D-pyran glucoside, kaempferia galanga 3-O-rue glucoside, caffeic acid, protocatechuc acid was isolated from gardenia dry flowers for the first time. It also contains carbohydrates, protein, crude fiber and vitamins \cite{5-6}.
Gardenia Flowers Essential Oil

At present, the research on the gardenia flowers essential oil is concentrated on the analysis of the aromatic composition of gardenia flowers. He Tianping used Gardenia flowers as raw materials, and the essential oils of gardenia flower heads were obtained by supercritical CO$_2$ extraction technology. 49 components were identified by qualitative and quantitative analysis with gas chromatography-mass spectrometry (GC-MS). the essential oils were mainly aromatic compounds, of which linalool (46.02%) was the highest$^7$. Ren Hongtao used solvent extraction method and steam distillation to extract the volatile components of gardenia flowers to obtain gardenia flowers clean oil and gardenia flowers essential oil respectively. 61 compounds were identified in the purified oil of gardenia flowers by solvent extraction, and 47 compounds were identified in the essential oil of gardenia flowers by steam distillation, among which linalool content was higher$^8$. Gardenia flowers essential oil has strong ability to eliminate free radicals$^9$. Gan Xiuhai$^{10}$ found that gardenia flowers essential oil has strong ability to eliminate DPPH· and ABTS+, and the ability to eliminate DPPH· is stronger than ABTS+, but its ability to eliminate free radicals is weaker than VC. The scavenging effect of hydroxyl radical is enhanced with the increase of the concentration of the volatile oil of gardenia flowers, which provides a certain basis for the study and development of gardenia flowers oil$^{11}$. Gardenia flowers essential oil can be used to develop a variety of fragrance cosmetics, soap essence and high-grade perfume essence and other products to meet the diverse needs of people$^{12}$.

Gardenia Yellow Pigment (Flavonoids)

Gardenia yellow pigment in gardenia flowers is the main flavonoid compound, which has the effect of clearing fire, detoxifying, detoxifying and relieving inflammation, and it is the active ingredient of gardenia flowers$^{13}$. Flavonoids have obvious anti-ulcer, antispasmodic, anti-inflammatory and lipid-lowering activities$^{14-15}$. In recent years, research on the extraction of gardenia yellow pigment is increasing. There are few studies on gardenia flowers. Liu Xia$^{16}$ used microwave assisted enzymatic method was used to extract total flavonoids from gardenia flowers, and the treatment conditions were milder and the results were better. You Jian$^{17}$ using ultrasonic extraction method, the extraction process of gardenia yellow pigment in gardenia flowers was studied, and the optimum extraction process conditions were determined. It provides theoretical guidance for further development and utilization of gardenia flowers and industrialization of gardenia yellow pigment in gardenia flowers.

Amino Acids

The content of amino acids in gardenia flowers was as high as 7.3 %, and 17 kinds of amino acids were contained, among which 7 kinds of essential amino acids were leucine, isoleucine, valine, phenylalanine, methionine, threonine, lysine, etc. the content of amino acids was 26.7 mg·g$^{-1}$, accounting for 36.6 % of the total amino acids. The amino acids in gardenia are relatively comprehensive. it is a good way to supplement amino acids by processing gardenia flowers into food$^{18}$.

Vitamins and Trace Elements

The content of vitamin in gardenia flowers was E>B2>B1>A, and the content of VE and VB was relatively high. Trace elements play an important role in cell metabolism, biosynthesis and physiological functions of human body.

Gardenia flowers contains a variety of trace elements necessary for human body, the content of iron>zinc>manganese>copper>molybdenum> cobalt> selenium> germanium, and the content of macro elements in turn is calcium> phosphorus>magnesium>potassium> sodium. Li Kaiquan et al.$^{19}$ studied the vitamin of gardenia flowers for the first time, and determined the kinds and contents of trace elements. The results showed that gardenia flowers are rich in many vitamins and essential trace elements, and the content of trace elements is higher than that of raw gardenia. it is a valuable medicinal and edible plant resources.
Medicinal Value

Discussion on the efficacy of gardenia flowers

Gardenia flowers medicinal first seen in the South Yunnan Materia Medica. Cold, bitter taste, into the lung, liver meridian. Has effects in clearing away lung heat and cooling blood, and can be used for treating cough due to lung heat and epistaxis. "Southern Yunnan Materia Medica" records gardenia flowers "purging lung fire, check lung heat cough, check epistaxis, eliminate phlegm." Li Shizhen in his book “Compendium of Materia Medica” called it "yue color". Sun si miao “Qianjin Yifang” contains a method of making beauty cream with gardenia flowers. In addition, there are many ancient prescriptions for the use of gardenia flowers to treat disease records.

The “South Yunnan Materia Medica” recorded that gardenia flowers can cure cold, the lung has solid phlegm, solid fire, lung fever cough, gardenia flowers three, honey a few, Fried and taken together. Treat the nose bleed ceaselessly, gardenia flowers several pieces, roasting, grind to powder, blow into the nose.

In Tang dynasty, Sun Simiao's Qianjin Yifang records gardenia flowers and angelica dahurica, wax gourd kernel, wilt, asarum, wind, shanglu and other compatibility, thin cut, water damage for 6 days, has the efficacy of beauty and anti-aging.

In Song dynasty, Wang Huai yin, Chen zhaoyu and other "Taiping holy huifang" and In Ming dynasty, Zhu bo, "Puji Fang" are recorded in the gardenia flowers and clove, lingliang, peach kernel, windproof, angelica, musk, dodder and other combinations, can be used for the treatment of black on the surface. All surface diseases can be treated.

“Sheng Ji Zonglu” records gardenia flowers and concha haliotidis, actinolite, radix Angelicae dahuricae, poria, radix glycyrrhizae, cortex magnolia officinalis, etc. are used for treating eye diseases caused by qi deficiency of liver and kidney and wind-toxin attack.

Modern Applications

Gardenia flowers have the effect of clearing lung and cooling blood. Modern gardenia flowers is also more used in lung heat cough, epistaxis and other aspects.

**Clear Heat and Cool Blood.** Gardenia flowers bitter cold, can enter the blood and clear evil heat, is sore swollen poison, intestinal wind dysentery and other diseases of auxiliary treatment food. Has effects in treating epistaxis, relieving inflammation, and is convenient to apply. Baked gardenia flowers, grinding into fine pow, blowing a little into nasal cavity each time, and pressing with sterilized cotton plug. Gardenia flowers, Sophora flower 10 grams each, water decoction for 15 minutes, instead of tea, and can effectively treat epistaxis.

**Clear Lung and Stop Cough.** Gardenia flowers has the effect of clearing lung and relieving cough, is good for cooling blood and stopping bleeding, and can relieve lung heat. In addition, the effective components of gardenia flowers can inhibit bacterial growth, release sputum and unobstructed airway, has the effect of eliminating phlegm and relieving cough, and can effectively treat cough caused by hot phlegm obstruction.

**Relax Bowels and Prevent Cancer.** Gardenia flowers contain cellulose, which can promote bowel movement, help excretion of stool, and prevent the occurrence of hemorrhoids and rectal carcinomas.

Dietetic Effect

Many foods are drugs, and there is no absolute dividing line between them. Chinese medicine has been known since ancient times as a "Medicine and food homologous" theory. It is also written in Huangdi Neijing Tai Su that “fasting food is food and patients eat medicine”, which reflects the idea of “homology of medicine and food”. Gardenia flowers is a kind of medicinal and edible resources, its edible value, In Ming dynasty, Wang xiangjin "QunFangPu" records: "to big gardenia flowers edible good", hot summer, take gardenia flowers juice, mixed with cool and refreshing drink, not only bright color, but also has a good effect of relieving summer-heat, because the flowers are rich in aromatic oil, with it smoked the advanced flower tea, deep fragrance, unique flavor.
Gardenia Flower Tea

Gardenia 5-7 flowers, boiling water brewing, instead of tea drinking, has the role of treatment of dumb voice. Gardenia flowers 15 grams with white sugar 30 grams pickled half a day, each take a little, tea drink; Fresh gardenia flowers 9 - 15g, honey a little, add water decoction, can clear diarrhea lung heat, lung heat cough, lung dryness heat effect is better.

Gardenia Flower Food

Cold mix gardenia flowers: Gardenia flowers 500 grams, green onion, ginger in moderation. Clean the gardenia flowers and remove impurities, after boiling, drain the water and add seasoning and stir evenly. It has the effect of clearing heat and cooling blood and detoxifying the dysentery. It is suitable for lung fever cough, carbuncle, intestinal wind, blood and other diseases.

Gardenia egg flower: Gardenia flowers 200 grams, eggs 3, green onion, ginger in moderation. After removing impurities, the gardenia flowers is washed and boiled in boiling water to cut into pieces, put into eggs, and stir evenly; the pot is refueling, adding ingredients to stir fry. It has the effect of clearing heat and nourishing the stomach and wide intestine. It can be used for the symptoms such as bad breath of the stomach, swollen gums and bad bowel movements.

Stir-fry small bamboo shoots with gardenia flowers: 200 grams of gardenia flowers, 150 grams of shelled bamboo shoots, 100 grams of bacon, and appropriate amounts of scallion and ginger. After removing impurities, the gardenia flowers is washed and boiled in boiling water; Obliquely cutting bamboo shoots into thin slices; Cutting bacon into dices; Pour gardenias flowers, bamboo shoots and bacon into a pot together, stir-fry them for several times, and add ingredients. It has the functions of invigorating the spleen and appetizing the stomach, clearing away heat and promoting intestinal function and it is applicable to anorexia, less diet, and abdominal distention.

Gardenia Flower Soup: 150 grams of gardenia flowers, 100 grams of lean pork, 30 grams of pickled mustard tuber, the appropriate amount of chopped green onion and ginger. Gardenia Flower wash, slightly blanched, drained water; Pork cut silk. Boiling clear water, adding gardenia flowers, lean pork and pickled mustard tuber, and adding seasoning. It has the effects of nourishing stomach, invigorating middle energizer, clearing away heat and promoting bowel movement. It is suitable for physical deficiency and anorexia, intestinal bleeding, constipation, cough and expectoration, gum swelling and pain, etc.

Outlook

Gardenia is widely distributed in China, and its fruits are usually used as medicine. Its flowers are used as ornamental flowers in many areas, which is a great waste of medicinal resources. How to make use of these rich resources is the first task at present. Ancient Chinese medicine records of gardenia flowers were used to treat lung fever cough, nose bleeding and face diseases. In recent years to analyze the composition of gardenia flowers determination showed that the flower is rich in volatile oil, gardenia yellow pigment, flavonoids, amino acids and trace elements, such as gardenia folk also have application to diet, has the very high medicinal and edible value.

But at present, the related literatures only study the extraction and separation of the chemical constituents of gardenia flowers, and there is no literature report on the experimental, clinical application and dietetic therapy research of gardenia flowers. As a resource-rich and cheap medicinal and edible resource, if gardenia flowers is fully utilized as a renewable resource, its pharmacological activity and clinical application are deeply studied, and its new drug is developed and produced, and its application in food, cosmetics and other fields is developed, it will have high economic and social benefits, and its prospect is very broad, which should attract the attention of drug researchers and clinical workers.

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Reference


