

Modern research and application analysis of honeysuckle

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Abstract. Honeysuckle mainly contains organic acids, flavonoids, triterpenoid saponins, cycloenyl ether terpenes, volatile oils, trace elements and other chemical components. Antivirus, anti-oxidation, antipyretic, anti-inflammatory, anti-tumor pharmacological effects. This paper summarizes and discusses the medicinal value of Chinese honeysuckle from the five aspects of ancient book records, chemical composition, pharmacological action, clinical application and food and drug homology, and provides a theoretical basis for its application.

1. Introduction

Lonicera lonicerae is the open flower and dry bud of *Lonicera lonicera*, *Lonicera lonicerae*, *Lonicera lonicera* or *Lonicera lonicera*. Ancient books of traditional Chinese medicine record that it can clear heat and detoxify, cool blood and stop dysentery, evacuate wind and heat and dissipate heat toxin. It can be used for redness, swelling and nodules caused by heat toxin, etc. Clinically, it is mainly used to treat summer heat cold, heat syndrome caused by carbuncle, sore and sore throat, erysivias and blood stasis^[1]. From the two kinds of genuine medicinal materials of *Lonicera lonicera* in 1977 stipulated in the pharmacopoeia: *Lonicera lonicera* with red glands, *Lonicera lonicera* with south China (*Lonicera lonicera*), to the final stipulation of the 2015 edition of the pharmacopoeia that *Lonicera lonicera* with red glands, *Lonicera lonicera* with south China, *Lonicera lonicera* with grey hair, *Lonicera lonicera* with yellow brown hair as its genuine medicinal materials. Chlorogenic acid is the main active component of *flos lonicerae*, the highest content is the bud of *flos lonicerae*, the lowest content is the branch of *flos lonicerae*. Different processing methods of mountain honeysuckle can lead to significant differences in the content of effective ingredients^[2]. There are six processing methods of mountain honeysuckle, namely, steaming, drying, direct drying, dry in the dark, wine-roasting, slow-fire frying of yellow and fire-firing of carbon. Among them, the highest content of chlorogenic acid is steamed and dried, followed by direct drying. The processing method with the lowest content of chlorogenic acid is carbon frying^[3]. Mountain honeysuckle folk often make clear heat dietotherapy, at present mountain honeysuckle has been listed in the health and family planning commission of the latest release of "food and medicine homology" list.

1.1 Chemical composition1

Organic acids: there are a variety of organic acid compounds in *Lonicerae japonicae*, mainly 3, 4-dihydroxycinnamic acid and caffeoquinic acid ester. Among the chemical components contained in 3, 4-dihydroxycinnamic acid, chlorogenic acid compounds are not only the main components, but also one of the important indicators for the detection of *Lonicerae japonicae*. Two new compounds, one is lonicerol F and the other is lonicerol G, have been identified. In *Lonicera* genus for the first

time found sanguisorba saponins II, red glandular honeysuckle was first discovered in maeranthoidinA, maeranthoidinB, hyoscyamine pavilion, chlorogenic acid, west indican, beta sitosterol^[4].

1.2 flavonoids:

In the separation of flavonoids from flos lonicerae, flavonoids and flavonols were respectively taken as the basic parent nucleus. Received quercetin - 3 - O - beta - D - glucoside, yellow flavin, mignonette element - 3 - O - alpha - L - buckthorn indican, quercetin, saint grass phenol, alizarin - 7 - O - beta - D - glucoside, mignonette element - 7 - O - beta - D - galactose glucoside, rutin, eustostatine - 7 - O - new - heptyl indican, alizarin - 7 - O - new - heptene indican, rhizoma kaempferiae honeysuckle (red glands), rhizoma kaempferiae phenol - 3 - O - beta - D - glycosidase, geranyl lignin - 7 - O - beta - D - glucoside, celery - 7 - O - alphaL-rhamnoside, isorhamulin-3-o-beta-d-glucoside, luteolin 7-o-beta-d-glucoside, etc^[5]. the triterpenoid saponins beta-aromatic resinane accounted for the largest proportion of triterpenoid saponins in the extracts of Lonicera japonica^[6]. In the extraction of Lonicera japonica compounds, some of the triterpene saponins were newly found to have chlorogenic acid. Extraction of triterpenoid saponins from Lonicera alba, Its main have grey hair felt honeysuckle saponins, grey hair felt honeysuckle saponins B, sichuan and radix dipsaci saponins B and grey blanket wool honeysuckle saponins, grey hair felt honeysuckle saponin B and A - ivy, ivy saponins yuan - 28 - O - beta - D - pyran glucose base (16) - beta - D - pyran glucose ester glucoside, 3 - O - alpha - L - pyran Arab sugar-based - ivy saponins yuan - 28 - O - beta - D - pyran glucose base (16) - beta - D - pyran glucose ester glucoside, 3 - O - beta - D - pyran glucose base (13) - alpha - L - pyran rat carbohydrate (12) - lee alphaL-pyranarabiny - ivy saponin -28- O- beta - D- pyranoglucoside. In red for the first time in the gland extracts from honeysuckle stem stem red glandular honeysuckle stem stalk ethanol extract were isolated from isolated seven components: sanguisorba saponins II, grey hair felt honeysuckle saponins armour, grey hair felt honeysuckle saponin b, belladonna pavilion, chlorogenic acid, west indican, glycosides (3 beta) - bean - 5 - ene - 3 - alcohol, Lonicera l. (caprifoliaceae) in addition to the first extraction have been the sanguisorba saponins II, the rest of the ingredients are first obtained from red glandular honeysuckle.

1.3 trace elements

The content of metallic elements in the Lonicerae japonicae grown in different regions was ranked As Ca > Mg > Mn > Fe > Zn > Cu > Cd > Pb > Cr > As^[11].

2. Pharmacological action

2.1 Inhibition of pathogenic microorganisms In vitro experiments

Lonicera lonicerae extract with the base source of Lonicera lonicerae and concentration of 80 mg/ m L was applied to achieve the best inhibitory effect on activities of staphylococcus aureus, escherichia coli, ocidococcus, pseudomonas aeruginosa, bacillus subtilis and bacillus typhus^[12]. Single extract ingredients like mountain saponins of honeysuckle, such as ivy saponins yuan, A - ivy, honeysuckle bitter glycosides, also saponins, when the concentration range of 1.8 ~ 2.5 mu g/m, L for gram-positive staphylococcus aureus and epidermis staphylococcus aureus, gram-negative pseudomonas aeruginosa, escherichia coli, sewer e. coli, klebsiella pneumonia of antibacterial, the sterilization effect of the best^[13].

2.2 Anti-inflammatory model was established by stimulating cells with cigarette smoke extract.

The experimental results showed that *Lonicera lonicerae* extract could effectively inhibit the secretion of cell pro-inflammatory factor *tnf-alpha* protein, and its effect was positively correlated with the concentration [14]. In vivo and in vitro, the aromatic alcohol in Zhongshan honeysuckle can play a role in vivo and in vitro, effectively reducing the expression level of tumor necrosis factor and interleukin-6 (il-6) induced by lipopolysaccharide (LPS) and playing an anti-inflammatory role [15].

2.3 Antioxidant Flavonoids crude extract from flos *Lonicerae* has significant antioxidant effect on h2o2-incubated vascular endothelium and cardiac muscle fibers.

In vitro culture experiment data showed that the antioxidant effect of flavonoids extract in the high-dose group was the same as that of vitamin C in the control group [16]. Compared with vitamin C, flavonoids extract of *flos lonicerae* has a stronger ability to remove OH and reduce Fe³⁺, and the effect of removing OH is better than that of removing O²⁻ [16].

2.4 Antipyretic and analgesic

The rat model of fever was established by subcutaneous injection of fresh brewer's yeast, and then 20 g/kg flavonoids extract was given by gavage. The results showed that the effective time of flavonoids extract was 1-4h, and the antipyretic effect decreased rapidly. The reason is related to the absorption and metabolism of flavonoids extracts in vitro or in vivo [17].

2.5 Anti-atherosclerosis

The arteriosclerosis model induced by apolipoprotein E knockout mice was infused with flavonoids extract, and the result showed that the ratio of atherosclerotic plaque area to aortic area decreased, only the lesion intima thickened. HPLC analysis showed that the content of total cholesterol, free cholesterol and cholesterol ester in lipid-bearing cells were significantly reduced. Flavonoid extracts can significantly improve the status of atherosclerosis in vessels [17].

2.6 Protect liver

Through the establishment of human liver L-02 cells cultured in vitro model, gives the mountain of mass concentration of 10 mg/L yinhua flavonoids extracts, fat drops of content and form of the treated cells than the model group were markedly improved [18] transcription factor Nrf2 linalool activated after the nuclear factor *nf-kappa B* activities while LPS induced joint D-galactosamine (LPS/D GalN), to realize the protection of liver injury in mice [19].

3. Matters needing attention

People who are generally weak, have stomach discomfort and suffer from diseases of Yin syndrome and deficiency syndrome, please take the preparations containing the ingredients of honeysuckle carefully.

4. Looking forward

Due to the development of modern science and technology and the deepening of the research on the field of traditional Chinese medicine, shanyinhua has not only followed the ancient prescription in practical application, but also attracted people's attention for its potential medicinal value. *Lonicerae* has a variety of pharmacological effects, such as anti-inflammatory sterilization, cooling, inhibition of tumor cells, antiviral, antioxidant and other effects. At present, the application of mountain

honeysuckle mainly focuses on anti-inflammatory sterilization, antipyretic cooling, and the effect of mountain honeysuckle on anti-influenza virus a/H1 N1 and tumor cells is still in the initial stage, and the pharmacological effects of many components have not been involved, which should be further studied and analyzed. The genuine medicinal origin of mountain honeysuckle has been ambiguous and controversial before. In addition, the extract of flos lonicerae contains a large amount of saponins. Some experimental results show that, as an intravenous injection, there is a risk of hemolysis, and there is also a risk of adverse reactions when the injection of traditional Chinese medicine and western medicine are applied simultaneously^[20]. In addition, mountain honeysuckle is mostly produced in southern China, and its picking season is from June to July, when the south is at the peak of rainfall, the weather is hot, the air is humid, processing is not timely or improper storage will lead to the mountain honeysuckle moldy deterioration, affecting the drug effect. As for sexual taste, some scholars think that honeysuckle is warm, but this view has not been adopted by the pharmacopoeia committee. All the above phenomena are the main problems that mountain honeysuckle faces at present. Since the components and functions of flos lonicerae are the same or similar with some other rare and expensive medicinal materials, it can be used as an alternative source of effective ingredients in expensive medicines to relieve the financial burden of patients' families. Chlorogenic acid, the signature active ingredient in flos lonicerae, has antioxidant effect, and its application in scavenging free radicals should be vigorously developed. Flavonoids in flos lonicerae have anti-tumor effects, while traditional Chinese medicine has less toxic and side effects than western medicine, and the quality of life of patients will be relatively higher after treatment. Mice were gavaged with ceftriaxone to establish a model of intestinal flora imbalance. The experimental results showed that the extract of flos nigriculae could restore normal intestinal flora after homeostasis was destroyed, suggesting that its beneficial effect could be used to restore intestinal flora imbalance caused by clinical medication or daily life^[21]. Therefore, in addition to the function and indications of flos lonicerae in ancient books, the use of modern science and technology to fully develop and study its single effective ingredient can vigorously promote the "medicine and food homology" of flos lonicerae, so that people can take it in daily life, to achieve the purpose of preventing disease. It can be predicted that the application market of mountain honeysuckle will be more extensive.

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