# Review of the role and Therapeutic Mechanism of TCM in the Treatment of COVID-19

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## Abstract

This article aimed to review the effect and mechanism of TCM intervention, in order to cure COVID-19 cases. Coronavirus disease 2019 (COVID-19) is a viral infectious disease caused by a novel coronavirus. The main symptoms included respiratory symptoms, fever, dry cough, fatigue, etc. TCM (TCM) intervention for COVID-19 cases has become highly recognised and worthy of attention regarding its holistic treatment by prescribing both drug and non-drug treatment strategies. TCM provides therapeutic mechanisms such as anti-viral effect, immunomodulatory effects, improve lung function, and improve microcirculation. The commonly used TCM formulars consist of Qingfei-jiedu decoction, Jinhua Qinggan capsule, Fangfeng Tonsheng pill, and Babao pills and Xiaoyao San.

**Keywords: Traditional Chinese Medicine (TCM), COVID-19, therapeutic mechanism of TCM**

## Introduction

Since the outbreak of COVID-19, there have been 127 countries or regions with more than 100,000 confirmed cases, with a total of 600 million cases, accounting for 99.7% of the global total, posing a serious threat to global public health security. At present, although the epidemic is steadily declining, it is unlikely to disappear in the short term. Human beings should coexist with the virus for a long time, which is conforming to global experts. Some problems such as the continuous emergence of mutant viruses still require us to continue to find alternative treatment. As a characteristic medical resource in China, TCM (TCM) has unique advantages in the treatment of diseases. Since the COVID-19 outbreak, the Chinese government has actively supported the application of TCM as well as a first line treatment

and issued a few TCM prevention and treatment guidelines to promote the prevention and treatment of COVID-19. Therefore, TCM intervention in the treatment of COVID-19 has become one of the most interesting treatments. For example, the application of TCM helps to enhance the body's immunity and improve lung function, thereby preventing the deterioration of the condition and promoting the rehabilitation process. TCM focuses on adjusting the overall balance of the human body and enhancing the body's self-healing ability. By regulating the spleen and stomach, promoting blood circulation, and removing blood stasis, TCM can promote metabolism and accelerate waste discharge, thereby improving lung function and speeding up the absorption and the reparation of lung diseases (O'Brien, 2010). This comprehensive conditioning effect can improve the body's immunity and enhance lung function, which is of great significance for the recovery of COVID-19 patients. However, further clinical research and evaluation are needed to determine the optimal application and efficacy of TCM in the treatment of COVID-19 (O'Brien, 2010).

## Objectives

The purpose of this study is to review the effect and mechanism of Chinese medicine intervention in the treatment of novel coronavirus pneumonia, and to propose the treatment methods of Chinese medicine.

## Research Scope

This study covered therapeutic mechanisms of commonly used TCM as well as its benefits for treating and curing COVID-19. The included documents in this study were based on fundamental prescription in China.

## Findings/ Results

During the COVID-19 pandemic, TCM (TCM) has become one of the important means to control the epidemic due to its characteristics of multi-target and multi-channel treatment. The role of TCM in the treatment of COVID-19 is mainly reflected in the following aspects.

**1. Anti-viral effect.** TCM shows the ability to inhibit SARS-CoV-2 virus, which provides new possibilities for the treatment of COVID-19. For example, Baicalein in *Scutellaria baicalein*, a commonly used TCM, has been found to have the ability to inhibit virus entry into host cells, thereby effectively inhibiting virus infection (Bie et al., 2017; Song et al., 2021). The results show that Baicalein can interfere with the interaction between virus and host

cells, protect cells against virus entry, and reduce virus replication in the host. This provides important implications for the development of drugs with antiviral activity (Bie et al., 2017; Song et al., 2021). Jinhua Qingzhen capsule (Cui et al., 2023) and Qingfei Jiedu decoction (Ren et al., 2020) have been widely used in the treatment of COVID-19 and have achieved good clinical results. The various components contained in these TCM prescriptions act synergistically to improve the immune status of the body by inhibiting the replication and spread of the virus, thus effectively controlling the development of the disease (B.-H. Li et al., 2021).

**2. Immunomodulatory effects.** The immune system of patients with COVID-19 is usually hyperactive, leading to an excessive inflammatory response and viral storm. The immunomodulatory effect is one of the important mechanisms of TCM to cure COVID-19 cases. TCM can regulate the function of the immune system, enhance the body's immunity, and reduce inflammatory response (Shah et al., 2022). The active ingredients in some TCM can inhibit the production of inflammatory factors and reduce the inflammatory response, thereby relieving the symptoms of COVID-19 (Shah et al., 2022). For example, *Scutellaria baicalensis* in Qingfei-Jiedu decoction has an anti-inflammatory effect. It is rich in flavonoids, which can inhibit the release of inflammatory factors, reduce the degree of inflammation in the lungs, and improve the respiratory symptoms of patients (Shah et al., 2022; X. Shen & Yin, 2021). Scutellaria(Jung et al., 2017) and Kushen(Zhou et al., 2021) in Xiaoyao Powder have been found to inhibit the production of inflammatory factors, regulate the balance of the immune system, and reduce the inflammatory response. These components can regulate the immune response of the immune system by regulating the activity of immune cells and inhibiting the release of inflammatory mediators, thereby reducing inflammatory reactions and injuries (Jung et al., 2017; Zhou et al., 2021).

**3. Improve lung function.** Patients with COVID-19 often present with pathological changes in the lung leading to difficulty breathing and reduced lung function, including inflammation, edema, and fibrosis. These pathological changes have a serious impact on the respiratory function of patients and may lead to long-term lung damage. Regulating lung function is considered to be one of the important mechanisms of TCM in the treatment of COVID-19. For example, Maidong (Gan et al., 2020; M. Shen et al., 2020) in Qingfei-Jiedu Decoction has been found to inhibit pulmonary fibrosis. It contains a variety of active ingredients, such as Maidong polysaccharide and Maidong side, which can reduce the proliferation of fibrous tissue and promote the repair and regeneration of pulmonary fibrosis by regulating cell signaling pathways and molecular targets. These components inhibit the expression of fibrosis-related factors, reduce inflammatory response, deposit fibrous tissue,

and protect lung tissue from further damage (M. Shen et al., 2020). Moreover, components in some TCMs have also been found to promote the absorption and dissipation of lung lesions, thereby shortening the course of disease, and improving symptoms.

**4. Improve microcirculation** Patients with COVID-19 are often accompanied by microcirculation disorders, leading to tissue hypoxia and aggravating lung lesions. Another important mechanism of TCM in the treatment of COVID-19 is to improve microcirculation. Specifically, some active ingredients in TCM, such as glycyrrhizin, have been found to improve microcirculation by inhibiting platelet aggregation and reducing erythrocyte aggregation (Lim, 2015). These ingredients have anticoagulant and anti-platelet aggregation effects, which can improve the fluidity and reduce the viscosity of blood, thereby promoting the unimpeded flow of blood in microvessels. Improving microcirculation is essential for the recovery of COVID-19 patients. By promoting the flow of blood in microvessels, TCM can increase the delivery of oxygen and nutrients, improve the oxygen supply status of tissues, and alleviate hypoxia condition of lungs. At the same time, improving microcirculation also helps to eliminate metabolites and toxins, reduce inflammatory response and tissue damage (Lim, 2015).

**Commonly used TCM formula**

**1. Qingfei-jiedu decoction** is a TCM formula composed of ginseng, *Scutellaria baicalensis*, Forsythiae Fructus, Isatidis Radix and other drugs (Ren et al., 2020) . This prescription has a significant effect on the treatment of COVID-19 patients, which can be beneficial to clearing heat and detoxing, moisturising the lung and relieving cough, dissipating air, and dispersing cold, and effectively improving the symptoms of patients. The results of this study provide strong scientific support for the application of Qingfei-Jiedu decoction in the treatment of COVID-19 (Ren et al., 2020). The application of Qingfei Jiedu decoction has the effect of regulating the body's immune system. By adjusting the balance of the immune system, the prescription can enhance the body's resistance, reduce inflammatory response, and tissue damage (Cui et al., 2023; Shah et al., 2022).. Compared with some Western drugs, Qingfei-Jiedu decoction has lower toxicity and side effects, higher safety, and will not lead to drug resistance.

**2. Jinhua Qinggan capsule** is a TCM formula composed of honeysuckle, *Lonicerae japonicae*, Forsythia, Daqing root and other drugs (X. Shen & Yin, 2021). The prescription has a variety of effects, including antiviral, anti-inflammatory and analgesic effects (Huang et al., 2021). These effects make Jinhua Qinggan capsule play an important role in the treatment of COVID-19 patients, which can significantly alleviate clinical symptoms and reduce mortality.

At the same time, Jinhua Qinggan capsule also has the ability to improve lung function and promote the recovery of patients and shorten the course of the disease (X. Shen & Yin, 2021). Therefore, Jinhua Qinggan capsule has potential application value in the prevention and treatment of COVID-19.

**3. Fangfeng Tongsheng pill** is a kind of TCM formula, which is composed of Fangfeng, platycodin, Pinellia and other drugs (Jong et al., 2010). This prescription has the effects of clearing heat and detoxifying, relieving cough and pain, moisturising lung, dissipating phlegm, and can relieve the clinical symptoms of COVID-19 patients (Xu & Zhang, 2020). In addition to the improvement of clinical symptoms, the Fangfeng Tongsheng pill has significant economic benefits in the treatment of COVID-19. This prescription can effectively reduce the treatment cost of COVID-19 and reduce the length of hospital stays of patients, thereby alleviating the pressure on medical resources (Pan et al., 2020). As a widely used therapeutic prescription, the Fengfeng Tongsheng pill not only has a relatively low cost, but also provides comprehensive therapeutic effects to alleviate patients' suffering and promote recovery.

**4. Babao pills and Xiaoyao San** show the effects of nourishing blood and Qi and promote the recovery of COVID-19 patients (Lee et al., 2021; Xue et al., 2022; Y. Zhang et al., 2012). Babao pill and Xiaoyao powder can significantly improve the clinical symptoms of COVID-19 patients, such as cough, fatigue, chest distress, etc., reduce pulmonary inflammatory response, and promote the recovery of the disease (Ji et al., 2022). These prescriptions regulate the internal environment of the body and enhance the body's resistance and self-healing ability by tonifying Qi and blood (Xue et al., 2022), adjusting immune functions (Xue et al., 2022), improving microcirculation (Xue et al., 2022), and other ways (Lee et al., 2021; Y. Zhang et al., 2012). In addition, the application of the Babao pill and Xiaoyao powder also have good safety and application prospects, and long-term clinical practice has proved that they have low adverse reactions and dependence. The Babao pill and Xiaoyao powder also have significant clinical efficacy in the treatment of COVID-19 patients and can improve the quality of life for patients (Xue et al., 2022).

| Drug name | Drug picture | Drug formula | Drug efficacy |
|---|---|---|---|
| Qingfei-jiedu decoction |  | Its ingredients consist of Ephedra (9g), sun-dried licourice (6g), almond (9g), Gypsum (15-30g) (decocted first), Guizhi (9g), Alisma (9g), Polyporus (9g), Atractylodes (9g), Poria (15g), Bupleurum (16g), Scutellaria baicalensis (6g), Ginger pinellia (9g), ginger (9g), aster (9g), winter flower (9g), Shegan (9g), Asarum (6g), Chinese yam (12g), Citrus aurantium (6g), Chenpi (6g), and Huoxiang (9g) | This prescription has a significant effect on the treatment of COVID-19 patients, which can be beneficial to clearing heat and detoxing, moisturising the lung and relieving cough, dissipating air, and dispersing cold, and effectively improving the symptoms of patients.By clearing heat and detoxifying, the prescription can inhibit the replication and spread of the virus, reduce the inflammatory response, and promote the recovery of patients . In addition, Qingfei Jiedu decoction also has the effect of moistening the lung and relieving cough, which can relieve the respiratory symptoms of patients and improve lung function. |
| Jinhua Qinggan capsule |  | Jinhua Qinggan capsuleis a TCM formula composed of honeysuckle, Lonicerae japonicae, Forsythia, Daqing root and other drugs. | The prescription has a variety of effects, including antiviral, anti-inflammatory and analgesic effects (Huang et al., 2021). These effects make Jinhua Qinggan capsule play an important role in the treatment of |

| Drug name | Drug picture | Drug formula | Drug efficacy |
|---|---|---|---|
| | | | COVID-19 patients, which can significantly alleviate clinical symptoms and reduce mortality. At the same time, Jinhua Qinggan capsule also has the ability to improve lung function and promote the recovery of patients and shorten the course of the disease (X. Shen & Yin, 2021). Therefore, Jinhua Qinggan capsule has potential application value in the prevention and treatment of COVID-19. |
| Fangfeng Tongsheng pill |  | Fangfeng Tongsheng pill (Figure 3) is a kind of TCM formula, which is composed of Fangfeng, platycodin, Pinellia and other drugs . | This prescription has the effects of clearing heat and detoxifying, relieving cough and pain, moisturising lung, dissipating phlegm, and can relieve the clinical symptoms of COVID-19 patients . Fangfeng Tongsheng pills can significantly improve lung function, reduce inflammatory response, detoxing the lung by reducing heat and inhibit cell replication, and promote disease recovery in patients |

| Drug name | Drug picture | Drug formula | Drug efficacy |
|---|---|---|---|
| | | | with COVID-19 . Platycodonum platycodonum and Pinellia sp. in Fangfeng Tongsheng pill also manifested the effects of relieving cough and pain, soothing the lungs and eliminating phlegm, thus relieving respiratory symptoms and improving lung function in patients with COVID-19 . |
| Babao pills and Xiaoyao San |  | Each pill contains amber, myrrh, red peony, angelica, as arum, naum, keel, and musk. | improve the clinical symptoms of COVID-19 patients, such as cough, fatigue, chest distress, etc., reduce pulmonary inflammatory response, and promote the recovery of the disease |

## Conclusion

Although there was some evidence that has shown the positive therapeutic effect of TCM intervention on COVID-19(Nile & Kai, 2021; Y. Wang et al., 2021), the specific mechanism of action is not fully understood. Further research and exploration will help us to gain better understanding and apply the TCM intervention to counteract COVID-19. TCM intervention primarily includes both TCM unique methods and non-drug treatment. TCM principally applies herbal decoction, such as Jinhua Qinggan granules, which show excellent effects against inflammation, virus, but improve immunity (Huang et al., 2021).

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