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Systematic Review On Herbal Drug Management In Covid-19

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1.Abstract

SARS-CoV-2 is the virus responsible for COVID-19. For centuries, traditional healers have used herbal plants and natural products to treat many illnesses. This review highlights key medicinal plants, their sources, properties, and possible antiviral roles against COVID-19. Research articles were collected from major databases, including PubMed, Scopus, Google Scholar, Medline, and Web of Science, up to August 2021. Many studies report that certain medicinal plants show antiviral effects and may support treatment of viral infections. However, limited safety data and unclear dosage guidelines remain major challenges. Herbal medicines may help against COVID-19 by blocking viral entry or reducing virus replication. Plants such as Citrus species, orange (C. sinensis), garlic (Allium sativum), onion (Allium cepa), peppermint (Mentha piperita), and black seed (Nigella sativa) are commonly used and may offer supportive benefits in COVID-19 management.

2.Keyword

Herbal medicine, medicinal plants, phytotherapy, traditional remedies, antiviral herbs, COVID-19 management, SARS-CoV-2 inhibition, immune boosting herbs, plant-based therapy, natural compounds

3. Introduction

COVID-19 triggers a strong inflammatory immune reaction, and the excessive release of cytokines can result in cytokine storm, immune imbalance, acute respiratory distress syndrome, and damage to multiple organs. Although several vaccines are now available to help prevent the spread of COVID-19, distribution remains difficult, particularly in developing countries. Remdesivir is one of the recently approved antiviral drugs, but its availability is still limited.

COVID-19 was declared a global pandemic by the World Health Organization (WHO) on March 12, 2020. The disease is caused by a new virus called SARS-CoV-2, which had not previously infected humans. By September 2021, more than 230 million people worldwide had been infected and over 4.7 million had died. In Ethiopia alone, more than 336,000 cases and over 5,200 deaths were recorded.COVID-19 triggers a strong inflammatory reaction in the body. When too many inflammatory cytokines are released, it can cause a cytokine storm, weak immunity, breathing problems such as acute respiratory distress syndrome, and even failure of multiple organs. Although several types of vaccines are available to help control the

pandemic, many developing countries still face challenges in vaccine distribution. Remdesivir is one of the approved antiviral drugs, but it is available only in limited amounts.

4.Need for Herbal Drug Management in COVID-19

1. **Limited treatment options:** COVID-19 emerged suddenly, and effective antiviral
2. **Accessibility and affordability:** Many communities, especially in developing countries, rely on easily available and inexpensive herbal remedies.
3. **Immune support:** Several medicinal plants have natural immune-boosting, anti-inflammatory, and antioxidant properties helpful during viral infections.
4. **Complementary therapy:** Herbal drugs can be used alongside modern medicine to improve symptom relief and recovery.
5. **Traditional knowledge:** Many cultures have long histories of using herbal treatments for respiratory infections, making them familiar and acceptable.

5.Objectives of Herbal Drug Management in COVID-19

- To identify and review medicinal plants with potential antiviral activity against SARS-CoV-2.
- To evaluate the immune-modulating, anti-inflammatory, and supportive effects of selected herbal drugs.
- To assess the role of herbal therapies when used along with conventional COVID-19 treatments.
- To summarize scientific evidence from in-vitro, in-vivo, and clinical studies related to herbal interventions.
- To discuss active phytochemicals responsible for antiviral activity and their mechanisms of action.

- **Herbal Drug Profile In COVID-19**

6. Pharmacology

Pharmacognosy plays a vital role in identifying, authenticating, evaluating, and standardizing herbal drugs used in the management of COVID-19. Traditional medicinal plants such as **Ashwagandha, Giloy, Tulsi, Turmeric, Ginger, Amla**, and polyherbal formulations like **Ayush-64, Samshamani Vati, and Ayush Kwath** gained importance as supportive therapy due to their antiviral, immunomodulatory, antioxidant, and anti-inflammatory properties. Pharmacognostic studies ensure the **quality, purity, efficacy, and safety** of these herbal drugs.

a) Antiviral Activity

- **Examples:**
  Curcumin, Withaferin-A (Ashwagandha), Tinospora cordifolia metabolites, Quercetin (found in many herbs).

b) Inhibition of Viral Replication

Examples:
Berberine (Giloy), Catechins (Green tea), Neem limonoids.

SARS-CoV-2 is an enveloped, single-stranded RNA virus that produces two polyproteins (pp1a and pp1ab), which are cleaved by PLpro and 3CLpro into non-structural proteins. It also encodes key structural proteins: spike, membrane, envelope, and nucleocapsid. The spike protein binds to ACE2 receptors, and host proteases like TMPRSS2 activate it for viral entry. High ACE2 expression in the lungs explains common respiratory symptoms, while its presence in other organs leads to multi-organ involvement.

COVID-19 can range from mild symptoms to severe disease, and asymptomatic carriers contribute to its spread due to the long incubation period of up to 14 day.

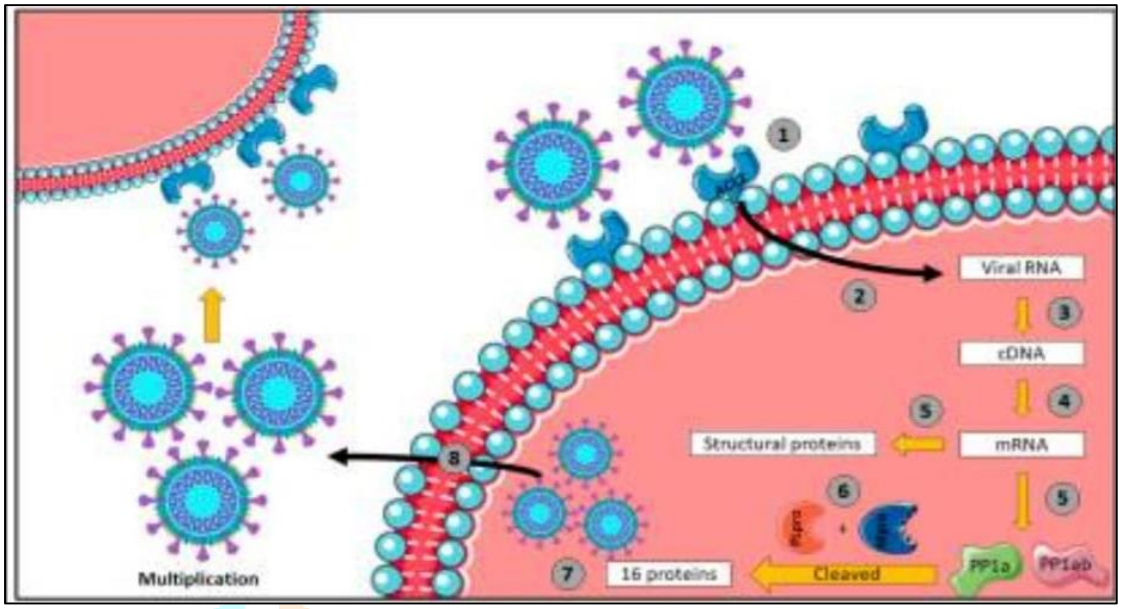

Fig.1, Replication of dna

7. Some herbal medicine used in COVID-19

7.1 List of Herbal drug used in covid-19

1. *Curcuma longa* (*C. longa*, *turmeric*)

This Zingiberaceae plant is widely used for food, natural dyes, and traditional medicine. Its active compounds show several biological activities, including anti-diabetic, anti-tumor, anti-inflammatory, and antioxidant effects. Curcumin, the major yellow pigment of *Curcuma longa*, is commonly used in supplements, cosmetics, and food products. It has long been recognized for its therapeutic value and is considered safe under the FDA's GRAS category. Curcumin demonstrates multiple pharmacological actions such as anti-inflammatory, antioxidant, antiviral, antibacterial, antifungal, and anti-thrombotic effects.

Fig.2, curcuma longa

2. Zingiber officinale (Ginger)

Ginger, a common culinary and medicinal plant from the Zingiberaceae family, contains key bioactive compounds such as phenolics (gingerols, shogaols, zingerone) and terpenoids (zingiberene, bisabolene, curcuminoids). These components give ginger strong antioxidant, anti-inflammatory, anti-diabetic, anti-cancer, and antiviral properties.

Fig.3, Ginger

3. Allium sativum (Garlic)

Garlic is widely used as both food and traditional medicine. Historically, it has been used to treat fever, digestive issues, skin diseases, and respiratory infections. It is also known for its antiviral activity. Clinical observations show that consuming 24 g of garlic daily for three days helped reduce fever and headaches in patients with moderate to severe COVID-19.

Fig.4, Garlic

3.1 Anti-Inflammatory and Immunomodulatory Activities

Garlic's sulfur compounds help suppress inflammation by lowering PGE2 and COX-2 and reducing NF-κB activity. It also decreases interleukins, chemokines, and free radicals. Allicin boosts immune cell function, while garlic proteins enhance T-cell—especially CD8+—responses, supporting immunity and easing COVID-19 symptoms.

3.2 Antiviral Activity

Compounds like allicin and ajoene show strong antiviral effects by blocking viral entry and inhibiting replication enzymes. Docking studies suggest several garlic components can bind to SARS-CoV-2 targets such as 3CLpro and ACE2, indicating potential to hinder viral attachment and replication, though more research is needed.

4. Cinnamomum verum (Cinnamon)

Cinnamon is widely used as a spice and traditional remedy. It contains numerous active compounds—especially cinnamaldehyde, eugenol, and other volatile oils—that give it antioxidant, antimicrobial, anti-diabetic, and anticancer properties.

Fig.5, Cinnamon

4.1 Anti-Viral Activity

Cinnamon essential oils can block viral attachment and show strong activity against SARS-CoV-2. Compounds such as cinnamaldehyde and eugenol bind to ACE2, spike protein, and Mpro, helping inhibit both viral entry and replication.

5. Rosmarinus officinale (Rosemary)

Rosemary, a herb from the Lamiaceae family, is widely used in food and traditional medicine. It contains important compounds like rosmarinic acid, luteolin, apigenin, and carnosic acid, which give it strong antioxidant, anti-inflammatory, and antiviral properties.

Fig.6, Rosemary

8.Future Perspective of Herbal Drugs in COVID-19

Herbal medicines hold promising potential for future COVID-19 management due to their antiviral, anti-inflammatory, and immune-modulating properties. As research continues, plant-based compounds may serve as valuable complementary therapies alongside modern medicine. Future studies should focus on isolating active phytochemicals, understanding their mechanisms on SARS-CoV-2, and conducting well-designed clinical trials to confirm safety and effectiveness. Standardization of herbal formulations, proper dosage guidelines, and quality control will also be essential for integrating herbal remedies into mainstream healthcare. With deeper scientific validation, herbal drugs may contribute to developing new antiviral agents, improving immunity, and offering affordable and accessible treatment options, especially in resource-limited settings.

9. Summary: Herbal Drug Management in COVID-19

Herbal drug management has gained significant attention during the COVID-19 pandemic due to the lack of early definitive treatments and the need for safe, accessible supportive therapies. Many medicinal plants used in traditional systems such as Ayurveda, Unani, Siddha, and Traditional Chinese Medicine (TCM) show antiviral, anti-inflammatory, antioxidant, and immune-modulating properties that may help reduce the severity of COVID-19. Studies suggest that certain herbs—such as *Tinospora cordifolia* (Giloy), *Withania somnifera* (Ashwagandha), *Ocimum sanctum* (Tulsi), *Curcuma longa* (Turmeric), *Allium sativum* (Garlic)

10. Conclusion

Herbal drug management shows promising potential as a complementary approach for COVID-19 prevention and treatment. The antiviral, immune-boosting, and anti-inflammatory activities of various medicinal plants support their use in reducing disease severity and enhancing patient recovery. However, despite encouraging laboratory and preliminary clinical evidence, more rigorous human trials are needed to establish safety, dosage, and long-term effectiveness. Overall, herbal medicines can serve as supportive therapeutic options, especially in resource-limited settings, and may contribute to the development of future plant-based antiviral treatments.

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