

Curcumin A Better Medicine to Treat Coronavirus- A Review

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Abstract

Curcumin, a yellow pigment, which is a bioactive compound in Turmeric, is a polyphenol derivative used as an herbal medicine to treat remedies. Coronavirus disease-2019 (COVID-19) is caused due to coronavirus which is an infectious and dangerous virus. Coronavirus causes severe infections in humans and also in different species of animals. Curcumin has multi properties in which one of them is anti-viral, which may help in the prevention and treatment of COVID-19. Curcumin can be taken by the means of food and studies show that there are no side effects, caused due to its consumption. Turmeric is the main source of Curcumin; RDA of Curcumin is 3mg/kg/day. Some of its properties include: anti-viral, anti-inflammatory, anti-bacterial, anti-parasitic, anti-tumor, anti-microbial activities. It also has the ability to gene transcription the viral strains like coronavirus, and maybe a possible treatment in treating COVID-19. Curcumin as exhibits anti-viral properties and acts on viral strains for gene transcription, can be a possible treatment in prevention and treating COVID-19.

Keywords: Curcumin; Turmeric; COVID-19; antiviral activity; symptoms; treatment.

Introduction

Curcumin is a yellow pigment which is a bio active compound present in Turmeric. Curcumin is mainly used as a therapeutic agent, it is so because of its multi-properties which include: antiviral activity, antifungal and anti-bacterial activities, antioxidant activity, and acts also as an anti-inflammatory agent and also has anticancer effects. Main aim of this study is to review whether curcumin can act as a better medicine than the drug treatment ¹ in treating COVID 19. Coronavirus are viruses which are infectious and can be transmitted from person to person and this diseased state is called COVID-19. There are etiologic agents [infectious

substances, materials reasonably expected to contain a pathogen] responsible for causing severe infections, they are enveloped RNA viruses [non-segmented, positive sense, short noncoding molecules that consist of 21–25 nucleotides in length ²] which are mainly found in humans and mammals ³. Curcumin is a polyphenol derivative which is mainly used as an herbal remedy and dietary spices, present in Turmeric ⁴. Curcuminoids refers to a family of active compounds which includes curcumin. Curcuminoids play a significant role in fundamental disease control at a cellular level, possessing anti-bacterial, anti-microbial, anti-viral, anti-tumor and anti-immunomodulatory properties ⁵. It is mainly known for its anti-inflammatory and anti-cancer properties ^{6 7}. Turmeric is the main source of Curcumin which is used for many remedies ⁸. Curcumin also has the ability to affect gene transcription ⁹, as it down regulates specific gene transcription in tumor cells according to this study ¹⁰. It also possesses skin protection capacity and wound dressing properties ¹¹. It also performs COVID-19 viral gene transcription. According to this study ¹² Curcumin has the ability to inhibit herpes simplex virus.

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Some of the previous studies were compared, and Curcumin is a spice, which is effectively used as a drug to treat various viral and bactericidal infections^{13 14}. In India it is being used as a primary agent to treat arthritis and muscular disorders, and in China it is used as a topic analgesic and flatulence, to treat chest pain, hepatitis and colic conditions¹⁵. Relief in symptoms like excretion of sputum, cough is normalized and no or less dyspneic conditions¹⁶ observed due to Curcumin administration^{17 18 19 20 21 22 23 24 25}.

The curcumin can be modified in addition with silver nanoparticles which are used in treating respiratory syncytial virus infections²⁶. Curcumin shows a bunch of treatment aspects which include, anti-inflammatory activity²⁷ [effectivity in rats- pathological changes observed in albino rats²⁸], antioxidant activity²⁹, antiprotozoal activity¹⁵, Nematocidal activity³⁰³¹, antibacterial activity³², anti-tumor activity³³ [pseudotumors treatment³⁴], and anti-venom activity³⁵. Curcumin due to its anti-inflammatory and antioxidant capacity³⁶ which exhibits negative influence towards obesity [which may be linked to thyroid functioning]³⁷ is a treatment option. Curcumin can also be used as therapeutic treatment for eye disease³⁸ like amblyopia³⁹, dry eye disease, conjunctivitis, corneal wound healing³⁸. Curcumin also acts as a potential inhibitor of COVID-19 main protease (M^{pro}), reported by the study⁴⁰ but still no proper and specific treatment and therapies has been found for the new strain of CoV⁴¹. The key concept of this review is to find whether the use of Curcumin will do any better in treating a viral infection such as COVID 19? Main focus on the antiviral activities of the Curcumin.

The aim of the study is to find whether Curcumin can treat COVID 19 better than any medical drug treatments available in the market, possible therapies to treat COVID 19 and to find whether Curcumin can act as a potential drug against coronavirus helping in treatment of COVID-19.

CURCUMIN AND COVID 19

COVID-19

Coronaviruses (CoV), they are the main causative and etiological agents which causes severe infections both in humans and animals mainly mammals, this

virus has been associated with the respiratory tracts in numerous cases and it also causes disorders in the digestive tract systematically⁴⁰. Coronaviruses infect various species of animals, including avian species and reptiles and also mammals. Curcumin can be used as a possible treatment option for the COVID-10 pandemic, it can also be used as a preventive factor for coronaviruses according to this study⁴². Coronaviruses were first discovered in the 1930's in domestic chickens who were infected with acute respiratory infection caused by IBV (infectious bronchitis virus)⁴³.

Epidemiology

COVID-19 epidemic has spread very quickly, as it approximately took 30 days for its spread⁴⁴. Findings suggest that the transmission has taken place either through airdrop lets or possibly from an infected person to another from an unknown source⁴⁵. Evidence found has reported the main cause due to huge clusters of infected family members and medical workers, so it was confirmed that COVID 19 can be transmitted from human to human interaction^{46 47 48}.

Symptoms

Coronavirus type NL63 will cause lower respiratory tract syndrome symptoms which is acquired in early life⁴⁹. Symptoms of respiratory tract illness were primarily found in very young, elderly and immunocompromised individuals⁵⁰. Human Coronavirus is found in small children as a minor proportion of infections⁵¹. Coronavirus had some symptoms of acute respiratory virus infection like fever, Myalgia and sore throat, which were found common in SARS-COV too⁵².

Controlling measures

Further control and prevention of the spreading of the disease globally, but no specific therapies and treatments have been found to cure COVID-19⁴¹. Investigation to find possible treatment for COVID-19 are still lacking⁵³. Nutrition supplement, symptomatic treatment and anti-viral treatments are needed as active intervention for the severe as well as mild patients affected with COVID-19⁵⁴. The transmission roots intermediate host with intense surveillance has to be mentioned⁵⁴.

Therapeutic treatment

Therapeutic Treatment of Curcumin induces treatment of arthritis and muscular disorder and is used as topical analgesic and flatulence, used to treat hepatitis and also cancer¹⁵. Curcumin in turmeric can possibly act as a treatment option for curing 2019 new Coronavirus it is also used as food preservative⁵⁵, and possesses the following therapeutic properties.

- 1) Anti-inflammatory⁵⁶
- 2) Anti-bacterial⁵⁷
- 3) Antiviral⁵⁸
- 4) Anti-fungal⁵⁹
- 5) Anti-tumor⁶⁰
- 6) Antispasmodic⁶¹
- 7) Hepatoprotective⁶²
- 8) Nephroprotective treatment of dementia⁶³
- 9) Effectiveness on AIDS (Auto immune deficiency syndrome)⁶⁴

Curcuma Longa

Turmeric is a spice which has its root called curcuma longa. They exhibit multi-therapeutic activities like anti-inflammatory, anti-human immunodeficiency virus, anti-bacteria, antioxidant effects and nematicidal activities⁶⁵. Curcuma longa belongs to the family Zingiberaceae which is native to India, commonly known as the term turmeric. In vitro it exhibits activities like anti-parasitic, anti-spasmodic and gastrointestinal effects it also inhibits carcinogenesis and cancer growth (anti-tumor activity).

Some medicinal properties exhibited from different roots are effective and they can be administered topically, orally and also by inhalation⁶⁶.

Beneficial effects of Curcumin

Curcumin exhibits a bunch of therapeutics by important activities are, they exert anti-inflammatory activity, anti-oxidant effect, antiviral and antifungal actions⁶⁶. Previous studies have shown that curcumin is non-toxic to humans⁶⁷. Curcumin is the bioactive compound, which is powerful and has antioxidant

action like vitamin C, vitamin E and beta-carotene of Turmeric which plays a major part in cancer prevention, liver protection and premature aging, and also treats respiratory problems⁶⁸.

Antiviral properties of Curcumin

Curcumin exhibits good microbial activity, it helps in development of vaginal microbial gel which will act as a defense system against viral infections⁶⁹. Curcumin when compared with systemically acting drugs, the drugs were more potent in binding with the COVID-19 M^{pro}⁷⁰. Curcumin-copper acts as a broad spectrum antiviral agent against vesicular stomatitis virus, coxsackie virus, respiratory syncytial viruses⁷¹. Curcumin acts as an agent to inhibit cancer growth, and sensitizes human colorectal cancer. Curcumin clearly has anti allergic properties and its related compounds possess the same activity⁷². Curcumin can hopefully act as a treatment of coronavirus infection⁷³, it can also be possibly used as a preventive treatment for COVID-19⁷⁴.

Curcumin is a bioactive agent exclusively present in turmeric, it's a polyphenol derivative, used as an herbal remedy and also as a dietary spice almost globally⁴. Turmeric being its main source, curcumin is having special therapeutic effects like anti-inflammatory and anti-cancer properties thus used to treat numerous conditions⁶⁶, it is also used extravagantly as a skin protector and also for wound healing and dressing purposes¹¹. It has the capacity for viral gene transcription in this case on COVID-19 disease viral strains⁴³ and miRNA has been tested as a novel molecular pathway/target in therapies of various heart diseases^{75 76 77}.

It's an important dietary source for Indian meals, present in turmeric and its bioavailability increases when it's combined with piperine (black pepper extract) which tends to boost immunity, and also taken with lipids. Curcumin daily intake or RDA is about 3 mg/kg/day, when it's combined with essential oils it can be taken as 500mg twice a day which is 1000mg/day as the recommended amount⁵.

It can hopefully be used as an antiviral drug for the treatment of coronavirus infection, it's also a possible preventive and treatment agent to COVID-19. So, curcumin against inflammatory response in our body could act as inhibitors which has phagocytic capacity

which may prevent from viral and bacterial infections, its effective against viral disease and infections^{78 79 74}.

It's important to consume curcumin in a routine because it's a multi-faced compound which has its therapeutics properties like: anti-oxidant, anti-parasitic, antitumor and anti-viral and more. It's an adjuvant in anti-HCV therapy, acts like an antioxidant, it exhibits chemopreventive and chemotherapeutic activities⁵⁶, it has antiviral activity against human immunodeficiency virus (HIV) in AIDS, it also acts as an inhibitor in the exhibition of breast cancer cell line and acts as an anti-cancer chemical in high doses.

Its main biological and pharmacological actions resemble its anti-viral properties. Curcumin effectively acts against dengue virus, influenza virus, zika virus and also chikungunya virus⁵.

Previous studies include: to reduce the inflammatory response of the temporal lobe in Alzheimer's disease⁸⁰. Studies include its action against human papillomavirus infection and cervical cancer treatments⁸¹. And was found when curcumin is combined with sodium valproate has shown response to treat bipolar disorder⁸². And its invasive is resistant to melanomas as it inhibits proliferation and invasion of the significant pathway^{83 84}.

Conclusion

From this meticulous review it was observed that curcumin is a best and better medicine to treat against various diseases. Though it has various properties against various diseases, it has very good antiviral properties. Thus the present study suggested that curcumin may be the promising medicine to mitigate COVID-19 infection.

Conflict of Interest: The author has none to declare.

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Ethical ClearanceAs it is a review article so it is not required.

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