

# The Bronchodilating herbs used in the treatment of COVID-19: A Review

## Review Article

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### Abstract

Nowadays, covid\_19(SARS\_CoV\_2) intimidating the world. This disease is spreading by contact with affected droplets. Some of the affected persons are asymptomatic, majority of people suffer from mild illness, meanwhile few were affected, some severe acute respiratory distress (pneumonia) and multi organs dysfunction like Pulmonary oedema, Cardiac failure, Renal failure. Currently doctors and peoples use some spices herb (basil, clove, black pepper, turmeric, garlic, ginger, ajwain, cumin) to prevent and reduce the corona virus infection. Most of these are Bronchodilator herbs. These drugs dilate the respiratory airway and allow more volume of atmospheric air to enter the lungs. Therefore a large amount of oxygen goes into the lungs and dissolves in the respiratory membrane. Further more, it's transported through the blood and carried to main organs of the body. So this review article reveals Bronchodilator herbs can reduce the risk factors and prevent the respiratory distress symptoms in covid\_19 (SARS\_CoV\_2) patients.

**Key Words:** Bronchodilator, Spices herb, Respiratory distress, Increased oxygen diffusion, Siddha medicine, Supportive therapy.

### Introduction

The covid-19 disease is caused by SARS-COV-2 virus. Under the family coronaviridae(1). It is a positive standard RNA virus that was first reported in Wuhan city, china. This virus usually affect mammals and birds. SARS-COV-2 Virus transmitted by close contact with affected persons and spread through contact droplets (sneeze, cough etc..) Until now, prenatal communication has not discovered but Can spread via the breast milk(32). Covid-19 Symptoms vary from patient to patient. Fever, Cough, Shortness of breath, Malaise, Sore throat, Acute respiratory injury (ARDS, pneumonia), Acute renal injury, Haemoptysis, Increased respiratory secretion, Septic shock, Gastrointestinal Symptoms (nausea, vomiting, diarrhoea etc..)(1,32). From this, respiratory distress is the primary reason for create critical situation. In this state, Bronchodilators are may be the right choice to prevent this worst condition. Siddha medicine is an ancient and popular medicational system in india. This medicinal system is based on herbs, metals and animal products. Lot of spice herbs present in herbal kingdom. Spice herbs plays key role in this medication, they are easily available and harmless also. Most of the spice herbs

have Bronchodilator effects. In which alkaloids are responsible for bronchodilating effect(33). siddha system of medication following the quote "Unavae marunthu Marunthae unavu(Let food be thy medicine and Medicine be thy food)". Most of the south Indian peoples use the spices herb in their food. Fresh and natural healthy foods to prevent and protect our body from any kind of diseases. According to Govt of India-AYUSH guidelines, the food chart provided by them contains the spices herbs which we have selected for our study. Not all the spices have bronchodilating activity, only few spices herbs possesses the bronchodilating action. (34)

### Aim

According to siddhars quote "Unavae marunthu Marunthae unavu (Let food be thy maedicine and Medicine be thy food)" is the aim of this review to express Spices added food is the best medicine for covid -19 affected patients and also this study will be helpful material for covid-19 related future researchers.

### Materials and methods

As per all the information so far provided was collected from the databases like Google scholar, Pubmed, Web of science and so on..We have presented this article and our study provided the links in the reference part which shows that the selected spices herbs posses the bronchodilator activity.

### Bronchodilators

Bronchodilators are the chief and perfect therapy for airway obstructive diseases.

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The bronchodilator is a material that relaxes the bronchi and bronchioles, down resistance in the bronchial pathway and rise the flow of air in to the lungs. Natural bronchodilators obviously present in our body, sometimes may be taken as therapeutically for medication of breathing distress (33). Bronchodilators are classified into 3 types. B(2)-adrenoceptor (AR) agonist, muscarinic receptor, antagonist xanthines. It can be helped as separately or combination (2). Physiologically, bronchial smooth muscular tone is managed by the parasympathetic nervous system via cholinergic and non-cholinergic innervation. Neurotransmitter acetylcholine involved in this nervous innervation. Currently accepted that exaggerated vagus nerve action plays important role in airway obstruction (3).

### Spice herbs

Culinary herbs and spices have been vastly analysed in many countries because of their advantageous functions on human health (18). In this review article listed currently used some spice herbs.

#### Black pepper

- Botanical name: *Piper nigrum* Linn
- Family: piperaceae
- Black pepper commonly called as “King of spices” or “black gold”. The fruit of pepper have rich in medicinal properties. It is added in many cough syrups as it has antitussive and bronchodilator effects (30). Piper nigrum act as immunomodulator (4). Evaluation on black pepper, let out the bronchodilatory effect was mediated through  $Ca^{++}$  channel blockade and phosphodiesterase (PDE) inhibitor alike effect, which may clarify its clinical significance in bronchial disorders (5).

#### Cardamom

- Botanical name: *Elettaria cardamom* Linn
- Family: Zingiberaceae
- Cardamom is a highly aromatic herb, usually called as “queen of spices”. It has lot of medicinal values, especially it relaxes the bronchial portions. Research on cardamom shows, bronchodilatory action mediated via  $Ca^{++}$  antagonist procedure. Which gives sound background for its medicinal utilize in respiratory diseases (6). In corona virus (COVID-19) affected cases, an intake of cardamom boost the immune system (7). A study by Sharma S et al in 2011 that, oil extract of *Elettaria cardamom* seeds, in doses of 175 microliters/kg and 280 microliters/kg were start to decrease the inflammation (8).

#### Clove

- Botanical name: *Syzygium aromaticum* Linn
- Family: Myrtaceae
- *Syzygium aromaticum*. L name implies its characteristics. Cloves are aroma filled, dried, unopened flower bud. It have extreme fragrance and burning taste sense. It is a main spice utilized in cuisines of Russia, India, Greece, Scandinavia and china. Experimental studies on animals suggested

that, eugenol react as strong bronchodilator and anti-inflammatory medium for the medication of allergic respiratory diseases. An oral administration of 40mg/kg or 80g/kg of eugenol notably defeated the number of entire inflammatory cells and eosinophils (10). Clove has strong antiviral property, Eugenol separated from clove buds, it exhibits antiviral action at concentration of 10 microgram/ml (9). Eugenol is the prime element of cloves volatile oil, It has potent anti-inflammatory role. In animal studies, it had anti-inflammatory action similar to that indomethacin at 0.05 and 0.2 ml/kg doses and etodolac at 0.025 and 0.1 ml/kg doses [9]. Eugenol decrease the hyperthermia, same as antipyretic drug acetaminophen (9).

#### Ajwain

- Botanical name: *Tracyspermum ammi* Linn
- Family: Apiaceae
- Ajwain is seed like and highly fragrance fruit. It has bronchodilatory, antiviral, anti-inflammatory, antifungal, antitussive and antimicrobial actions. The Total Alcoholic Extract (TAE) and Total Aqueous Extract (TAQ) from the ammi seeds, release an outstanding anti-inflammatory power (15). The bronchodilatory actions of Ajwain decoction extract was investigated in successive trials. These trials elicit that, Ajwain extract has excellent bronchodilatory action on asthmatic airtract compared to the action of theophylline (16). An In vitro assessment was performed on the methanolic extract of Ajwain which expressed noteworthy antiviral activity results on Hepatitis C virus (HCV) protease (16).

#### Cumin

- Botanical name: *Cuminum Cyminum* Linn.
- Family: Apiaceae
- Cumin seeds have distinctive aroma and flavour. Its chief aroma properties are Cuminaldehyde and cuminalcohol (17). Mohammad B et al observed that, cumin plant extract and codeine were tested on guinea pigs, that results indicate cumin has antitussive effect due to its bronchodilatory property (14). Multiple pharmacological functions have been notified, for the extracts and essential oil from cumin herb, together with, anti-inflammatory, antitussive, antimicrobial and smooth muscle relaxant effects (bronchodilation) (14). Alcoholic extract and essential oil from cumin has indications of antimicrobial activity to *Klebsiella pneumoniae* (15).

#### Garlic

- Botanical name: *Allium sativum* Linn
- Family: Liliaceae
- Garlic is a Bulbo perennial spice. Badreddine F et al described that, *Allium sativum* L aqueous extract on rat, significantly increase the relaxation of bronchial smooth muscle (bronchodilation) and prevent the symptoms of high altitude respiratory distress (12). Wendy P et al represent that, *Allium Sativum* bulb aqueous extract (ASBAE) may reduce, tachypnea, in horse affected from recurrent airway obstruction

(13). It has antiviral, antimicrobial and expectorant effects. Due to its medicinal properties, garlic added herbal preparations are used in whooping cough and other respiratory issues (19). The outcome of investigation on garlic-based time-released tablet "Allicor" may be advised for ARD (Acute respiratory distress) in children (20). Many research results, proved that garlic and its sulfuric components have immunomodulatory and antiviral actions against HIV, Herpes simplex type 1&2, Coxsackie virus, Influenza (21).

### Ginger

- Botanical name: *Zingiber Officinale* Rosc
- Family: Zingiberaceae
- Ginger is a medicinal valued rhizome. Its active materials increase the bronchodilation by changing intracellular  $Ca^{++}$  in bronchial smooth muscle (22). The therapeutic values of ginger are mostly developed by shogaol and gingerol. Shogaol is more efficient than gingerol and it has antitussive effect (23). In vitro assay represents that ginger has effective immunomodulatory, antiviral and antimicrobial action (23). Allicin is an energetic element present in *Zingiber officinale*. It has anti-inflammatory cytokinesis and antiviral agents to influenza A(H1N1) (31).

### Turmeric

- Botanical name: *Curcuma Longa* Linn
- Family: Zingiberaceae
- Turmeric is commonly called as "Indian saffron". Huge studies have submitted that maximum of the turmeric actions are due to Curcumin. Kohli *et al* have studied on various animals, that curcumin in doses of 100- 200mg/kg can reduce the allergic respiratory inflammation by suppressing the action of inflammatory protein NF- $\kappa$ B (nuclear factor kappa B) (25). Ram A *et al*, in 2003 analysed, the efficacy of Curcumin on airway hyperresponsiveness in guinea pigs investigated by plethysmography, it crucially dilates the Ovalbumin-induced airway narrowing and hyperactivity in guinea pigs by bronchodilating effect (24).

### Mint

- Botanical name: *Mentha piperita* Linn
- Family: Lamiaceae
- The peppermint has a chief element menthol component. It is the key material of cough tonics and ointments like vaporub. It is also used in pediatric seasonal cold and cough (26). Mint oil is obtained by steam distillation method. Essential oils (Eos) are administered via many ways such as oral (e.g. peppermint oil), inhalation (e.g. eucalyptus oil) and transdermal way (e.g. rosemary oil) (11). Essential oils (Eos) possess a wide range of pharmacological effects like bronchodilator, mucolytic, antiviral, anti-inflammatory (11). Peppermint vapour was helped as an inhalant for bronchial congestion (26). Mint oil mixed tea was a best medication to treat cough, bronchitis, throat and oral mucosal inflammation

because of its capacity to trigger laryngeal cold receptors (27).

### Basil

- Botanical name: *Ocimum basilicum* Linn
- Family: Lamiaceae
- It is a highly used medicinal and culinary herb in India. Aqueous extract or ethanolic extract of tulsi doses from 300 mg/day to 10 g/day, shoot up the natural killer cells and T<sub>H</sub> helper cells in adults and also raise the immune resistant to viral infections (28). The Aqueous-methanolic extract of *Ocimum basilicum* was studied for its bronchodilator action to be mediated via  $Ca^{++}$  channel blockers exert respiratory smooth muscle relaxant activities in hyper reactivity of airway (29).

### Discussion

In the current scenario, all over the world is waiting for potential and proper treatment in COVID-19. Till date, no definite drug has been discovered. From the reviews of past and present database collections, spices have bronchodilatory effect, which also have anti-inflammatory, immunomodulatory, anti-pyretic, antiviral, antimicrobial and antitussive effects. In COVID-19 cases, bronchial way obstruction and inflammation are the main causes to create the emergency and critical situation. Bronchodilation is the best way to reduce the risk in COVID-19 cases. When we intake the spice herbs, in which bronchodilation effect relieves the bronchial spasm and stagnated bronchial fluids. Automatically bronchial tree allows the entry of more atmospheric air. It leads to normalise the pulmonary ventilation and oxygen diffusion in respiratory membrane. So diffused oxygen enters the blood stream and reach the vital organs in our body. It may reduce the threatening symptoms in COVID cases.

### Conclusion

From this review article concludes, bronchodilating spice herbs may be recommended, the best supportive therapy for mild to moderate COVID cases. Apart from these bronchodilating effect, it has lots of pharmacological effects. It may also help to reduce the co-symptoms of COVID-19 disease. It's necessary to take the preventive measures like wearing mask, gloves, maintain isolation and social distancing. This study will do a lot of benefits for research article that explore this theme in the future.

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