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# PULMO *strong*



## RESPIRATORY HEALTH

- ✓ Quercetin derived from Sophora Japonica plant
- ✓ Ursolic acid derived from Rosemary leaves
- ✓ Vitamin C

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## Introduction

The Respiratory System is vital to every human being. Without it, we would cease to live outside of the womb. The respiratory tract is divided into two sections: Upper Respiratory Tract and the Lower Respiratory Tract. Included in the upper respiratory tract are the Nostrils, Nasal Cavities, Pharynx, Epiglottis, and the Larynx. The lower respiratory tract consists of the Trachea, Bronchi, Bronchioles, and the Lungs.

Of all human illnesses, upper respiratory tract infections (URTIs) occur most frequently. These acute infections of the nose, paranasal sinuses, pharynx, larynx, trachea, and bronchi are exemplified by the common cold. Viruses (predominantly rhinovirus, influenza virus, coronavirus, adenovirus, parainfluenza virus, and respiratory syncytial virus) are the causal agents of most URTIs, with rhinovirus accounting for the largest number of cases. Acute lower respiratory infections include pneumonia (infection of the lung alveoli), as well as infections affecting the airways such as acute bronchitis and bronchiolitis, influenza and whooping cough. They are a leading cause of illness and death in children and adults across the world.

Respiratory diseases impose an immense worldwide health burden.

As we all know, Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) has become a global issue. This has posed an enormous quantitative and qualitative challenge for the healthcare facilities. As of July 29<sup>th</sup>, 2020 the disease caused by SARS-CoV-2 (COVID-19) has resulted in approximately 169 lakh cases and 6.6 lakh deaths. In the various scientific citations the infection in the upper respiratory organs and lower respiratory organs due to SARS-CoV-2 has been reiterated time and again. It has been suggested that SARS-CoV-2 gain entry into the upper respiratory system via a receptor called ACE2. Once inside the cell the virus is able to produce millions of copies of itself. It was suggested that on an average, there were 676,000 copies of the virus per swab from the upper respiratory tract during the first 5 days of symptoms.

The severity of infection and the spontaneity of its spread has made it imperative to study and develop pharmacological treatments suitable for the prevention and treatment of COVID-19. At this time the drug developers have to race against time, but formulation of new drug molecules is a huge and time consuming task. The outbreak of SARS-CoV-2 has impacted the medical facilities of almost all the countries, the data of the infected people is rising exponentially and unavailability of reliable cure has left everyone with no solution but prevention through

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strengthening of immunity systems and lockdowns. All medical enterprises are working day and night to take care of the patients and also to come out with either an effective vaccine or to find quick immunity boosters, but none of the reported remedies are working on the development of preventive medicine for treatment of the respiratory system and other crucial organs like liver, brain, heart etc.

In such times, it is important that we use already established nutraceuticals for prevention of complications caused by the infection. The prevention of the fatal infection of lungs can thus, help a patient to fight the virus as well as strengthen the upper and lower respiratory tracts.

Our insight into the working mechanism of phytochemicals developed over our long experience of 17 years and research has inspired us to propose a novel combination of nutraceuticals that can effectively help in fighting upper and lower respiratory infections.

CHERESO, an innovative nutraceuticals manufacturing company, holding 20 international patents and 24 trademarks, has developed an innovative and proprietary blend of three powerful ingredients under the brand name 'PULMOSTRONG', which addresses the increasing fragility of the whole respiratory system. It supports healthy respiratory function & stronger immunity. Clinical study on PULMOSTRONG has already been initiated at a prestigious Government Research Institute.

There is sufficient literature available to support the effectiveness these ingredients for prevention of upper and lower respiratory tract infections. The ingredients are:

1. Quercetin derived from Sophora Japonica plant
2. Ursolic acid derived from Rosemary leaves
3. Vitamin C

These are naturally occurring and frequently used compounds which are effective nutraceutical therapeutic agents and are used for pharmaceutical and/or nutritional purposes. The scientific literature available about the three ingredients has been briefly summarized below.

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## QUERCETIN- FOR UPPER RESPIRATORY FUNCTION

Quercetin is a well-known flavonoid whose antiviral properties have been investigated in numerous studies. Quercetin (Nomenclature: 3,3',4',5,7-pentahydroxyflavone) is a widely distributed plant flavonoid, found in several vegetables, leaves, seeds, and grains, where it is conjugated with residual sugars to form quercetin glycosides. Studies suggest that quercetin supplementation may promote antioxidant, anti-inflammatory, antiviral and immunoprotective effects. Quercetin has been studied in various types and models of viral infection due to its promising antiviral effects in inhibiting polymerases, proteases, reverse transcriptase, suppressing DNA gyrase, and binding viral capsid proteins. Quercetin is known for its role in attenuating allergic reactivity. Quercetin has also been reported to influence immune function.

Quercetin helps in fight against allergic diseases caused either by interaction of environmental or genetic factors. These diseases mainly include respiratory, skin and food allergies.

## URSOLIC ACID (ROSEMARY EXTRACT) - FOR LOWER RESPIRATORY FUNCTION

Ursolic acid (3-β-3-hydroxy-urs-12-ene-28-oic-acid) is a natural triterpene compound found in various fruits and vegetables. There is a growing interest in Ursolic acid because of its beneficial effects. Ursolic acid is isolated from the leaves of various plants (rosemary, marjoram, lavender, thyme, and organum), fruits (apple fruit peel), flowers, and berries. Ursolic acid mediates some pharmacological processes and modulates several signaling pathways to prevent the development of chronic diseases, it exhibits anti-inflammatory, anti-oxidant, anti-carcinogenic, antiobesity, anti-diabetic, cardioprotective, neuroprotective, hepatoprotective, anti-skeletal muscle atrophy, and thermogenic effects.

Ursolic acid also has preventive effect on particulate matter 2.5-induced chronic obstructive pulmonary disease and involves suppression of lung inflammation and inflammatory cytokines and oxidative enzymes. It also inhibits inflammatory cell infiltration. It helps in reducing respiratory syncytial virus-associated with immunopathology.

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## VITAMIN-C – ASCORBIC ACID

Vitamin C is an essential vitamin with known antiviral properties which is under investigation for its beneficial effects during the stress response in sepsis and critically ill patients. Vitamin C exerts its antiviral properties by supporting lymphocyte activity, increasing interferon- $\alpha$  production, modulating cytokines, reducing inflammation, improving endothelial dysfunction, and restoring mitochondrial function. There are also suggestions that vitamin C may be directly viricidal. There is evidence that vitamin C and quercetin co-administration exerts a synergistic antiviral action due to overlapping antiviral and immunomodulatory properties and the capacity of ascorbate to recycle quercetin, increasing its efficacy. Vitamin C is able to recycle oxidized quercetin, enhancing its antiviral effects.

Taken together, the review of the literature evidences of these three ingredients constitute the platform for their use as potential nutraceutical for promotion of immunity, helping in prevention of lower and upper respiratory organ infections and prevention towards complications related to heart, liver, brain and other crucial organs of COVID-19 patients.

### Reference

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