Pulmonary Revive™ was formulated to address various aspects of lung health including those factors that participate in the pathophysiology and symptomatology of inflammatory lung diseases - particularly asthma and bronchitis - including microbial, inflammatory, and immune issues. It also demonstrates antitussive (cough suppressing), immunomodulating/balancing, antimicrobial and broncho-relaxing properties.

While asthma and bronchitis are both inflammatory conditions of the lungs, they have very different etiologies. Asthma is a multifactorial, complex disease process that has genetic, allergic, environmental, infectious, emotional, and nutritional components. Its underlying process appears to be related to an abnormal or inadequately regulated immune response and is characterized by unpredictable yet persistent symptoms, including airflow obstruction, bronchospasms, wheezing, coughing, chest tightness, and shortness of breath.

Bronchitis, an inflammation of the mucous membranes of the bronchi, can be separated into acute and chronic subdivisions. Acute bronchitis is typically caused by a viral or bacterial infection and is characterized by symptoms similar to asthma, while chronic bronchitis is depicted as a productive cough that lasts at least three months for two consecutive years and is normally caused by cigarette smoking or long term inhalation of other lung irritants.

Cordyceps sinensis is a ‘medicinal mushroom’ with a broad spectrum of health benefits which studies of diseases of the respiratory system have shown to display antitussive and expectorant effects. Studies using cordyceps in patients suffering from chronic bronchitis or bronchitis with asthma resulted in very high rates of clinical improvement. In other studies cordyceps was shown to decrease markers of inflammation, possibly by the regulation of Th1/Th2 immunity and by reducing production of IgE immunoglobulins.

Propolis is a resinous substance collected by bees from the buds of trees and is used as a sealant in the construction of their hives. Like cordyceps, propolis is a compound exhibiting various medicinal properties including antiviral, antibacterial, antifungal, anti-inflammatory and antioxidative effects and has been shown to increase immune response.

In animal models of asthma, use of propolis and/or its primary active constituent caffeic acid significantly reduced airway inflammation and hyper-responsiveness and demonstrated immunoregulatory properties. Propolis also demonstrated the ability to decrease markers of inflammation, reduce nocturnal asthmatic attacks and improve pulmonary function in human test subjects.

Pulmonary Revive™ may be beneficial for:
- Asthma
- Bronchitis
- Chronic Obstructive Pulmonary Disease (COPD)

### Supplement Facts

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<tr>
<th>Serving Size</th>
<th>Servings Per Container</th>
<th>Amount Per Serving</th>
<th>% Daily Value</th>
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<tbody>
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*Daily Value not established.

**Mechanisms of Action**

**Immune modulating/balancing:**
- Cordyceps, propolis, ginger, astragalus

**Antimicrobial:**
- Cordyceps, poropolis, ginger, astragalus, adhatoda vasica

**Anti-inflammatory:**
- Cordyceps, propolis, ginger, astragalus, boswellia, bromelain, vinpocetine

**Antitussive, antispasmodic, expectorant:**
- Cordyceps, propolis, adhatoda vasica

**Antioxidative properties:**
- Cordyceps, propolis, ginger
Ginger root is not only a spice but also a medical herb. In animal models of pulmonary inflammation, ginger demonstrated significant Th2 immune suppression and reduced airway hyper-responsiveness.\textsuperscript{8, 9, 10} Ginger is a proven anti-inflammatory, as it suppresses prostaglandin synthesis through inhibition of COX-1 and COX-2 and also suppresses leukotriene biosynthesis by inhibiting 5-lipoxygenase.\textsuperscript{11} Ginger has also been shown to possess antibacterial, analgesic and anti-cancer properties.\textsuperscript{12}

Astragalus root is one of the classic Chinese plants used to strengthen the respiratory tract and fight upper respiratory infections. A combination of astragalus and cordyceps was shown to decrease airway remodeling (bronchial tissue damage) by inhibiting the cytokine TGF-β1, which is responsible for cell proliferation.\textsuperscript{13} Astragalus was shown to stimulate Th1 immunity while inhibiting Th2 immunity in patients suffering with asthma.\textsuperscript{14} It also reduced airway hyperreactivity and demonstrated protective properties of the epithelial tissue of the lungs in acute lung injury models.\textsuperscript{15, 16} Finally, astragalus demonstrated preventative measures as it was shown to reduce the incidence of upper respiratory tract infections in patients with a past history of inflammatory lung conditions.\textsuperscript{17}

Boswellia is an Ayurvedic plant that contains potent anti-inflammatory triterpenoids called boswellic acids. Boswellic acid and its derivatives have demonstrated anti-inflammatory, anti-tumor, and blood lipid lowering activities. Dried extracts of the resin of the boswellia serrata tree have been used since antiquity in India to treat inflammatory conditions.\textsuperscript{18} Mimicking to a certain degree ginger’s mechanism of action, boswellic acids mediate their anti-inflammatory actions by suppression of lipoxygenases (5-LOX) and cyclooxygenases, preferentially COX-1, which leads directly to the formation of leukotrienes.\textsuperscript{19} This property was shown to be of key benefit in a six week clinical trial of asthmatic patients, where 70\% of the study participants supplemented with boswellia showed significant improvements in their symptoms, as opposed to only a 20\% improvement experienced by those taking a placebo.\textsuperscript{20}

But unlike ginger, boswellia also suppresses the proinflammatory enzyme human leukocyte elastase (HLE). Leukotrienes, HLE and other factors contribute to disease processes that lead to the formation of the inflammatory lung conditions such as emphysema.\textsuperscript{21, 22, 23}

Bromelain, a well known proteolytic enzyme derived from pineapple, possesses potent anti-inflammatory and immunoregulatory properties, both shown to be mechanisms of action in various models of inflammatory lung conditions. In animal models of asthma, bromelain displayed these two properties by significantly reducing leukocytes, eosinophils, and CD4+ and CD8+ lymphocytes and lowered the concentration of the inflammatory cytokine IL-13.\textsuperscript{24, 25}

Another possible mechanism of bromelain’s anti-inflammatory action was demonstrated in a study where bromelain significantly decreased neutrophil migration to sites of acute inflammation by interrupting the action of an important cytokine signaling protein, the CD128 chemokine receptor.\textsuperscript{26}

Adhatoda vasica is a classic ayurvedic herb used by Indian healers for thousands of years to address various respiratory conditions. The herb has been shown to possess antitussive, expectorant, bronchodilating and antimicrobial properties.

The antitussive activity of this extract was evaluated in animal models and was shown to function similarly to codeine against coughing induced by irritant aerosols.\textsuperscript{27, 28} Additionally, the herb has displayed antibacterial properties against drug resistant Mycobacterium tuberculosis.\textsuperscript{29}

Vinpocetine, an extract from the periwinkle plant, is known primarily for its use in cerebrovascular and age related cognitive disorders. But vinpocetine has also been shown to be a potent anti-inflammatory in animal models of lung inflammation by modulating a variety of mechanisms including the inflammatory cytokine TNf alpha and lipopolysaccharide-induced lung inflammation where lipopolysaccharides found on the outside of gram negative bacteria cause inappropriate immune responses. Also, regulated by vinpocetine is the transcription factor NF-kappaB and its subsequent dependent inflammatory responses.\textsuperscript{30, 31}

How To Use: take 3 capsules per day

For a list of references cited in this document, please visit the product landing page at: catalog.designsforhealth.com