



## Letter to Editor

JMR 2020; 6(6): 313-314  
November- December  
ISSN: 2395-7565  
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www.medicinarticle.com  
Received: 16-10-2020  
Accepted: 01-11-2020

## Bromelain and its potential therapeutic effects in COVID-19-induced respiratory complications

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### Abstract

The new viral outbreak, Coronavirus Disease 2019 (COVID-19) -caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)- has started since December 2019, and it has affected the whole world during recent months. There is not any specific antiviral treatment for this highly contagious and potentially fatal disease. Numerous different kinds of medicines are used to manage the conditions and treat COVID19 patients, but we are in a tough situation, since, COVID-19 is a multiple organ infection and SARS-CoV-2 possess different and unfortunately effective pathogenic mechanisms. Bromelain, with its numerous proven medicinal properties may be beneficial for the treatment of COVID-19.

**Keywords:** Bromelain, COVID-19, SARS-CoV-2.

Dear editor

At present, there is no specific antiviral medication for COVID-19, but several nonspecific antiviral agents, in addition to the other adjuvant drugs, are employed as medicinal cocktails for the treatment of this strange viral infection <sup>[1]</sup>.

Bromelain -a complex of proteolytic enzymes- is the most critical component of Ananas cosmosus (pineapple) active compounds with numerous therapeutic properties <sup>[2]</sup> which possesses proved antioxidant activity, can diminish cellular oxidative stress and alleviate degenerative tissue damage <sup>[3,4]</sup>. Oxidative Stress is a Key Player in COVID-19 infection <sup>[5]</sup>.

Besides, viral unbridle replication and the exaggerated host immune system response (inflammation) are the two significant causes of lung fibrosis and damage-induced by SARS-CoV-2. The bad news is that this damage may remain even after recovery and patients discharge <sup>[6,7]</sup>. Bromelain, with different mechanisms such as improvement of blood perfusion, modulation of fibroblast differentiation, and epithelialization enhancement, can ameliorate the healing process <sup>[8,9]</sup>.

In patients with COVID-19, Interleukin 6 (IL-6) levels are significantly elevated which is a potential biomarker of COVID-19 progression <sup>[10]</sup>. Bromelain inhibits the biosynthesis of (pro)inflammatory mediators such as IL-6 <sup>[11]</sup>. Administration of Bromelain in inflammatory diseases leads to a reduction in the pain <sup>[12]</sup> which is one of the main complains of COVID-19 patients <sup>[13]</sup>.

Bromelain -with proteolytic properties and subsequently mucolytic activity- appears to reduce sputum viscosity and increase the fluidity of mucus secretion in the respiratory tract, which may diminish difficulty breathing and also reduce the viral load in the respiratory system of COVID-19 patients <sup>[14]</sup>.

While the pathogenesis of SARS-CoV-2 and its proliferation-induced pathways are not still crystal clear, several distinct features of COVID -19 have been identified, and epithelial cell proliferation is one of them <sup>[15]</sup>. Bromelain, with pro-apoptotic and anti-proliferative effects <sup>[16]</sup>, can be considered as a protective candidate theoretically.

Considering all points, Bromelain may decrease pulmonary failure of COVID-19 patients. Its effectiveness in this case can be easily evaluated by clinical trials of Bromelain-containing oral nutraceuticals as safe, available, unexpansive, and efficient adjuvant herbal medicine, for the treatment of COVID-19 patients with respiratory complaints.

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