



BerriQi® as an anti-pollution ingredient

The World Health Organisation estimates that 99% of the global population breathes air containing levels of pollutants exceeding healthy limits, with at least 80% of the global population living in high pollution environments. Air pollution is one of the leading risk factors for death, attributing to 11.65% of deaths globally.¹

With growing industrialisation and urbanisation the problem of air pollution is growing. The combination of outdoor and indoor particulate matter and ozone is a risk factor for many of the leading causes of death including heart disease, stroke, lower respiratory infections, lung cancer, diabetes and chronic obstructive pulmonary disease (COPD).²

Airborne particle pollution primarily comes from the burning of fossil fuels. The smallest of these particles, 2.5 micrometres or less, dubbed particulate matter 2.5 (PM_{2.5}) are less than two and a half thousandths of a millimetre- it takes sixty of them to span the diameter of a single human hair.³ At this microscopic size they are small enough to infiltrate deep into our lung tissue and enter our bloodstream. In our lungs they can cause inflammation, with chronic long-term inflammation causing scarring and making breathing more difficult.

Once in our bloodstream, PM_{2.5} can cause further inflammation and promote plaque formation – thereby increasing blood pressure and increasing risk of stroke.⁴

BerriQi relieves immediate symptoms of exposure to high levels of air pollution and prevents further damage to the lungs and body.⁵

BerriQi works with the body's natural respiratory immune system to neutralise harmful particulate, calm immune responses to pollution, and repair damage from long term pollution exposure. BerriQi consumers may experience this as less lung constriction and the ability to take deeper breaths with ease.



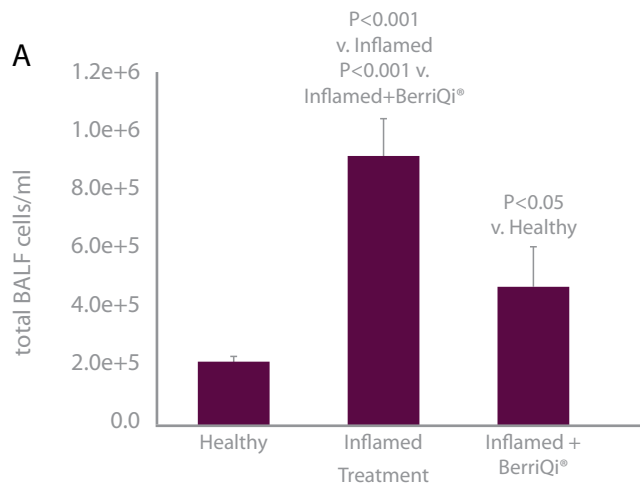
1 Murray, C. J., Aravkin, A. Y., Zheng, P., Abbafati, C., Abbas, K. M., Abbasi-Kangevari, M., ... & Borzouei, S. (2020). Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, 396(10258), 1223-1249.

2 Manisalidis I, Stavropoulou E, Stavropoulos A, Bezirtzoglou E. Environmental and Health Impacts of Air Pollution: A Review. *Front Public Health*. 2020;8:14. Published 2020 Feb 20. doi:10.3389/fpubh.2020.00014

3,4,5 Manisalidis I, Stavropoulou E, Stavropoulos A, Bezirtzoglou E. Environmental and Health Impacts of Air Pollution: A Review. *Front Public Health*. 2020;8:14. Published 2020 Feb

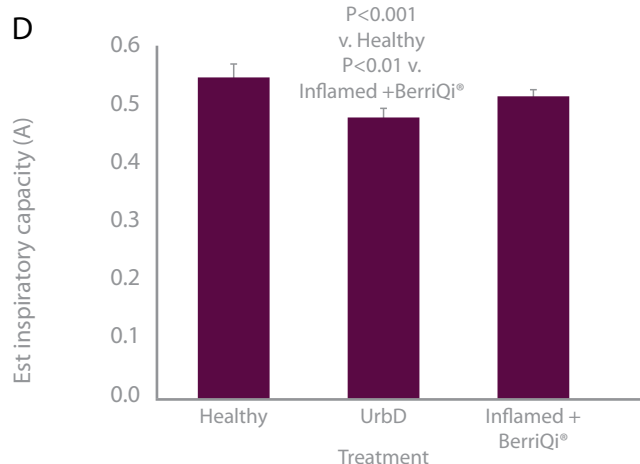
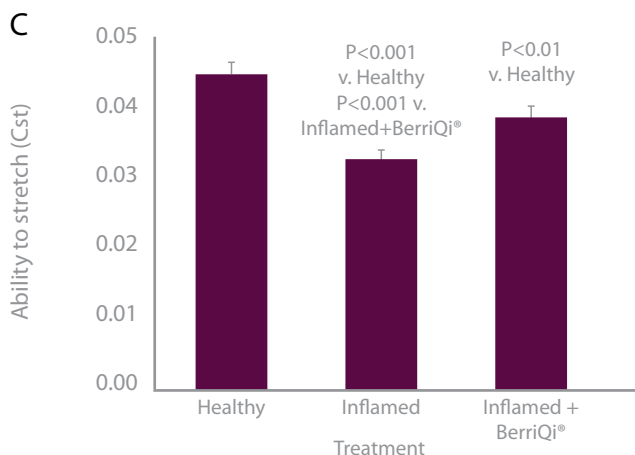
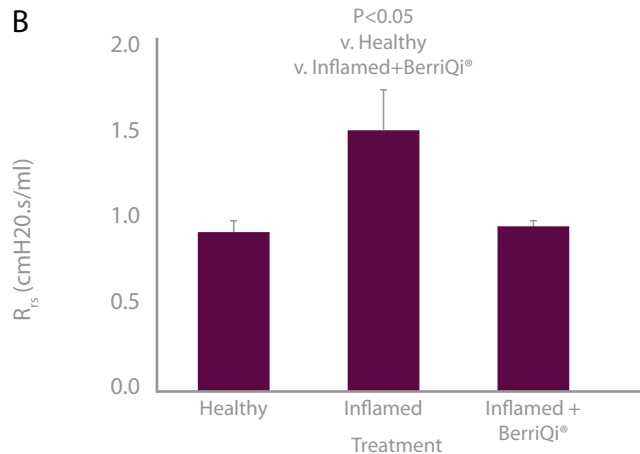
Inflammation is the body's primary response to pollution. Airborne particulate from fuel combustion and gasses such as nitrogen dioxide, sulfur dioxide, and ozone are irritating to delicate lung tissue and increase expression of pro-inflammatory factors. Increased translocation of transcription factor NfκB due to high air pollution is a broad pathway that leads the body to produce more reactive oxygen species and inflammatory cytokines. This perpetuating cycle can lead to chronic inflammation.

The unique anthocyanins in BerriQi are potent anti-inflammatory agents. They prevent the translocation of NfκB and prevent further production of pro-inflammatory factors. This is shown as a reduction in immune cells in the lungs of animals who consumed BerriQi after exposure to urban dust (UrbD) in figure A.



Lung Constriction, Stretch, and Capacity

When the lungs are inflamed from exposure to urban dust, capacity to inhale and hold air decreases due to the influx of immune cells. Eventually this reduced capacity persists due to excess collagen deposition and scarring, which reduces stretchiness and causes constriction of the lungs. BerriQi reduces the constriction caused by urban dust, returning the lungs to their healthy state prior to urban dust exposure (B). Measured another way, the stretchiness of lungs is reduced with exposure to urban dust but is restored with BerriQi consumption (C). Collectively, the volume of air that can be inhaled (Inspiratory capacity) is restored with BerriQi consumption after exposure to urban dust (D).



1 World Health Organisation (September 2021) Ambient (outdoor) air pollution [Fact Sheet]

2 World Health Organisation (September 2021) What are the WHO Air quality guidelines? [Fact Sheet]

3 Burnett et al. (2018). Global estimates of mortality associated with long-term exposure to outdoor fine particulate matter. PNAS: 115 (38) 9592-9597

4 Wei Y, Wang Y, Di Q, Choirat C, Wang Y, Koutrakis P, Zanobetti A, Dominici F, Schwartz JD. (2019) Short term exposure to fine particulate matter and hospital admission risks and costs in the Medicare population: time stratified, case crossover study. BMJ. Nov 27;367:16258.

5 Shaw, O.M., Sawyer, G.M., Hurst, R.D., Dinnan, H. and Martell, S. (2021), Different immune and functional effects of urban dust and diesel particulate matter inhalation in a mouse model of acute air pollution exposure. Immunol. Cell Biol., 99: 419-427.



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