

Don't Overheat!

Supplementation with Oligonol® Derived from Lychee Could Improve Exercise Performance

INTRODUCTION

For those of us who are not familiar with tropical fruits from Southeast Asia, the fruit of the Lychee tree (*Litchi chinensis*) is one we most likely have never come across. At first glance, perhaps one would pass over this unfamiliar fruit. But if you look more closely, peeling off its red, bumpy skin reveals the sweet, translucent, succulent lychee fruit.

As with all fruits, within the flesh of the lychee dwell bioactive phytochemicals (natural beneficial compounds from plants). The presence of these compounds makes fruits not only delicious but also healthy. One widely investigated class of plant-derived bioactive compounds, polyphenols, is connected to the health benefits associated with increased consumption of fruits and vegetables.¹ Polyphenols you may be familiar with are: catechin from tea, resveratrol from grapes, or anthocyanin from blueberries.² The health benefits of these polyphenolic compounds are largely linked to their anti-oxidant ability to neutralize reactive free radicals that otherwise could damage cells.

OLIGONOL: WHAT AND WHY?

One of the key factors scientists consider when investigating bioactive compounds is oral bioavailability. In other words, how much you absorb into your blood after ingesting a compound. Multiple factors can influence absorption, ranging from physical properties of the compound to the physiology of the person taking it. With polyphenols, absorption is limited due to the size of the molecules.² Larger, higher-molecular-weight compounds are poorly absorbed compared with smaller, lower-molecular-weight compounds.

Not all polyphenols are the same, and the majority of naturally occurring polyphenols typically exist as long-chain polymers. While these compounds exhibit strong anti-oxidant activity in the lab, they are poorly absorbed in the body due to their large size. If compounds are not absorbed into the blood, they never have a chance to benefit the body. Polyphenols' poor absorption by the body has led to the development of Oligonol. Oligonol consists of smaller monomer, dimer, and trimer polyphenols derived from lychee fruit. The smaller size of molecules in Oligonol increases their absorption and in turn increases their bioactivity compared with larger polyphenols.³ Over the last decade, the research behind Oligonol has established its safety and efficacy as an anti-oxidant, anti-inflammatory, and anti-obesogenic ingredient with superior absorption compared with other polyphenolic compounds.

OLIGONOL: INCREASES PERFORMANCE – NEW FINDINGS

More recently, a growing body of evidence published by researchers in Korea has begun to establish efficacy for Oligonol as a performance-enhancing ingredient. These studies investigated the effect of Oligonol in humans experiencing simulated heat stress. In everyday life, individuals experience heat stress when performing strenuous physical exertion or they're exposed to excessive environmental heat. Heat stress results in increased circulation of pro-inflammatory compounds in the blood, contributing to fatigue and muscle soreness. Also, these pro-inflammatory compounds are known to increase body temperature. Moreover, heat stress induces our body's sweat response, resulting in loss of fluids from the body and in turn reducing exercise performance.

As exercise performance is interconnected with inflammation status and Oligonol has previously been shown to reduce inflammation, investigators began to explore whether Oligonol supplementation improved exercise performance. A brief review of these findings appears below:

A study using 19 healthy volunteers investigated the interrelationship between Oligonol supplementation and blood concentrations of pro-inflammatory compounds in humans performing vigorous exercise.⁴ As expected, exercise increased the concentration of pro-inflammatory compounds circulating in the blood. Test subjects receiving 100 mg of Oligonol treatment daily in a beverage for 1 month presented significant reduction in the exercise-induced increase of inflammatory compounds. These results substantiate the anti-inflammatory effect of Oligonol in humans.

A similar study conducted by the same researchers investigated the immediate effects of Oligonol treatment on concentrations of these same inflammatory compounds.⁵ In this study, subjects received 100 mg of Oligonol 30 minutes before heat stress began. This study simulated heat stress by immersing

subjects in a pool of hot water. As expected, simulated heat stress resulted in increases in body temperature and concentrations of inflammatory compounds. Oligonol treatment resulted in significant reduction of these increases compared with control. These results establish the potential of Oligonol to reduce body temperature in humans.

From these first two studies, researchers took the next logical step in investigating the mechanism of action for the cooling effect produced by Oligonol.⁶ Prostaglandin E2 (PGE2) plays a central role in fever and inflammatory response. Concentrations of PGE2 and cyclooxygenase-2 (COX2), which is responsible for forming PGE2, were measured in humans experiencing a background of heat stress simulated by immersion in hot water. The treatment group received 100 mg of Oligonol 1 hour before measurements were taken. As expected, simulated heat stress resulted in increased body temperature and concentrations of PGE2 and COX2. Oligonol treatment significantly reduced increases in body temperature and PGE2 concentration elicited by heat stress compared with the control group. Also, Oligonol treatment reduced the increases of COX2 so that the increase was not significant from base line levels. These results further substantiate the cooling effect of Oligonol supplementation in humans.

Continuing investigation of Oligonol's actions in lowering body temperature, the following study measured the effect of Oligonol supplementation on sweating response in humans.⁷ Members of the treatment group received 200 mg of Oligonol treatment daily for 1 week. Increases in body temperature associated with simulated heat stress were significantly reduced in the treatment group. Also in the treatment group, sweat onset time was increased. Moreover, sweat rate, sweat volume, active sweat gland density, and sweat gland output were all reduced compared with control. These results suggest that Oligonol supplementation reduces increases in body temperature associated with heat stress and reduces fluid loss from sweating.

Our final study of interest investigated the immunomodulatory potential of Oligonol supplementation in humans undergoing heat stress.⁸ In this study, treatment consisted of 200 mg of Oligonol daily for 1 week. As expected, heat stress induced increases in body temperature, and concentrations of inflammatory compounds were significantly reduced in the treatment group compared with control. Also, Oligonol treatment significantly increased counts of T, B, and natural killer (NK) cells. T and B cells are involved in specific acquired immune response. T cells seek out specific pathogens that have been previously identified as invaders. B cells generate antibodies and essentially remember the identity of specific pathogens so they can be quickly identified as outsiders in the future. The role of NK cells is to provide a first line of defense against cancer and pathogens.

Specific evidence from the studies indicates that supplementation with Oligonol reduced the heat-stress-induced increases in inflammatory compounds, body temperature, and sweating response. Oligonol has the potential to increase exercise performance and recovery by:

1. Lessening fatigue and muscle soreness by limiting the increase of circulating inflammatory compounds associated with heat stress.
2. Reducing increases in body temperature resulting from heat stress.
3. Decreasing sweat response (i.e., reduced sweat volume and increased time to sweat onset).
4. Stimulating immune response, resulting in faster muscle repair.

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