

Oligonol® Overview

Low-molecular-weight polyphenolic extract derived from lychee fruit

Derived from lychee fruit, Oligonol is a proprietary, low-molecular weight polyphenolic extract that has metabolic, cardiovascular, and anti-aging benefits.

Constituent Profile

The lychee tree (*Litchi chinensis*) is a type of tropical fruit tree from Southeast Asia. Within the flesh of the lychee dwell bioactive phytochemicals which are natural beneficial compounds from plants. One important class of such beneficial compounds is polyphenols. Conventional long-chain polyphenols' poor absorption by the body has inspired the development of Oligonol. Compared with conventional polyphenols, Oligonol is a functional food containing catechin-type monomers and a proanthocyanidin oligomer converted from polymer forms via a novel and proprietary manufacturing process innovated by Amino Up Chemical Company (one of Japan's leading bionutraceutical companies) to improve its bioavailability. The final product, which contains high levels of low-molecular-weight flavonols, was tested in many human clinical trials. The results showed that the blood concentration of polyphenols in subjects who had taken a single dose of the extract was three times higher than that of those who had taken the regular lychee extract.

Clinically Researched Benefits

Maintaining a healthy weight is an increasingly common concern, both in the United States and around the world. Not everyone gains weight in the same place though. People who have a pear-shaped body have smaller waists and carry fat around the hips. People who have an apple-shaped body, on the other hand, have larger waists and accumulate fat around the belly. This kind of fat, known as visceral fat, can collect around the organs and is considered more dangerous than regular fat, because it interferes with normal metabolism. A person doesn't even have to be overweight to suffer the consequences of visceral fat.

Preliminary research evidence has already shown that Oligonol has beneficial effects on metabolism. A randomized, double-blind, placebo-controlled 10-week trial recruited adult volunteers whose abdominal circumference measured greater than 85 cm (33.5 inches). The results showed that the Oligonol-group subjects experienced reductions in weight, body mass index (BMI), abdominal circumference, and waist circumference compared with the placebo group. Abdominal CT scan analyses also revealed a

dramatic 15% drop in visceral fat (Nishihira J., et al., 2009). What do these data mean? A study conducted by Duke University on 175 overweight adults found that participants who performed high-dose vigorous-intensity activity had their visceral fat levels drop by only 7% in six months. In other words, Oligonol reduced visceral fat levels twice as much as vigorous exercise — in less than half the time.

Blood tests showed that the antioxidant ability of the Oligonol group trended higher than that of the placebo group, while their levels lipid peroxides (fats that have been attacked by free radicals) were remarkably reduced. Oligonol also maintained triglycerides that were already within a healthy range.

Other studies showed Oligonol may regulate the production of special hormones produced in the fat tissues to facilitate fat metabolism.

Maintaining balanced blood sugar is another important element of healthy metabolism. Blood sugar is linked with triglycerides; when triglycerides are high, blood sugar tends to be as well. Elevated triglycerides don't cause high blood sugar, but they do indicate there is a problem with glucose metabolism, because they only rise once the body has lost its sensitivity to insulin. Maintaining healthy triglyceride levels is associated with improved arterial health.

A three-way, crossover clinical study conducted in 9 healthy male participants showed that when compared with the control group, administration of Oligonol helped maintain post-prandial levels of triglycerides that were already within a healthy range, decreased chylomicron TG responses significantly, and delayed the time for reaching a maximum level of serum TG and chylomicron TG. The results suggested supplementation with Oligonol could inhibit fat absorption and keep postprandial lipid levels in the normal range among healthy subjects, thereby supporting arterial flexibility (Tani M., et al., 2009).

Heat stress is experienced by everyone, especially professional athletes, when performing strenuous physical exertion. Heat stress results in increased circulation of excitatory compounds in the blood, contributing to fatigue and muscle soreness, and also wreaks havoc with DNA (Kantidze OL, et al., 2016). In addition, heat stress induces the body's sweat response, which results in loss of bodily fluids and in turn reduces exercise performance.

Previous studies showed Oligonol could reduce serum concentration of excitatory biomarkers including cortisol, IL-1 β ,

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and IL-6 after heat stress (Li S., et al., 1999) and improved exercise performance. One double-blind, crossover clinical study using oral supplementation of 100 mg of Oligonol showed that Oligonol intake before submerging half the body into hot water significantly prevented elevation of tympanic temperature and mean body temperature, when compared with the placebo group. In addition, Oligonol ingestion lowered serum levels of prostaglandin E2 (PGE2) and cyclooxygenase-2 (COX-2) significantly when compared with the placebo group (Shin YO, et al., 2013).

Another placebo-controlled, crossover clinical trial using 200 mg of Oligonol for one week showed a smaller increase in body temperature during heat stress and reduced the amount of whole-body sweat loss. The subjects in the Oligonol group maintained serum aldosterone at a relatively low level and serum sodium at a relatively higher level than the placebo group did (Jeong BL, et al., 2015). These results indicated the important role Oligonol plays in sweating, plasma volume, and osmolality in response to heat stress, suggesting its potential use in attenuating body temperature and excessive sweating under heat load in healthy humans, especially in professional athletes, who are under tremendous heat stress caused by intense training every day.

Skin damage due to strong UV exposure during the summer season and dehydration of skin under low temperature during winter time are main aging concerns. Clinical studies demonstrated that applying 10% Oligonol®-CS solution to skin twice a day showed improvement on noticeability of pores, skin elasticity, pigmentation, and wrinkles. Also, skin thickness was reduced in the Oligonol®-CS applied area compared with placebo, which can be attributed to the improvement of barrier function. (Tsuboi T., et al., 2008, presentation). Another open-label, controlled clinical study showed that 12 weeks of Oligonol supplementation at 100 mg twice a day, showed a tendency toward improvement of pigmentary deposits as well as wrinkles in the eye area, reduction of skin age and roughness, and overall noticeable improvement of skin condition (MacKenzie AR, 2007, unpublished data).

Fatigue prevention — When more blood is flowing to the muscle, more oxygen is delivered. In the meantime, more waste is being removed from the muscle. This combination prevents fatigue. In one clinical study conducted in a total of 47 young athletes, half the participants took Oligonol, and the other half took regular lychee extract. At the end of the trial, not only did the Oligonol group report feeling improvements in recovery from fatigue,

mental clarity, quality of sleep, eye fatigue, and stiff shoulder compared with the regular lychee group, but they also had lower urine levels of 8-OHdG, which is a marker for physical and mental fatigue (Ohno H., et al., 2008).

Capsule vs. Ready-to-Drink — Conventional formulation produces Oligonol in capsule form, while Oligonol is an ideal candidate for ready-to-drink or stick-pack applications. Bioequivalence clinical studies showed that drinkable Oligonol has higher bioavailability than the hard-capsule formulation in two aspects: 1) The polyphenol concentration and antioxidant activity in blood of both groups reached the maximum level (Tmax) 2 hours after the intake. 2) The maximum value (Cmax) was doubled in the groups that took Oligonol dissolved in a drink compared with the groups that took Oligonol in hard-capsule form (bioequivalence study of Oligonol, unpublished data, 2007).

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