

thus implicating its potential as a powerful radical scavenger. Additionally, both sesamol and sesamol dimer were reported as having a higher rate constant than BHT; 4.00 ± 0.006 vs. 0.37 ± 0.009 , and 0.50 ± 0.015 vs. 0.37 ± 0.009 , respectively.²⁷

Recently, sesame oil was demonstrated to be protective against DNA oxidative damage and lipid peroxidation. Given a chemical challenge a 2.5-fold increase in lipid peroxidation was observed, which was reduced by 16-61% with sesame intake. In addition, DNA damage resulting from the challenge increased three-fold, while no damage was observed in the sesame treated group.²⁸ Consequently, this study demonstrated that pretreatment with sesame oil offered effective protection of DNA from both lipid peroxidation and oxidative damage, in a dose-dependent fashion.²⁸

In a separate study, sesame oil was observed to exhibit a “profound inhibitory effect on the Epstein-Barr virus early antigen induction.” Of the sesame compounds, sesame oil exhibited the most potent effect, which was followed by sesamol, then resveratrol. Additionally, both sesamol and resveratrol demonstrated both “a remarkable cytotoxic activity,” and a “profound free radical scavenging activity.”²⁶

A further toxicity study in animals demonstrated the benefit of sesamol in the improvement of cognitive impairment and oxidative damage. Subsequently, its use has been proposed as an effective agent in the management of Huntington's disease.²⁹ Sesamol pretreatment was also demonstrated to significantly decrease the “cytotoxicity, intracellular ROS, lipid peroxidation, oxidative DNA damage and apoptotic morphological changes” in cells subjected to UVB-irradiation, all of which was attributed to its “ROS scavenging activity.”³⁰ A significant improvement ($P < 0.001$) in the activities of enzymatic and non-enzymatic antioxidants with the use of sesame oil has also been reported.³¹

Anti-Aging Benefit and Vitamin E Sparing Activity

Associated with its antioxidant activity is the feature of sesame that acts as a preventative in the accumulation of factors attributed to or resulting in aging.³² This anti-aging feature is associated with its sparing action on the activity of vitamin E, and is correlated with a significant increase in the levels of both alpha- and gamma-tocopherol, as well as the total plasma tocopherol ratio with intake. In correlation to its vitamin E sparing action, sesame intake is also associated with the inhibition of lipid peroxidation, a characteristic

attributed to the lignans distinct to sesame.²⁷

Alpha-tocopherol is recognized as an important component in vascular tone, and is a mediator of nitric oxide production. In hypercholesterolemic patients and smokers, alpha-tocopherol supplementation has been demonstrated to aid in the maintenance of normal artery wall flexibility.³³ Yamashita et al. examined the effect of ingestion of sesame on the concentration of alpha-tocopherol and vitamin E activity in plasma, and noted an enhanced vitamin E bioactivity with sesame intake.³⁴

Gamma-tocopherol on the other hand, functions in the scavenging of reactive nitrogen species, the resulting product being 5-Nitro-gamma-tocopherol.³³ Like reactive oxygen species, the consequence of the accumulation of reactive nitrogen species is damage to proteins, lipids, and DNA. An increase in nitric oxide reactive species is associated with numerous degenerative diseases, including atherosclerosis,^{35,36} Parkinson's disease, amyotrophic lateral sclerosis (ALS),³⁷ Alzheimer's disease,³⁸ Huntington's disease, and multiple sclerosis.^{39, 40, 41, 42} Cooney, RV, et al. reported a 19.1% increase above baseline in gamma-tocopherol in subjects consuming two sesame muffins each morning for three days, each containing ~10.8 g of sesame seed/muffin (~2.5 mg gamma-tocopherol/muffin), versus a 12% decline in those consuming the control muffins (no sesame). In addition to this increase in gamma-tocopherol, a 68% mean increase in the gamma-to beta-tocopherol ratio, along with nearly a doubling of the median ratio (4.6 at baseline vs. 9.2 after sesame) was also observed.⁴³ This action has been attributed to the inhibition of tocopherol gamma-hydroxylase or CYP-3A, resulting in the accumulation of tocopherol.^{44, 45, 46} Yamashita has postulated that a synergistic action exists between the gamma-tocopherol and the suppressive action on the peroxidation of lipids, and that gamma-tocopherol exerts vitamin E activity equivalent to that of alpha-tocopherol.⁴⁷ This action is also postulated to be associated with its anti-aging characteristic.

Antihypertensive (Hypotensive) Effect

Sankar, et al. recently reported a lowering of blood pressure in conjunction with sesame use. In addition to an improvement in blood pressure, a beneficial effect on the lipid profile (total cholesterol, LDL, HDL and triglyceride), and the antioxidant status was also reported.³¹ A separate double-blind, placebo controlled study noted a 3.5 mmHg decline in systolic blood pressure (BP), and a 1.9 mmHg decline in diastolic BP, with an intake of 60 mg sesamin.⁴⁸ Although these

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