Review Paper: Bioactive Compounds in Persimmon and Emerging Evidence for Their Positive Impact

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Abstract—Persimmon (Diospyros spp.), a fruit high in bioactive chemicals, has sparked widespread interest due to its possible health advantages. It is famous for its nutritional value, which includes vitamins, minerals, fiber, and polyphenolic substances. Recent research suggests that persimmon may provide a variety of health benefits, including antioxidant, antianti-cancer, and inflammatory, cardioprotective characteristics. This review investigates the bioactive chemicals found in persimmons and gives an outline of developing evidence supporting their medicinal potential. The objective of this paper is to highlight the growing interest in persimmon as a functional food and to assess its health benefits using scientific research.

Index Terms—Persimmon, Bioactive compounds, Polyphenols, Carotenoids, Antioxidant, Antiinflammatory, Cardiovascular health, Anti-cancer properties, Neuroprotective effects, Weight management

I. INTRODUCTION

Persimmon is a subtropical to temperate fruit native to East Asia, although it has spread to other countries due to its commercial and nutritional value. Diospyros spp. includes cultivars such as Diospyros kaki (Japanese persimmon), which is frequently consumed worldwide. Persimmons have traditionally been used in Asian medicine, but in recent years, their bioactive chemicals have sparked interest in Western study due to their potential to treat a variety of chronic conditions. Persimmons contain variety of bioactive а substances, including polyphenols, carotenoids, vitamins, dietary fiber, and tannins, which are thought to contribute to their beneficial health effects. This research examines the present evidence for bioactive chemicals in persimmons and explores their

possible therapeutic effects in light of emerging scientific results.



Fig 1 Persimmon Fruit – Nutrition and Benefits Bioactive Compounds in Persimmon Persimmons contain a high concentration of bioactive chemicals, which have been linked to potential health benefits. Key components:

1. Polyphenols.

Polyphenols are a class of plant-based chemicals that possess antioxidant effects. Persimmons, especially the astringent variety, are high in polyphenols such flavonoids (e.g., quercetin, kaempferol, and myricetin) and tannins. These chemicals are associated to a variety of biological processes, including:





Perrsimmon polyphenols contain significant antioxidant properties that neutralize free radicals and reduce oxidative stress. This is critical for preventing cellular damage, aging, and the development of degenerative diseases such as heart disease, diabetes, and cancer.

• Persimmon polyphenols block pro-inflammatory cytokines and enzymes, including COX-2, making them beneficial for inflammatory illnesses.



Fig 1 Visualizing the Cardiac Cycle: Persimmon Polyphenols and Their Role in Cardiovascular Health



Fig 2 Blood Glucose Monitoring: Implications of Persimmon in Glycemic Control

2. CAROTENOIDS

Carotenoids, including beta-carotene, lutein, and zeaxanthin, are abundant in persimmons. These molecules have a key role in preserving good age-related macular avoiding eyesight and degeneration (AMD). Beta-carotene, a precursor to vitamin A, is particularly important. · Carotenoids help protect cells from oxidative stress, contributing to the fruit's overall antioxidant capability.



3. VITAMINS AND MINERALS

Persimmons are high in vitamins C, A, and numerous B vitamins, as well as vital minerals such as potassium and manganese. These nutrients promote a variety of biological activities, including:
Vitamin C promotes immunological function and collagen formation, supporting skin and connective tissue health.

• Cardiovascular Health: Potassium regulates blood pressure, while manganese promotes heart function and reduces oxidative damage to blood vessels.

4. DIETARY FIBER

Persimmons are high in dietary fiber, specifically soluble fiber in the form of pectin. Fiber promotes digestive health and prevents constipation. It also improves intestinal health by promoting the formation of healthy bacteria.

• Fiber induces satiety, which can aid in weight management by reducing hunger and food consumption.



Fig 3 Soluble Fiber in Persimmon: Supporting Digestive and Metabolic Health



Fig 4 Dietary Fiber from Persimmon and Safety: Aiding Weight Management

5. TANNINS

Tannins, particularly ellagic acid and its derivatives, are polyphenolic chemicals that contribute to persimmon's astringency. Ellagic acid and other tannins have anti-mutagenic and anti-carcinogenic properties, preventing the growth of cancer cells in multiple investigations.

Research suggests that tannins in persimmons may have antiviral capabilities, perhaps reducing infections.

Emerging Evidence for Persimmon's Health Benefits

1. Antioxidant and Anti-inflammatory Effects Recent research has found that persimmons' polyphenolic and carotenoid content contribute greatly to their antioxidant and anti-inflammatory capabilities. Kim et al. (2021) found that persimmon extracts can reduce oxidative stress and modify inflammatory indicators in animal models. These effects are especially effective in preventing chronic diseases such as cardiovascular disease and neurological disorders.



Fig 5 Health Benefits of Persimmon Fruit

2. Cardiovascular Health

Persimmon eating has been related to better cardiovascular health. Zhao et al. (2020) discovered that persimmon extracts dramatically reduced LDL cholesterol levels and the risk of atherosclerosis in animal studies. Additionally, the potassium component of persimmons helps regulate blood pressure, which supports their involvement in cardiovascular health.

3. Anti-cancer Effects

Several in vitro and animal studies have demonstrated that persimmons have anti-cancer potential, owing to the presence of polyphenols and tannins. Shih et al. (2019) found that persimmonderived chemicals suppress the proliferation of breast cancer cells. Other research has revealed that the tannins found in persimmons may trigger apoptosis (programmed cell death) in cancer cells, making them a promising natural anticancer drug.

4. Weight Management and Metabolic Health

Persimmons are low in calories and high in fiber, which may help with weight loss and lower the risk of obesity. Yang et al. (2022) found that persimmons could help obese rats lose weight and increase insulin sensitivity. These data indicate that persimmons may help manage blood glucose levels and promote metabolic health.

5. Neuroprotective Effects

Emerging evidence supports persimmon's neuroprotective capabilities. According to studies, persimmons' high quantities of antioxidants and flavonoids may protect the brain from oxidative stress and inflammation, potentially lowering the risk of neurodegenerative disorders like Alzheimer's and Parkinson's.

6. CONCLUSION

Persimmons are a highly nutritious fruit rich in bioactive chemicals that provide numerous health advantages. Emerging research confirms their antioxidant, anti-inflammatory, anti-cancer, and cardiovascular protective capabilities, as well as their significance in metabolic health and weight management. A increasing amount of research highlights persimmons' potential as a functional food, providing not only nutritional value but also therapeutic benefits for the prevention and treatment of a variety of chronic illnesses. However, more clinical investigations and human trials are required to completely comprehend the scope of these advantages and set precise guidelines for their consumption.

REFERENCES

- Kim, Y. J., et al. (2021). "Antioxidant and antiinflammatory effects of persimmon extracts in vivo." *Journal of Nutritional Biochemistry*, 45, 145-151.
- [2] Zhao, X., et al. (2020). "Effects of persimmon on cardiovascular health: A review of recent studies." *Journal of Clinical Nutrition*, 50(4), 350-358.
- [3] Shih, P. C., et al. (2019). "Anticancer potential of persimmon-derived compounds in breast cancer cells." *Cancer Research Journal*, 12(2), 202-209.
- [4] Yang, Y., et al. (2022). "Persimmon extract promotes weight loss and improves metabolic health in obese rats." *Obesity Research and Therapy*, 6(3), 234-245
- [5] Kim, Y.-M., et al. (2021). Bioactivities of Phenolic Compounds from Kiwifruit and Persimmon. Molecules, 26(15), 4405. https://doi.org/10.3390/molecules26154405
- [6] Gea-Botella, S., et al. (2021). Carotenoids from Persimmon (Diospyros kaki Thunb.) Byproducts Exert Photoprotective, Antioxidative and Microbial Anti-Adhesive Effects on HaCaT. Pharmaceutics, 13(11), 1898. https://doi.org/10.3390/pharmaceutics13111898

[7] Yokozawa, T., et al. (2014). Role of Oligomeric Proanthocyanidins Derived from an Extract of Persimmon Fruits in the Oxidative Stress-Related Aging Process. Molecules, 19(5), 6707– 6726.

https://doi.org/10.3390/molecules19056707

[8] Xie, C., et al. (2015). Persimmon (Diospyros kaki L.) Leaves: A Review on Traditional Uses, Phytochemistry and Pharmacological Properties. Journal of Ethnopharmacology, 163, 229–240.

https://doi.org/10.1016/j.jep.2015.01.027

[9] Yaqub, M., et al. (2016). Chemistry and Functionality of Bioactive Compounds Present in Persimmon. Journal of Chemistry, 2016, 3424025. https://doi.org/10.1155/2016/3424025