Open Access Review Article

January - February 2026, Vol. 02 (1), 01-14

INTERNATIONAL JOURNAL OF PHARMACEUTICAL RESEARCH AND MEDICINAL PLANTS

(An International Peer Reviewed Journal)

# Overview Study on The Nutrition Value, Types and Beneficial Effect of Tea and Coffee

**Prof. (Dr.) Niraj Gupta**

College of Pharmacy Agra, Dr. A.P.J. Abdul Kalam Technical University, Lucknow, UP, India

**ARTICLE INFO:**

**Received:** 06th Jan. 2026; **Received** in revised form: 24th Jan. 2026; **Accepted:** 08th Feb. 2026; **Available online:** 27th February 2026.

**Keywords:** History of Tea, Green Tea, History of Coffee, Types of Tea, Tyes of Coffee.

**DOI:** https://doi.org/10.61280/journalmedicinalplants.v2i1.240

***Corresponding Author:** Prof. (Dr.) Niraj Gupta

**ABSTRACT**

Both Tea and Coffee have been shown in several epidemiological research and clinical trials to have positive benefits on human health, including hepatoprotective, anti-obesity, anti-diabetic, antihypertensive, and anticancer properties. Additionally, cell-based and animal research corroborate these human findings. These effects have been linked to chlorogenic acid in coffee and epigallocatechin gallate in green tea. These compounds have been suggested to act through a variety of pathways, the most significant of which seems to involve reactive oxygen species. Both have opposing dual effects as prooxidants and antioxidants. By scavenging ROS, their antioxidative impact can cause nuclear factor-κB to be downregulated, which can result in a number of beneficial benefits, including anti-inflammatory effects and cancer cell death. The prooxidant effects, however, can enhance the formation of ROS, resulting in the activation of AMP-dependent protein kinase, which regulates various enzymes and factors that have advantageous functions. Currently, it is uncertain how they can be induced to function as either a prooxidant or an antioxidant, although the levels within cells, the existence of metal cations, and the cells' redox state seem to be significant factors. Significantly, numerous human studies failed to indicate the positive health benefits of coffee and green tea. The varying outcomes might have resulted from several confounding variables such as smoking, gut microbiota, and genetic influences. This chapter explores the existing knowledge regarding the qualities of green tea and coffee to enhance the comprehension of a method for enjoying a healthy longevity. Tea, originating in China, has reached every corner of the globe and has become the most enjoyed drink, following water. This review seeks to enhance current understanding by providing insights into the nutritional benefits of green tea and its pharmacological impacts on people. Moreover, its market share, patents, and formulations for nutraceuticals and pharmaceuticals are presented.

## Introduction

At present, coffee production is predominantly focused in the region known as the coffee belt, which lies between the Tropic of Cancer and the Tropic of Capricorn. Currently, the leading coffee producers include Brazil, Colombia, and Vietnam, collectively accounting for over half of global production of this commodity. Among the 100 recognized species of the Coffea genus, Coffea arabica L. (Arabica coffee) and Coffea canephora P. (Robusta coffee) are the two key species of commercial significance. Regarding the evaluation of the quality profile, arabica is prominent and accounts for more than 70 percent of global coffee production. Arabica coffee features a subtle flavor and has nearly double the caffeine content of robusta. Robusta, in contrast, is characterized by its bold and powerful flavor, and scientific research indicates it has greater resistance to diseases during farming. The extensive history of tea as a drink is notable, and it has flourished in various regions around the globe.

## History of Tea

Green tea [camellia sinensis]is one of the most common globally consumed beverages. Camellia sinensis is the species of plant whose leave &leaf buds are used to produce Chinese tea. It is of the genus camellia, a genus of flowering plant in the family theaceae green tea is a non-fermented tea & contains more catechins than black tea. The flavonoids in green tea are the catechins, epicatechin, epigallocatechin & epigallocatechin gallate [EGCG]. The concentration of total polyphenols in dried green tea is ~ 8-12% other compounds of interest in dried green tea leave include gallic acid quercetin, kaempferol, reciting, caffeic acid& chlorogenic acid. There are various types of green tea that are classified according to their taste and antioxidant properties. Green tea may exert the prevention effect in various cancers including lung, esophagus, stomach, international, pancreatic, breast, prostate or, bladder, cancers. In Ayurveda system, Unani system practitioners used green tea as a stimulant, diuretic& astringent.

### History of Green Tea

- Green tea has been a popular beverage for thousands of year& was originally grown in China dating back 5001 years.
- Green tea has remained popular beverages in Asia since
- Tea was introduced to the western culture in the 6th century by Turkish traders.
- Second to water, tea is now considered to be the world's most popular beverage World tea production of green tea has passed from 3.15 million tons in2003to 3.6million tons in2006.

**Common name:** -green tea
**Other name:** -Chinese tea, camellia tea, Gruner tea Matsu-cha
**Botanical name:** -camellia sinensis
**Family**: -Theaceae
**Plant part used**: - leaf

**Figure:** Tea leaf

**Tea Composition**

Eight catechins, caffeine, theaflavin, gallic acid, chlorogenic acid, ellagic acid, and kaempferol-3-G are the main chemical compounds in tea. In addition, the chemical structures of main phytochemical compounds in tea. The main constituents of green tea leaves are polyphenols. The fresh tea leaves Contain Caffeine of 3.5% of the total dry weight, Theobroma [0.15-0.2%.], theophylline (0.02-0.04%) & other methylxanthines, lignin (6.5%), Organic acids (1.5%), chlorophyll (0.5) & other pigments, theanine (4%) & free amino acid (1.5-5%) & numerous flavor compounds.

| Component | Percentage Range |
|---|---|
| Water | 5-10% |
| Polyphenols (catechins) | 25-30% |
| Caffeine | 3-5% |
| Amino acids | 2-4% |
| Carbohydrates | 5-10% |
| Minerals | 1-5% |
| Vitamins | Traces |
| Essential oils | 0.5-1% |

*Water:* Tea leaves contain around 5% to 10% water by weight.

*Polyphenols:* Polyphenols are the major group of bioactive compounds in tea. They include catechins, flavonoids, and phenolic acids. Catechins are the most abundant, with epigallocatechin gallate (EGCG) being one of the most researched and prominent catechins in tea. Polyphenols contribute to the antioxidant properties of tea and are responsible for its bitterness and astringency. They typically make up around 25% to 30% of tea leaves.

*Caffeine:* Tea contains caffeine, a natural stimulant. The caffeine content varies depending on the type of tea and the brewing method but generally ranges from 3% to 5% of tea leaves. Green tea usually contains less caffeine compared to black tea.

*Amino Acids:* Tea contains various amino acids, with theanine being the most notable. Theanine contributes to the flavor of tea and has calming effects. Amino acids typically make up around 2% to 4% of tea leaves.

*Carbohydrates:* Carbohydrates in tea include sugars, polysaccharides, and dietary fiber. They contribute to the sweetness and mouthfeel of tea and typically make up around 5% to 10% of tea leaves.

*Minerals:* Tea contains minerals such as potassium, calcium, magnesium, and trace amounts of others like iron, manganese, and zinc. The mineral content can vary depending on the soil composition and growing conditions but generally ranges from 1% to 5% of tea leaves.

*Vitamins:* Tea contains small amounts of vitamins, including vitamin C, vitamin E, vitamin K, and B vitamins (such as B2, B3, and B6). The vitamin content can vary depending on factors such as processing and storage conditions.

*Essential Oils:* Tea leaves contain essential oils that contribute to its aroma and flavor. These oils are volatile compounds that are responsible for the characteristic scents of different types of tea. Essential oils typically make up around 0.5% to 1% of tea leaves.

**Types of Tea in World Wide**

| Tea Name | Benefits | Image |
|---|---|---|
| Herbal Tea | Herbal teas are made from herbs, flowers, fruits, or spices rather than tea leaves. Popular herbal teas include chamomile, peppermint, hibiscus, and rooibos. They come in a wide range of flavors and are caffeine-free. |   |
| Yellow tea | Yellow tea is a rare and delicate tea variety with a process similar to green tea but with an additional step called "yellowing." It has a mellow flavor profile with subtle floral notes and a slightly sweet taste. |   |
| Matcha tea | Matcha is a powdered green tea made from finely ground tea leaves. It is traditionally used in Japanese tea ceremonies and has a vibrant green color and rich, umami flavor. Matcha is often used in culinary applications as well. |   |

**Benefits of Tea:**

***Protects Against Skin Cancer***

Green tea contains polyphenols and trace element, polyphenol containing differing kinds of catechins, with epigallocatechin gallate (EGCG) and epicatechin gallate (ECG) having the foremost potency. These compounds have antioxidant properties. Antioxidants are molecules that have the facility to fight free radicals within the body. Free radicals are compounds which can harm your body, your health, and your skin if their levels get too high. they were causing cellular damage, and are linked to several diseases, including cancer. According the antioxidant power of EGCG (epigalocatechingallete) could help repair DNA damage caused byultraviolet (UV) rays from the sun. This can help protect you from nonmelanoma carcinoma.

***Fights Premature Aging***

It has Study to showed that the antioxidant EGCG, which is abundant in tea. it has the facility to rejuvenate dying skin cells. EGCG are protecting and repairing your cells, this antioxidant can combat signs

of aging and make dull skin look healthier. The vitamins in tea, especially vitamin B-2, can also keep your skin looking younger. Vitamin B-2 has the facility to require care of collagen levels, which can improve the firmness of your skin.

**Reduces Redness and Irritation**

Green tea also has anti-inflammatory properties Trusted Source. This is thanks to the tea's high content of polyphenols. Green tea is anti-inflammatory properties can help reduce skin irritation, skin redness, and swelling. It is applying green tea to your skin can soothe minor cuts and sunburn, too. it is anti-inflammatory properties of green tea studies Trusted Source. It has also found topical green tea to be an effective remedy for many dermatological conditions. It can smooth irritation and itching caused by psoriasis, dermatitis, and rosacea, and it is going to even be helpful for treating keloids.

**Effect Of Tea in Our Body**

***Reduced Iron Absorption***

Tea is a rich source of a class of compounds called tannins. Tannins can bind to iron in certain foods, rendering it unavailable for absorption in your digestive tract. Iron deficiency is one of the most common nutrient deficiencies in the world, and if you have low iron levels, excessive tea intake may exacerbate your condition. Research suggests that tea tannins are more likely to hinder the absorption of iron from plant sources than from animal-based foods. Thus, if you follow a strict vegan or vegetarian diet, you may want to pay extra close attention to how much tea you consume

***Increased Anxiety, Stress, and Restlessness***

Tea leaves naturally contain caffeine. Overconsuming caffeine from tea, or any other source, may contribute to feelings of anxiety, stress, and restlessness. An average cup (240 ml) of tea contains about 11–61 mg of caffeine, depending on the variety and brewing method Black teas tend to contain more caffeine than green and white varieties, and the longer you steep your tea, the higher its caffeine content. Research suggests that caffeine doses under 200 mg per day are unlikely to cause significant anxiety in most people. Still, some people are more sensitive to the effects of caffeine than others and may need to limit their intake further. If you notice your tea habit is making you feel jittery or nervous, it could be a sign you have had too much and may want to cut back to reduce symptoms.

***Poor Sleep***

Because tea naturally contains caffeine, excessive intake may disrupt your sleep cycle. Melatonin is a hormone that signals your brain that it's time to sleep. Some research suggests that caffeine may inhibit melatonin production, resulting in poor sleep quality. Inadequate sleep is linked to a variety of mental issues, including fatigue, impaired memory, and reduced attention span. What's more, chronic sleep deprivation is associated with an increased risk of obesity and poor blood sugar control. People metabolize caffeine at different rates, and it's difficult to predict exactly how it impacts sleep patterns in everyone.

***Nausea***

Certain compounds in tea may cause nausea, especially when consumed in large quantities or on an empty stomach. Tannins in tea leaves are responsible for the bitter, dry taste of tea. The astringent nature of tannins can also irritate digestive tissue, potentially leading to uncomfortable symptoms, such as nausea or stomach ache. The amount of tea required to have this effect can vary dramatically depending on the person. More sensitive individuals may experience these symptoms after drinking as few as 1–2 cups (240–480 ml) of tea, whereas others may be able to drink more than 5 cups (1.2 liters) without noticing any ill effects.

***Heartburn***

The caffeine in tea may cause heartburn or aggravate preexisting acid reflux symptoms. Research suggests that caffeine can relax the sphincter that separates your esophagus from your stomach, allowing acidic stomach contents to more easily flow into the esophagus. Caffeine may also contribute to an increase in total stomach acid production. Of course, drinking tea may not necessarily cause heartburn. People respond very differently to exposure to the same foods.

***Pregnancy complications***

Exposure to high levels of caffeine from beverages like tea during pregnancy may increase your risk of complications, such as miscarriage and low infant birth weight. Data on the dangers of caffeine during pregnancy is mixed, and it's still unclear exactly how much is safe. However, most research indicates that the risk of complications remains relatively low if you keep your daily caffeine intake under 200–300 mg. That said, the American College of Obstetricians and Gynecologists recommends not exceeding the 200-mg mark. The total caffeine content of tea can vary but usually falls between 20–60 mg per cup (240 ml). Thus, to err on the side of caution, it's best not to drink more than about 3 cups (710 ml) per day.

**History of Coffee**

Coffee grown worldwide can trace its heritage back centuries to the ancient coffee forests on the Ethiopian plateau. There, legend says the goat herder Kaldi first discovered the potential of these beloved beans. The story goes that that Kaldi discovered coffee after he noticed that after eating the berries from a certain tree, his goats became so energetic that they did not want to sleep at night. Kaldi reported his findings to the abbot of the local monastery, who made a drink with the berries and found that it kept him alert through the long hours of evening prayer. The abbot shared his discovery with the other monks at the monastery, and knowledge of the energizing berries began to spread. As word moved east and coffee reached the Arabian Peninsula, it began a journey which would bring these beans across the globe.

The history of coffee dates back to centuries of old oral tradition in modern-day Somalia, Ethiopia and Yemen. It was already known in Mecca in the 15th century. Also, in the 15th century, Sufi monasteries in Yemen employed coffee as an aid to concentration during prayers. Coffee later spread to the Levant in the early 16th century; it caused some controversy on whether it was halal in Ottoman and Mamluk society. Coffee arrived in Italy the second half of the 16th century through commercial Mediterranean trade routes, while Central and Eastern Europeans learned of coffee from the Ottomans. By the mid-17th century, it had reached India and the East Indies.

**Figure:** Coffee seeds

**Coffee Composition:**

The main constituents of coffee are caffeine, tannin, fixed oil, carbohydrates, and proteins. It contains 2–3% caffeine, 3–5% tannins, 13% proteins, and 10–15% fixed oils. In the seeds, caffeine is present as a salt of chlorogenic acid (Coffee bioactive components include phenolic compounds (chlorogenic acids, cafestol and kahweol), alkaloids (caffeine and trigonelin), diterpenes (cafestol and kahweol) and other secondary metabolites. The image of coffee as a super functional food has helped to increase coffee consumption across the globe.

| Component | Percentage Range |
|---|---|
| Water | 10-12% |
| Caffeine | 1.2-2.5% |
| Carbohydrates | 30-40% |
| Lipids (Oils) | 10-15% |
| Proteins | 10-12% |
| Chlorogenic Acids | 5-8% |
| Acids | Variable |
| Minerals | Variable |

*Water:* Coffee beans contain a small percentage of water, usually around 10% to 12% by weight.

*Caffeine:* Caffeine is a natural stimulant found in coffee beans. It's responsible for the stimulating effects of coffee. The caffeine content varies depending on factors such as the type of coffee bean and the brewing method, but it typically ranges from 1.2% to 2.5% by weight.

*Carbohydrates:* Carbohydrates in coffee beans include sugars, polysaccharides, and dietary fiber. They contribute to the flavor and body of brewed coffee. The carbohydrate content can vary but generally ranges from 30% to 40% by weight.

*Lipids (Oils):* Coffee beans contain lipids, which are fats and oils. These lipids contribute to the mouthfeel and aroma of brewed coffee. The lipid content can vary but typically ranges from 10% to 15% by weight.
Proteins: Coffee beans contain proteins, which are made up of amino acids. Proteins contribute to the formation of crema in espresso and affect the texture of brewed coffee. The protein content can vary but generally ranges from 10% to 12% by weight.

*Chlorogenic Acids:* Chlorogenic acids are a group of antioxidant compounds found in coffee beans. They contribute to the acidity and bitterness of brewed coffee and have potential health benefits. The chlorogenic acid content can vary but typically ranges from 5% to 8% by weight.

*Acids:* Coffee beans contain various acids, including citric acid, malic acid, acetic acid, and quinic acid. These acids contribute to the flavor profile of brewed coffee, providing acidity and brightness.

*Minerals:* Coffee beans contain minerals such as potassium, magnesium, and phosphorus. The mineral content can vary depending on factors such as soil composition and growing conditions.

*Volatile Compounds:* Coffee beans contain numerous volatile compounds that contribute to the aroma and flavor of brewed coffee. These compounds develop during roasting and brewing processes.

**Types of Coffee in World Wide:**

| Coffee Name | Benefits | Image |
|---|---|---|
| Arabica Coffee | Arabica beans have a smoother, sweeter, and more nuanced flavor than other coffee types, with notes of fruit, chocolate, nuts, and caramel. |   |

| | | |
|---|---|---|
| Robusta | Arabica has a sweeter, smoother taste to it. Robusta is generally more bitter and harsher on the taste buds. |  |
| Excelss | Unique flavor profile: Excelsa coffee has a unique flavor profile that is different from other coffee species. |  |
| **Coffee Name** | **Benefits** | **Image** |
| Liberia Coffee | It can also help to reduce inflammation and improve your overall health. Liberica coffee is also known to have a lower acidity level than other coffee varieties, making it easier on your stomach. |  |
| Espresso | The most popular coffee drink in the entire world is espresso. Espresso originates from Italy and is produced by forcing small amounts of boiling |  |
| Lattle | Latte. Another Italian creation, a latte combines espresso with a larger amount of steamed milk. This results in a mild and milky taste, perfect for those |  |

**Benefits of Coffee**

**Could Live Longer.**

Recent studies found that coffee drinkers are less likely to die from some of the leading causes of death in women: coronary heart disease, stroke, diabetes and kidney disease.

**Body May Process Glucose (Or Sugar) Better.**

That's the theory behind studies that found that people who drink more coffee are less likely to get type 2 diabetes.

**Less Likely to Develop Heart Failure.**

Drinking one to two cups of coffee a day may help ward off heart failure, when a weakened heart has difficulty pumping enough blood to the body.

**Likely to Develop Parkinson's Disease.**

Caffeine is not only linked to a lower chance of developing Parkinson's disease, but it may also help those with the condition better control their movements.

**Liver Will Thank You.**

Both regular and decaf coffee seem to have a protective effect on your liver. Research shows that coffee drinkers are more likely to have liver enzyme levels within a healthy range than people who don't drink coffee.

**DNA Will be Stronger.**

Dark roast coffee decreases breakage in DNA strands, which occur naturally but can lead to cancer or tumors if not repaired by your cells.

**Odds of Getting Colon Cancer Will Go Way Down.**

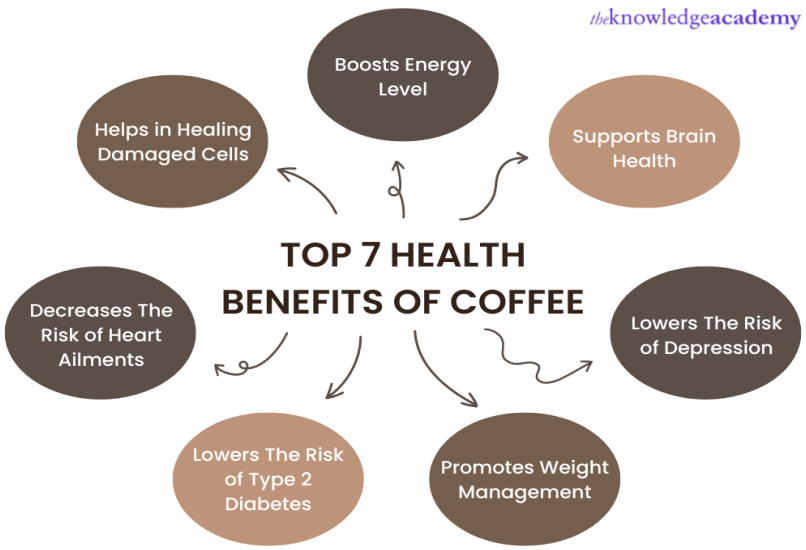
One in 23 women develop colon cancer. But researchers found that coffee drinkers — decaf or regular — were 26 percent less likely to develop colorectal cancer.

**May Decrease Your Risk of Getting Alzheimer's Disease.**

Almost two-thirds of Americans living with Alzheimer's disease are women. But the caffeine in two cups of coffee may provide significant protection against developing the condition. In fact, researchers found that women age 65 and older who drank two to three cups of coffee a day were less likely to develop dementia in general.

**Not As Likely to Suffer a Stroke.**

For women, drinking at least one cup of coffee a day is associated with lowered stroke risk, which is the fourth leading cause of death in women**.**



**Here are Some Health Benefits of Both Tea and Coffee in Our Body**

| Serial No | Health Benefits | Product |
|---|---|---|
| 1. | Antioxidant properties: Tea, especially green and black tea, contains antioxidants such as catechins and polyphenols, which help protect cells from damage caused by free radicals. |  |
| 2. | Heart health: Regular consumption of tea has been linked to a reduced risk of heart disease. Certain compounds in tea, like flavonoids, may help lower LDL cholesterol and improve artery function. |  |
| 3. | Improved cognitive function: The caffeine and amino acid L-theanine found in tea can improve brain function, including mood, alertness, and memory. |  |
| 4. | Weight management: Some studies suggest that the compounds in green tea can help boost metabolism and aid in weight loss when combined with a healthy diet and exercise. |  |
| 5. | Lower risk of certain cancers: Research indicates that regular tea consumption may be associated with a reduced risk of certain cancers, such as breast, prostate, and colorectal cancer, due to its antioxidant properties. |  |

**Here Are Some Health Benefits of Both Tea and Coffee in Our Body:**

| Serial No. | Health Benefits | Product |
|---|---|---|
| 1. | Increased alertness and energy: Coffee is well-known for its caffeine content, which can help improve focus, concentration, and overall cognitive function. |  |

| | | |
|---|---|---|
| 2. | mood enhancement: The caffeine in coffee may help improve mood by increasing the production of neurotransmitters like dopamine and serotonin. |  |
| 3. | Reduced risk of neurodegenerative diseases: Some studies suggest that regular coffee consumption may lower the risk of neurodegenerative diseases like Alzheimer's and Parkinson's due to its neuroprotective properties. |  |
| 4. | Liver health: Moderate coffee consumption has been linked to a reduced risk of liver diseases such as cirrhosis and liver cancer. Compounds in coffee may help protect the liver from damage caused by alcohol and other toxins. |  |
| 5. | Improved physical performance: Caffeine can stimulate the nervous system, leading to increased adrenaline levels and enhanced physical performance during exercise. |  |

## Conclusion

In recent years, coffee and tea have become two of the most favored drinks enjoyed globally by individuals of all ages. They are appreciated mainly for their flavor and scent, as well as for the abundance of active compounds that benefit the human body. In various areas globally, the demand for herbal infusions is increasing, likely due to the ever-expanding range of herbal products with diverse health benefits.

## Reference

1. S. Kumar and Abhay K. Pandey "Free radicals: Health implications and their Mitigation by Herbals" British Journal of Medicine and Medicinal Research, V.I 7(6), P.P 438- 457, 2015, DOI: 10.9734/BJMMR/2015/16284.
2. Wulf Droge "Free radicals in the Physiological control of Cell Function" National Library of Medicine PubMed, vol 82, P.P 47- 95, 2002.
3. V.S. Khot, S.S Upadhye, B.K Kothali, A.K Apte, A.A. patil and A.B. danole "Free radicals, Oxidative stress and Diseases" American Journal Pharmtech Research, V.I 8(4), P.P 60- 67, 2018, http://www.ajptr.com/.
4. Md. Mahbubur Rahman, Md. Badrul Islam, Mohitosh Biswas and A.H.M. Khurshid Alam "In vitro antioxidant and free radical scavenging activity of different parts of Tabebuia pallida growing in Bangladesh" BioMed central Research Notes, vol 8, P.P 1-9, 2015, DOI 10.1186/s13104-015-1618-6.

5. Mustafa Taha Mohammed, Sura Mohammed Kadhim and Sarah Isam Abbas "Free radicals and Human Health" International Journal of Innovation Sciences and Research, V.I 4(6), P.P 218-233, 2015, http://www.ijisr.com.
6. Hemant Kumar, Sandeep Vasant More, Sushruta Koppula and Dong-Kug Choi "The Role of free radicals in the Ageing brain and Parkinson's Disease: Convergence and Parallelism" International Journal of Molecular Sciences, Vol. 13, P.P 10478- 10504, 2012, doi:10.3390/ijms130810478.
7. Vinita Sindhi, Vartika Gupta, Kameshwar Sharma, Sonal Bhatnagar and Neeti Dhaka "Potential applications of antioxidants" ELSEVIER Journal of Pharmacy Research, vol 7, P.P 828-835, 2013, www.elsevier.com/locate/jopr.
8. Howard P. Grill, MD. FACC, Jay L. Zweier and PhD. Myron L. Weisfeldt "Direct Measurement of myocardial free radical generation in vivo model: Effects of Postischemic reperfusion and treatment with human recombinant superoxide dismutase" Journal of the American college of Cardiology, V.I 20(7), P.P 1604- 1611,1992.
9. Md. Mizanur Rahaman, Ana C.J. Araujo, Daniel S. Alves and Muhammad T. Islam "Free radicals and their different effect: A literature-based review" CECAPE Biology and Health Journal, vol8, P.P 1-9, 2023, https://doi.org/10.29327/2256856.1.2-8.
10. Chateen, Ali Pambuk and Fatma Mustafa Muhammad "Free radicals: The types generated in biological system" MOJ Cell Science and report, V.I 5(3), P.P 72- 73, 2018, http://medcraveonline.com.
11. A.K. Ghosh and Abheri Das Sarma "Free radicals and their role in different clinical conditions" International Journal of Pharma Sciences and Research, vol 1(3), P.P 185- 192, 2010.
12. Sailaja Rao P, Sireesha Kalva, Aparna Yerramilli and Sadanandam Mamidi "Free radicals and tissue damage: Role of antioxidants" Peer reviewed Journal of free radical biology and antioxidants, vol 1(4), P.P 1-6, 2011, DOI: 10.5530/ax.2011.4.2.
13. Paola Vendetti "Evolution of the knowledge of free radicals and other oxidants" Hindwani oxidative Medicine and cellular Longevity volume, P.P 1-32, 2020.
14. Joel D. Trinity, Ryan M and Russell S. Richardson "Regulation of exercise blood flow: Role of free radicals" HHS Public Access, P.P 1-35, 2020, 10.1016/j.freeradbiomed.2016.01.017.
15. Carla Ferren, Annalisa Masi, Michele Melchiorre and Micheal A. Terzidis "Free radicals in chemical biology: From chemical Behaviour to Bio maker development" Journal of visualized Experiments and National Library of medicine, Issue 74, P.P 1-10, 2015, doi:10.3791/50379.
16. Grzywna Ewelina, Stachura Krzysztof and Moskala Marek "Blood free radicals concentration determined by electron paramagnetic resonance spectroscopy and delayed cerebral Ischemia occurrence in patients with Aneurysmal subarachnoid Hemorrhag" Cell biochemistry and biophysics and National library of medicine, vol 3, P.P 351- 358, 2017, DOI 10.1007/s12013-017-0820-7.
17. Nehal Gupta, Rajiv Lall and Alok Kulshreshtha "Free radicals as a doubled- edged sword: The cancer preventive and Therapeutic roles of curcumin" PubMed central and Multidisciplinary digital publishing institute, V.I 25(22), P.P 1-20, 2020, doi:10.3390/molecules25225390.
18. Md. Saiful Islam Arman, Abdullah Al Mahmud and Ali Reza "Free radical, oxidative stress and diabetes mellitus" ResearchGate, vol 6, P.P 99-101, 2020, DOI:10.15562/phytomedicine.2019.98.
19. Igor Afanas' ev "Signaling and Damaging functions of free radicals in Aging – Free radicals theory, Hormesis and TOR" National library of medicine (NIH), vol 1(2), P.P 75- 88, 2010.
20. Nuan Lin, Koen Van Zomeren, Yue Zhang and Romana Schirhagl "Quantum sensing of free radicals in human granulosa cells with nanoscale resolution" ASC central science, vol 3, P.P 1784- 1798, 2023, https://doi.org/10.1021/acscentsci.3c00747.
21. Richard C. Petersen "Free radicals and advanced chemistries involved in cell membrane organisation influence oxygen diffusion and pathology treatment" AIMS Biophysics and National library of medicine, vol 4(3), P.P 240- 283, 2017, doi:10.3934/biophy.2017.2.240.

22. Suhaili Othma, Nidhi Rajesh Mavani, M.A. Hussain, Norliza Rahman, Jarinah Mohd Ali, "A comprehensive review on nutraceutical potential of underutilized cereals and cereal-based products". 15 February 2023; 4 April 2023.
23. Mahek Rawat, Aditi Varshney, Muskan Rai, Aniket Chikara, Arvandana Liza Pohty, Akanksha Joshi, Anjali Binjola, Chandra Pratap Singh, Kamna Rawat, Muzamil Ahmad Rather, Arun Kumar Gupta. "Artificial intelligence-based techniques for adulteration and defect detections in food and agricultural industry: A review on 28 January 2023, 1 May 2023 P.P 89-96, 2008.
24. Honglin Zhu, Sunni Chen, Yangchao Luo "Adsorption mechanisms of hydrogels for heavy metal and organic dyes removal": A review vol 5(1) 27 February 2023 and 6 March 2023.
25. Atif Khurshid Wani, Farida Rahayu, Lilia Fauziah, Cece Suhara. Advances in safe processing of sugarcane and bagasse for the generation of biofuels and bioactive compounds. Vol 12 (7) Page – 227,654 on 11 December 2022.
26. Trias Sitaresmi, Aris Hairmansis, Yuni Widyastuti, Rachmawati, Untung Susanto, Bayu Pramono Wibowo, Mira Landep Widiastuti, Indrastuti Apri Rumanti, Willy Bayuardi Suwarno, Yudhistira Nugraha. "Advances in the development of rice varieties with better nutritional quality in Indonesia 15 April 2023; Page 299-768.
27. Behnaz Saboori, Noor Alhuda Alhattali, Tarig Gibreel "Agricultural products diversification-food security nexus in the GCC countries". 15 December 2022 form 11 April 2023 vol 8(87).
28. Robel Orsango a, D. Sundaraa Rajan, professor emeritus, Marisennayya Senapathy, Elias Bojago an analysis of rural farmers' livelihood sustainability in Offa district, Southern Ethiopia Vol10(98) 1 November 2022 form 31 March 2023.
29. Deepika Kaushik, Mukul Kumar, Charalampos Proestos, Prerna Gupta, Ashwani Kumar, Priyanka Kundu, Jasjit Kaur, Vishal kumar, Anjali Anjali, Jianbo Xiang. "A narrative review on the anti- spectabilisWilld". P. P1-54,2023, https://doi.org/10.3390/ma14154135.
30. Shuang Liu, Muyao Wang, Yibin Xing, Xueru Wang, Anti-oxidation and anti-fatigue effects of the total flavonoids of Sedum aizoon L., vol 5, P.P 27986-28006, 2017, DOI: 10.1039/c4ra13315c
31. Klimentia Kottaridi, Anna Milionis, Vasilis Demopoulos, Aimilia Rigakou, Vasileios Nikolaidis A regression analysis method for the prediction of olive oil sensory attributes. vol 11, P.P 1-24, 2023, DOI 10.3389/fchem.2023.1158198
32. Suhaili Othman, Nidhi Rajesh Mavani, M.A. Hussain, Norliza Abd Rahman, Jarinah Mohd Ali Artificial intelligence-based techniques for adulteration and defect detections in food and agricultural industry: A review, 15 February 2023 form 4 April 2023 10 April 2023.
33. João Guilherme Costa, Bojana Vidovic, Nuno Saraiva, Maria does Céu Costa, Giorgia Del Favero, Doris Marko, Nuno G. Oliveira & Ana Sofia Fernandes. "Contaminants dark side of food supplements" vol 6, P.P 1-15, 2017, https://doi.org/10.3390/antiox6030051.
34. Bekele Wegi Feyisa, Jema Haji, Alisher Mirzabaev Determinants of food and nutrition security: Evidence from crop-livestock mixed farming households of central and eastern Ethiopia 10 March 2023.
35. Kashish Goyall, Parteek Kumar, Karun Verma Food Adulteration Detection using Artifcial Intelligence: A Systematic Review / 27 April 2021 © CIMNE, Barcelona, Spain 2021
36. Zhe Liu, Shuzhe Wang, Yudong Zhang, Yichen Feng, Jiajia Liu Artificial Intelligence in Food Safety: A Decade Review and Bibliometric Analysis: 9 March 2023 Published: 14 March 2023
37. Fatema ElAmrawy, Ghada ElAgouri, Ola Elnoweam, Samar Aboelazayem, ElMohanad Farouk & Mohamed I. Adulterated and Counterfeit Male Enhancement Nutraceuticals and Dietary Supplements Pose a Real Threat to the Management of Erectile Dysfunction: A Global Perspective vol 39(87). Page no – 243-684 26 February 2016.
38. Huan Liu, Wenjun Xiong, Li He, Guilin Chu, Dejun Dong, Jielun Hu. Nanotechnology as a sustainable approach for combating the environmental effects of climate change 11 April 2023 to Accepted 30 April 2023.

39. Neha Chausali, Jyoti Saxena, Ram Prasad Biochemical Engineering Nanotechnology as a sustainable approach for combating the environmental effects of climate change vol 10, P.P 1-47, 2022, https://doi.org/10.3390/biomedicines10123051.
40. Tripti Singh, Vinay Kumar Pandey, Kshirod Kumar Dash, Sonal Zanwar, Rahul Singh Natural bio-colorant and pigments: Sources and applications in food processing 16 January 2023 form 6 May 2023; Accepted 7 May 2023.
41. Monika Koul1, Romila Rawat Bisht1 and Arjun Aditi. Detection of adulteration in daily food items Insights into laboratory procedures Vol. 1, Issue. 1, (2020) pp. 20-26.
42. Md. Mizanur Rahaman, Ana C.J. Araujo, Daniel S. Alves and Muhammad T. Islam "Free radicals and their different effect: A literature-based review" CECAPE Biology and Health Journal, vol8, P.P 1-9, 2023, https://doi.org/10.29327/2256856.1.2-8.
43. Chateen, Ali Pambuk and Fatma Mustafa Muhammad "Free radicals: The types generated in biological system" MOJ Cell Science and report, V.I 5(3), P.P 72- 73, 2018, http://medcraveonline.com.
44. A.K. Ghosh and Abheri Das Sarma "Free radicals and their role in different clinical conditions" International Journal of Pharma Sciences and Research, vol 1(3), P.P 185- 192, 2010.

**How to cite this article:** Prof. (Dr.) Niraj Gupta. (2026). Overview Study on The Nutrition Value, Types and Beneficial Effect of Tea and Coffee. *International Journal of Pharmaceutical Research and Medicinal Plants*, *2*(1), 01–14. https://doi.org/10.61280/journalmedicinalplants.v2i1.240

**Informative Journals**

**Jadoun Science Publishing Group India**