

Test Results of Turnitin AI Detection Capabilities – December 2023

PART 1: Test Case 1

Below is the original text copied from a Wikipedia page, along with the reports generated by Turnitin after analyzing the text.

In the Similarity Report, the text is correctly identified as 100% matching the existing text.

In the AI Writing Report, there is no detection of the text being generated by an AI tool. However, we cannot determine whether the text was written by a human or an AI.

Similarity Report

1 Caffeine is a central nervous system (CNS) stimulant of the methylxanthine class.[12] It is mainly used recreationally, as a eugeroic (wakefulness promoter) or as a mild cognitive enhancer to increase alertness and attentional performance.[13][14] Caffeine acts by blocking binding of adenosine to the adenosine A1 receptor, which enhances release of the neurotransmitter acetylcholine.[15] Caffeine has a three-dimensional structure similar to that of adenosine, which allows it to bind and block its receptors.[16] Caffeine also increases cyclic AMP levels through nonselective inhibition of phosphodiesterase.

Caffeine is a bitter, white crystalline purine, a methylxanthine alkaloid, and is chemically related to the adenine and guanine bases of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). It is found in the seeds, fruits, nuts, or leaves of a number of plants native to Africa, East Asia and South America,[18] and helps to protect them against herbivores and from competition by preventing the germination of nearby seeds,[19] as well as encouraging consumption by select animals such as honey bees.[20] The best-known source of caffeine is the coffee bean, the seed of the Coffea plant. People may drink beverages containing caffeine to relieve or prevent drowsiness and to improve cognitive performance. To make these drinks, caffeine is extracted by steeping the plant product in water, a process called infusion. Caffeine-containing drinks, such as coffee, tea, and cola, are consumed globally in high volumes. In 2020, almost 10 million tonnes of coffee beans were consumed globally.[21] Caffeine is the world's most widely consumed psychoactive drug.[22][23] Unlike most other psychoactive substances, caffeine remains largely unregulated and legal in nearly all parts of the world. Caffeine is also an outlier as its use is seen as socially acceptable in most cultures and even encouraged in others.

Caffeine has both positive and negative health effects. It can treat and prevent the premature infant breathing disorders bronchopulmonary dysplasia of prematurity and apnea of prematurity. Caffeine citrate is on the WHO Model List of Essential Medicines.[24] It may confer a modest protective effect against some diseases,[25] including Parkinson's disease.[26] Some people experience sleep disruption or anxiety if they consume caffeine,[27] but others show little disturbance. Evidence of a risk during pregnancy is equivocal; some authorities recommend that pregnant women limit caffeine to the equivalent of two cups of coffee per day or less.[28][29] Caffeine can produce a mild form of drug dependence – associated with withdrawal symptoms such as sleepiness, headache, and irritability – when an individual stops using caffeine after repeated daily intake.[2][4][6] Tolerance to the autonomic effects of increased blood pressure and heart rate, and increased urine output, develops with chronic use (i.e., these symptoms become less pronounced or do not occur following consistent use).[30]

AI Writing Report

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After using the AI tool QuillBot to paraphrase the entire copied text, the AI Writing Report from Turnitin still does not detect the text as being generated by an AI tool.

Similarity Report

QuillBot:
Within the methylxanthine class of stimulants, caffeine acts on the **central nervous system (CNS)**. [12] It is primarily used recreationally, either as a modest cognitive enhancer to improve alertness and attentional function, or as a eugeroic (wakefulness promoter). [13][14] Acetylcholine release is enhanced by caffeine's ability to prevent adenosine from attaching to the adenosine A1 receptor. [15] Because of its three-dimensional structure, which is comparable to adenosine's, caffeine can

attach to and block receptors. [16] Additionally, by nonselective inhibition of phosphodiesterase, caffeine raises levels of cyclic AMP.

1 Chemically related to the adenine and guanine bases of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA), caffeine is a white, crystalline purine that is bitter. It is classified as a methylxanthine alkaloid. Many plants native to Africa, East Asia, and South America contain it in their seeds, fruits, nuts, or leaves. It shields these plants from herbivores and competition by stopping neighboring seeds from germinating [19], and it also promotes the consumption of certain animals like honey bees. [20] The coffee bean, which is the seed of the Coffea plant, is the most well-known source of caffeine. Caffeine-containing beverages can help people stay up longer and perform better cognitively. Caffeine is extracted from plant products by steeping them in water, a technique known as infusion, to create these beverages. Drinks with caffeine, like cola, tea, and coffee, are widely consumed throughout the world. Around 10 million tonnes of coffee beans were eaten worldwide in 2020. [21] Worldwide, caffeine is the most often used psychoactive substance. [21][23] In contrast to the majority of other psychoactive chemicals, caffeine is still widely legal and unrestricted worldwide. Another exception is caffeine, which is viewed as socially acceptable and even encouraged in most societies.

There are both advantages and disadvantages to caffeine's health. Premature newborn apnea and bronchopulmonary dysplasia are two respiratory problems that it can treat and prevent. The WHO Model List of Essential Medicines includes caffeine citrate. [24] It might offer a slight protective advantage against certain illnesses, such as Parkinson's disease. [25][26] Caffeine consumption can cause anxiety or interrupt sleep for some people [27], but not for others. There is conflicting evidence about the risk of caffeine during pregnancy, leading some authorities to advise against consuming more than two cups of coffee daily. [28][29] After consistent daily use, caffeine use can lead to a minor form of drug dependence, which is accompanied by withdrawal symptoms such as headaches, irritability, and tiredness. [2][4][6] Chronic use leads to the development of tolerance to the autonomic effects of elevated blood pressure, heart rate, and urine output (i.e., these symptoms become less apparent or do not occur following continuous use). [30]

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After using the AI tool ChatGPT 3.5 in POE to paraphrase the entire copied text, the AI Writing Report from Turnitin detects approximately 22% of the text as being generated by an AI tool.

Similarity Report

ChatGPT 3.5 in POE, to paraphrase:

Caffeine belongs to the methylxanthine class and acts as a stimulant for the central nervous system (CNS). It is commonly used for recreational purposes, as a wakefulness promoter, or as a mild cognitive enhancer to improve alertness and attention. Its mechanism of action involves blocking the binding of adenosine to the adenosine A1 receptor, which leads to increased release of the neurotransmitter acetylcholine. Caffeine has a similar three-dimensional structure to adenosine, allowing it to bind and block its receptors. Additionally, caffeine inhibits phosphodiesterase, leading to elevated levels of cyclic AMP.

Chemically, caffeine is a bitter, white crystalline purine and a methylxanthine alkaloid. It is related to the adenine and guanine bases found in DNA and RNA. This compound is naturally present in various plants native to Africa, East Asia, and South America, where it serves as a defense mechanism against herbivores and competition by preventing nearby seed germination. Some animals, like honey bees, are attracted to caffeine and aid in its consumption. The primary source of caffeine is the coffee bean, which is the seed of the Coffea plant. People consume caffeine-containing beverages, such as coffee, tea, and cola, to combat drowsiness and enhance cognitive performance. Caffeine is extracted by steeping the plant product in water, a process known as infusion. These beverages are consumed widely worldwide, with approximately 10 million tonnes of coffee beans consumed globally in 2020. Caffeine is recognized as the most commonly consumed psychoactive drug globally. Unlike many other psychoactive substances, caffeine remains legal and largely unregulated in nearly all regions. Its use is socially acceptable in most cultures and even encouraged in some.

Caffeine has both positive and negative effects on health. It can be used to treat and prevent breathing disorders in premature infants, such as bronchopulmonary dysplasia and apnea of prematurity. Caffeine citrate is listed on the WHO Model List of Essential Medicines. It may also provide a modest protective effect against certain diseases, including Parkinson's disease. However, some individuals may experience sleep disturbances or anxiety when consuming caffeine, while others may be less affected. The evidence regarding risks during pregnancy is inconclusive, with some experts suggesting that pregnant women should limit their caffeine intake to the equivalent of two cups of coffee per day or less. Caffeine can lead to mild drug dependence, characterized by withdrawal symptoms like sleepiness, headache, and irritability when a person stops consuming it after regular use. With chronic use, tolerance to the autonomic effects of increased blood pressure, heart rate, and urine output develops, resulting in less pronounced or absent symptoms.

AI Writing Report

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After using the AI tool ChatGPT 3.5 in POE to rewrite the entire copied text in point form, the AI Writing Report from Turnitin does not detect the text as being generated by an AI tool.

Similarity Report

ChatGPT 3.5 in POE, summarize in point form:

- Caffeine is a CNS stimulant of the methylxanthine class.
- It is used recreationally, as a wakefulness promoter and cognitive enhancer.
- Caffeine blocks adenosine receptors and increases acetylcholine release.
- It has a similar structure to adenosine, allowing it to bind and block its receptors.
- Caffeine also inhibits phosphodiesterase, leading to increased cyclic AMP levels.
- It is a bitter, white crystalline purine and methylxanthine alkaloid.
- Found in plants native to Africa, East Asia, and South America.
- Protects plants and attracts certain animals like honey bees.
- Main source is the coffee bean from the Coffea plant.
- Caffeine is extracted through infusion for beverages like coffee, tea, and cola.
- It is widely consumed globally, with coffee beans being heavily consumed.
- Caffeine is the most widely consumed psychoactive drug.
- It is legal and socially acceptable in most cultures.
- Caffeine has positive effects like treating infant breathing disorders and some disease protection.
- Negative effects include sleep disruption, anxiety, and potential risks during pregnancy.
- Caffeine can lead to mild dependence and tolerance with chronic use.

AI Writing Report

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- It has a similar structure to adenosine, allowing it to bind and block its receptors.
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- It is a bitter, white crystalline purine and methylxanthine alkaloid.
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- Caffeine can lead to mild dependence and tolerance with chronic use.

PART 1: Test Case 2

Below is the original text copied from a book, along with the reports generated by Turnitin after analyzing the text. The book is also widely available online.

In the Similarity Report, the text is accurately identified as 100% matching the existing text.

In the AI Writing Report, there is no detection of the text being generated by an AI tool.

Similarity Report

Direct Copy from Book:

One of the most important questions in agriculture is that of the significance of nitrogen—its influence in all farm-production. This is generally recognised; nevertheless the question, what is the essence of nitrogen's activity, has fallen into great confusion nowadays. Wherever nitrogen is active, men only recognise, as it were, the last excrement of its activities—the most superficial aspects in which it finds expression. They do not penetrate to the relationships of Nature wherein nitrogen is working, nor can they do so, so long as they remain within restricted spheres. We must look out into the wide spaces, into the wider aspects of Nature, and study the activities of nitrogen in the Universe as a whole. We might even say—and this indeed will presently emerge—that nitrogen as such does not play the first and foremost part in the life of plants. Nevertheless, to understand plant-life it is of the first importance for us to learn to know the part which nitrogen does play.

Nitrogen, as she works in the life of Nature, has so to speak four sisters, whose working we must learn to know at the same time if we would understand the functions and significance of nitrogen herself in Nature's so-called household. The four sisters of nitrogen are those that are united with her in plant and animal protein, in a way that is not yet clear to the outer science of today. I mean the four sisters, carbon, oxygen, hydrogen and sulphur.

To know the full significance of protein it will not suffice us to enumerate as its main ingredients hydrogen, oxygen, nitrogen and carbon. We must include another substance, of the profoundest importance for protein, and that is sulphur. Sulphur in protein is the very element which acts as mediator between the Spiritual that is spread throughout the Universe—the formative power of the Spiritual—and the physical.

Truly we may say, whoever would trace the tracks which the Spiritual marks out in the material world, must follow the activity of sulphur. Though this activity appears less obvious than that of other substances, nevertheless it is of great importance; for it is along the paths of sulphur that the Spiritual works into the physical domain of Nature. Sulphur is actually the carrier of the Spiritual. Hence the ancient name, "sulphur," which is closely akin to the name "phosphorus". The name is due to the fact that in olden time they recognised in the out-spreading, sun-filled light, the Spiritual itself as it spreads far and wide. Therefore they named "light-bearers" these substances—like sulphur and phosphorus—which have to do with the working of light into matter.

Seeing that sulphur's activity in the economy of Nature is so very fine and delicate, we shall, however, best approach it by first considering the four other sisters: carbon, hydrogen, nitrogen and oxygen. These we must first learn to understand; we shall see what they signify in the whole being of the Universe. The chemist of today knows little of these substances. He knows what they look like when he has them in his laboratory, but he knows practically nothing of their inner significance in the working of the Cosmos as a whole. The knowledge of modern chemistry about them is scarcely more than our knowledge of a man of whose outer form we caught a glimpse as we passed by him in the street—or maybe we took a snapshot of him, and with the help of the photograph we can now call him to mind. We must learn to know the deeper essence of these substances. What science does is scarcely more than to take snapshots of them with a camera. All that is said of them in scientific books and lectures is scarcely more than that.

AI Writing Report

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Similar to PART 1 Test Case 1, after using the AI tool QuillBot to paraphrase the entire copied text, the AI Writing Report from Turnitin continues to show no detection of the text being generated by an AI tool.

Similarity Report

Paraphrase by QuillBot:

The role that nitrogen plays in all aspects of farm output is one of the most crucial concerns in agriculture. Although this is well acknowledged, there is now a lot of misunderstanding surrounding the topic of what exactly nitrogen's activity entails. Men only recognize, as it were, the final byproduct of nitrogen's activities—the most exterior manifestations of its presence—wherever it is present. As long as they stay inside boundaries, they are unable to enter the interactions inside nature where nitrogen is active. We need to study the activities of nitrogen in the universe as a whole and gaze out into the vast stretches and broader facets of Nature. We could even say—and this will in fact become apparent shortly—that nitrogen in and of itself does not have a primary role in plant life. Nonetheless, understanding the role that nitrogen plays in plant life is crucial to our understanding of it.

As nitrogen functions in the life of Nature, she has four sisters, or sisters, whose workings we must simultaneously learn about in order to comprehend the roles and importance of nitrogen itself in Nature's so-called family. The four sisters of nitrogen are those who, in a manner still unknown to modern outside science, are linked with her in plant and animal protein. I refer to the four sisters: sulfur, hydrogen, oxygen, and carbon.

It would be insufficient to list the elements of protein as hydrogen, oxygen, nitrogen, and carbon if we were to attempt to comprehend its entire significance. We also need to add sulfur, which is a material that is really important for protein. The very element found in proteins, sulfur, serves as a mediator between the formative power of the Spiritual—the Spiritual that permeates the Universe—and the physical.

It is indeed true that anyone wishing to follow the paths that the Spiritual leaves in the physical world will have to adhere to sulfur's activities. Even while this activity doesn't seem as evident as it does for other elements, it is nonetheless very important since the Spiritual enters the physical realm of Nature through the pathways of sulfur. The Spiritual is actually carried by sulfur. This is the origin of the old name "sulphur," which is similar to the name "phosphorus." The origin of the word comes from the ancient people's recognition of the Spiritual itself as it expanded widely in the outward, sunlit light. As a result, these substances that deal with the transformation of light into matter were given the term "light-bearers."

Given how little and fragile sulfur's role is in the natural economy, it will be best to approach it by first taking into account the four other sisters: carbon, hydrogen, nitrogen, and oxygen. We will see what these mean throughout the entirety of the universe after we have a better understanding of them. Today's chemist has limited knowledge of these compounds. He is aware of their appearance in his laboratory, but he is mostly ignorant of their internal importance to the operation of the universe as a whole. Our understanding of contemporary chemistry of them is hardly greater than our comprehension of a man whose exterior we glimpsed while walking past him. — or perhaps we took a picture of him, and now that we have the picture, we can remember him. We need to become knowledgeable about these compounds' underlying nature. Science hardly does anything more than use a camera to take pictures of them. Very little more than that is written about them in scientific publications and lectures.

AI Writing Report

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After using the AI tool ChatGPT 3.5 in POE to paraphrase the entire copied text, the AI Writing Report from Turnitin detects approximately 62% of the text as being generated by an AI tool.

Similarity Report

Paraphrase by GhatGPT in Poe:

The question of nitrogen's significance in agriculture is crucial, as it influences all aspects of farm production. However, the understanding of nitrogen's activity has become greatly confused in recent times. People tend to recognize only the superficial manifestations of nitrogen's effects, without delving into the underlying relationships and broader context in which nitrogen operates. To truly comprehend the role of nitrogen in plant life, we must expand our perspective and study its activities within the wider scope of the universe.

Nitrogen, in its interactions within nature, has four companions that we must simultaneously understand in order to grasp the functions and importance of nitrogen itself. These companions are carbon, oxygen, hydrogen, and sulphur, which are united with nitrogen in plant and animal proteins. The precise nature of this union is not yet clear to mainstream science. Among these companions, sulphur plays a particularly significant role in protein, acting as a mediator between the spiritual forces permeating the universe and the physical realm.

Sulphur, though its activity may be less apparent than that of other substances, is of great importance, as it serves as the conduit for spiritual forces to manifest in the material world. In ancient times, substances like sulphur and phosphorus, which were associated with the working of light in matter, were called "light-bearers." Understanding sulphur's delicate and refined activity in the natural order requires us to first examine the four other companions: carbon, hydrogen, nitrogen, and oxygen. By comprehending their significance in the grand scheme of the universe, we can gain a deeper understanding of these substances that extends beyond the limited knowledge of modern chemistry.

The knowledge of these substances in contemporary chemistry is superficial, akin to catching a glimpse of someone's outer appearance on the street or having a photograph of them. We must strive to grasp the profound essence of these substances, as scientific descriptions of them often amount to little more than snapshots captured by a camera.

AI Writing Report

Paraphrase by GhatGPT in Poe:

The question of nitrogen's significance in agriculture is crucial, as it influences all aspects of farm production. However, the understanding of nitrogen's activity has become greatly confused in recent times. People tend to recognize only the superficial manifestations of nitrogen's effects, without delving into the underlying relationships and broader context in which nitrogen operates. To truly comprehend the role of nitrogen in plant life, we must expand our perspective and study its activities within the wider scope of the universe.

Nitrogen, in its interactions within nature, has four companions that we must simultaneously understand in order to grasp the functions and importance of nitrogen itself. These companions are carbon, oxygen, hydrogen, and sulphur, which are united with nitrogen in plant and animal proteins. The precise nature of this union is not yet clear to mainstream science. Among these companions, sulphur plays a particularly significant role in protein, acting as a mediator between the spiritual forces permeating the universe and the physical realm.

Sulphur, though its activity may be less apparent than that of other substances, is of great importance, as it serves as the conduit for spiritual forces to manifest in the material world. In ancient times, substances like sulphur and phosphorus, which were associated with the working of light in matter, were called "light-bearers." Understanding sulphur's delicate and refined activity in the natural order requires us to first examine the four other companions: carbon, hydrogen, nitrogen, and oxygen. By comprehending their significance in the grand scheme of the universe, we can gain a deeper understanding of these substances that extends beyond the limited knowledge of modern chemistry.

The knowledge of these substances in contemporary chemistry is superficial, akin to catching a glimpse of someone's outer appearance on the street or having a photograph of them. We must strive to grasp the profound essence of these substances, as scientific descriptions of them often amount to little more than snapshots captured by a camera.

After using the AI tool ChatGPT 3.5 in POE to rewrite the entire copied text in point form, the AI Writing Report from Turnitin detected a small portion of the text as being generated by an AI tool.

Similarity Report

ChatGPT list in point form:

- The significance of nitrogen in agriculture is a crucial question.
- Understanding the essence of nitrogen's activity has become confused.
- Nitrogen's activity is often recognized only in its superficial manifestations.
- To truly understand nitrogen's role, we must study its activities in the wider context of the universe.
- Nitrogen has four companions: carbon, oxygen, hydrogen, and sulphur.
- These companions are united with nitrogen in plant and animal proteins.
- Sulphur plays a significant role as a mediator between spiritual forces and the physical realm.
- Sulphur carries the spiritual and is associated with the working of light in matter.
- Sulphur's activity is delicate and refined, requiring understanding of the other companions first.
- Modern chemistry has limited knowledge of these substances, focusing on their outer appearance.
- To fully understand these substances, we need to grasp their deeper essence beyond scientific snapshots.

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- Sulphur's activity is delicate and refined, requiring understanding of the other companions first.
- Modern chemistry has limited knowledge of these substances, focusing on their outer appearance.
- To fully understand these substances, we need to grasp their deeper essence beyond scientific snapshots.

PART 2: Test Case 1

Subsequently, we shifted our evaluation focus to requesting the AI tool to generate new text for Turnitin's analysis. Below is the text generated by ChatGPT3.5 in POE using a specific prompt. Surprisingly, Turnitin detected 97% of the text as being AI-generated.

Similarity Report

AI writing with ChatGPT 3.5 in POE:

The Effect of Caffeine in the Human Body: Coffee vs. Tea

Caffeine is a widely consumed psychoactive substance that has a considerable impact on the human body. Two of the most popular sources of caffeine are coffee and tea. While both beverages contain caffeine, they differ in terms of their composition, caffeine content, and the physiological effects they produce.

Coffee, derived from the roasted seeds of the *Coffea* plant, is known for its robust flavor and invigorating properties. It is a rich source of caffeine, containing approximately 95 mg of caffeine per 8-ounce cup. The high caffeine content in coffee leads to its pronounced stimulating effects on the central nervous system (CNS). Upon consumption, caffeine quickly enters the bloodstream and reaches the brain, where it binds to adenosine receptors. By blocking adenosine, a neurotransmitter that promotes sleep and relaxation, caffeine promotes wakefulness and alertness.

The stimulating effects of coffee go beyond the CNS. Caffeine stimulates the release of adrenaline, a hormone that prepares the body for physical exertion and increases heart rate and blood pressure. This can result in a temporary boost in energy and improved physical performance. Moreover, caffeine has been shown to enhance cognitive function, including improved attention, reaction time, and memory retention. These cognitive benefits contribute to the widespread consumption of coffee as a "pick-me-up" and productivity aid.

On the other hand, tea, derived from the leaves of the *Camellia sinensis* plant, is available in various forms, including green, black, and white tea. While tea contains caffeine, its caffeine content is generally lower than that of coffee. An 8-ounce cup of brewed black tea typically contains around 47 mg of caffeine, while green tea contains approximately 29 mg. The lower caffeine content in tea leads to milder stimulating effects compared to coffee.

The effects of tea on the human body are influenced not only by caffeine but also by other compounds present in tea leaves, such as L-theanine. L-theanine is an amino acid that promotes relaxation and counteracts the potential jittery effects of caffeine. It has been found to have a calming effect on the brain by increasing the production of gamma-aminobutyric acid (GABA), a neurotransmitter that promotes relaxation and reduces anxiety.

Tea consumption has been associated with various health benefits. The presence of polyphenols, antioxidants found in tea, contributes to its potential protective effects against chronic diseases, including cardiovascular disease and certain types of cancer. Additionally, tea has been linked to improved cognitive function, weight management, and enhanced immune function. It is worth noting that the specific health benefits may vary depending on the type of tea consumed and the brewing method.

While both coffee and tea provide a source of caffeine and offer different physiological effects, individual responses to caffeine can vary greatly. Factors such as genetics, tolerance, and sensitivity influence how individuals react to caffeine consumption. Some people may experience side effects like increased heart rate, restlessness, or difficulty sleeping, while others may not be as affected.

In conclusion, caffeine, found in both coffee and tea, has notable effects on the human body. Coffee, with its higher caffeine content, provides a strong stimulant effect, promoting wakefulness, increased energy, and improved cognitive function. Tea, with lower caffeine content, offers a milder stimulant effect while providing additional health benefits due to its antioxidant content. Ultimately, personal preferences, tolerance levels, and desired effects will determine whether one chooses coffee or tea as their preferred source of caffeine.

AI Writing Report

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PART 2: Test Case 2

We continued our testing by using another generative AI tool. Below is the text generated by Bing Chat using a prompt. This time, Turnitin detected "100%" of the text as being AI-generated. Please note that some of the short bullet points in the body text and the reference section could not be detected as AI-generated text. It appears that the AI detection process excludes short text and point form text, resulting in a "100%" detection rate.

Similarity Report

AI Writing with Bing:
Caffeine is a natural stimulant that is found in many foods and drinks, such as coffee, tea, chocolate, and energy drinks. It is one of the most widely consumed psychoactive substances in the world, and it has various effects on the human body and brain. However, the amount and type of caffeine in different beverages can vary significantly, depending on the ingredients and how they are prepared. This essay will compare and contrast the effect of caffeine in human body between coffee and tea, two of the most popular caffeinated drinks.

Coffee is made from roasted and ground seeds of the Coffea plant, which are brewed with hot water to produce a dark and bitter drink. Coffee has a higher caffeine content than tea, as it contains about 96 mg of caffeine per 8-ounce (237-ml) cup, compared to 47 mg for the same amount of brewed black tea. However, the caffeine content of coffee can vary depending on the type, roast, and brewing method of the coffee beans. For example, espresso, which is made by forcing hot water through finely ground coffee, has about 64 mg of caffeine per 1-ounce (30-ml) shot, while instant coffee, which is made by dissolving dried coffee powder in hot water, has about 62 mg of caffeine per 8-ounce (237-ml) cup.¹

Tea is made from the leaves and buds of the Camellia sinensis plant, which are steeped in hot water to produce a light and aromatic drink. Tea has a lower caffeine content than coffee, as it contains about 28 mg of caffeine per 8-ounce (237-ml) cup of brewed green tea, and 2 mg for the same amount of brewed decaffeinated black tea. However, the caffeine content of tea can also vary depending on the type, quality, and steeping time of the tea leaves. For example, black tea, which is made from fully oxidized tea leaves, has about 47 mg of caffeine per 8-ounce (237-ml) cup, while white tea, which is made from young and unoxidized tea buds, has about 6 mg of caffeine per 8-ounce (237-ml) cup.¹

The effect of caffeine in human body between coffee and tea can be similar or different, depending on the amount and frequency of consumption, as well as the individual's sensitivity and tolerance to caffeine. In general, caffeine can have positive effects, such as enhancing alertness, mood, memory, and performance, as well as negative effects, such as causing anxiety, insomnia, headaches, and palpitations.²

Some of the similarities between the effect of caffeine in human body from coffee and tea are:

- Both coffee and tea can stimulate the central nervous system, which can increase the levels of neurotransmitters such as dopamine, serotonin, and norepinephrine, and improve the cognitive functions such as attention, learning, and reaction time.^{2,3}
- Both coffee and tea can increase the metabolic rate, which can boost the energy expenditure and fat oxidation, and help with weight management and obesity prevention.^{2,4}
- Both coffee and tea can have antioxidant and anti-inflammatory properties, which can protect the cells from oxidative stress and inflammation, and reduce the risk of chronic diseases such as cardiovascular disease, diabetes, and cancer.^{2,5}

Some of the differences between the effect of caffeine in human body from coffee and tea are:

- Coffee can have a stronger and faster effect than tea, as it has a higher caffeine content and a higher bioavailability, which means that more caffeine is absorbed and reaches the bloodstream. Coffee can also have a longer-lasting effect than tea, as it has a longer half-life, which means that it takes longer for the body to eliminate half of the caffeine.²
- Tea can have a milder and smoother effect than coffee, as it has a lower caffeine content and a lower bioavailability, which means that less caffeine is absorbed and reaches the

bloodstream. Tea can also have a shorter-lasting effect than coffee, as it has a shorter half-life, which means that it takes less time for the body to eliminate half of the caffeine.²

- Tea can have some additional effects than coffee, as it contains other bioactive compounds besides caffeine, such as polyphenols, flavonoids, and amino acids, which can modulate the caffeine's effect and have their own benefits. For example, tea can have a calming and relaxing effect, as it contains theanine, which can increase the levels of gamma-aminobutyric acid (GABA), a neurotransmitter that inhibits the nervous activity. Tea can also have a blood pressure-lowering effect, as it contains catechins, which can inhibit the enzyme that constricts the blood vessels.²

In conclusion, caffeine is a common ingredient in coffee and tea, and it has various effects on the human body and brain. However, the amount and type of caffeine in different beverages can vary significantly, depending on the ingredients and how they are prepared. Therefore, the effect of caffeine in human body between coffee and tea can be similar or different, depending on the amount and frequency of consumption, as well as the individual's sensitivity and tolerance to caffeine.²

References:

- [1]: [Caffeine content for coffee, tea, soda and more - Mayo Clinic] <https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/caffeine/art-20049372>
 - [2]: [Caffeine in Tea vs. Coffee: How Do They Compare? - Healthline] <https://www.healthline.com/nutrition/caffeine-in-tea-vs-coffee>
 - [3]: [The Health Effects Of Coffee And Tea - Indiana Public Media] <https://indianapublicmedia.org/amomentofscience/health-effects-coffee-tea.php>
 - [4]: [Tea or coffee: which is better for you? - BBC] https://www.bbc.co.uk/food/articles/tea_vs_coffee
 - [5]: [Health Benefits of Coffee and Tea - WebMD] <https://www.webmd.com/food-recipes/ss/slideshow-coffee-tea-benefits>
- : [Coffee vs. Tea: Is One Better for Your Health? - WebMD]
- : [Tea and coffee: their effects on health - NCBI]
- : [Coffee and tea consumption and risk of stroke subtypes in male smokers - NCBI]

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References:

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 - [3]: [The Health Effects Of Coffee And Tea - Indiana Public Media] <https://indianapublicmedia.org/amomentofscience/health-effects-coffee-tea.php>
 - [4]: [Tea or coffee: which is better for you? - BBC] https://www.bbc.co.uk/food/articles/tea_vs_coffee
 - [5]: [Health Benefits of Coffee and Tea - WebMD] <https://www.webmd.com/food-recipes/ss/slideshow-coffee-tea-benefits>
- : [Coffee vs. Tea: Is One Better for Your Health? - WebMD]
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