



Nutritional profiling and health benefits of uziza (*Piper guineense*) leaves and seeds

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Abstract

Uziza (*Piper guineense*), commonly known as West African black pepper, is a plant native to West Africa, widely used for its culinary and medicinal properties. This review article examines the nutritional composition and health benefits of Uziza leaves and seeds. It explores the bioactive compounds, traditional uses, and scientific evidence supporting its therapeutic potential. The article aims to provide a comprehensive understanding of Uziza's role in nutrition and health.

Keywords: *Piper guineense*, leaves and seeds

Introduction

Uziza (*Piper guineense*), also known as West African black pepper, is a perennial climbing vine belonging to the Piperaceae family. It is indigenous to West Africa, where it is cultivated and utilized extensively, particularly in countries like Nigeria, Ghana, and Cameroon. Uziza is esteemed for its dual role as both a culinary spice and a medicinal plant. The leaves and seeds of Uziza are integral to various traditional recipes, adding a unique peppery flavor to dishes, and are also used in traditional medicine for their therapeutic properties. In the culinary context, Uziza leaves and seeds are commonly used to enhance the flavor of soups, stews, and other local delicacies. The leaves are often added to dishes like "Afang soup" and "Pepper soup," while the seeds, known for their pungent and slightly bitter taste, are used as a spice in various recipes. Beyond its culinary uses, Uziza has a rich history in traditional African medicine, where it is employed to treat a wide range of ailments, including gastrointestinal disorders, respiratory issues, and inflammatory conditions. Nutritionally, Uziza is a powerhouse of essential macronutrients and micronutrients. The leaves and seeds are rich in carbohydrates, proteins, fats, and dietary fiber, contributing to their caloric content and nutritional value. They also contain significant amounts of vitamins and minerals such as vitamins A, C, and E, calcium, potassium, magnesium, and iron. These nutrients are vital for maintaining various bodily functions, including immune support, bone health, muscle function, and blood formation.

The therapeutic potential of Uziza is largely attributed to its high content of bioactive phytochemicals, including alkaloids, flavonoids, tannins, phenolic acids, and piperine. These compounds exhibit a range of biological activities, such as antioxidant, anti-inflammatory, antimicrobial, and anticancer properties. The presence of these bioactive compounds makes Uziza a valuable plant in both traditional and modern medicine. Research into the health benefits of Uziza has highlighted its effectiveness in treating and preventing various health conditions. Its antioxidant properties help combat oxidative stress and reduce the risk of chronic diseases. The anti-inflammatory effects of piperine and other compounds are beneficial in managing inflammatory conditions such as arthritis and inflammatory bowel disease. Uziza's antimicrobial activity makes it

effective against a variety of bacterial and fungal infections, and its digestive health benefits are well recognized in traditional medicine. Additionally, Uziza supports respiratory health by relieving congestion and facilitating easier breathing, and its cardiovascular benefits include improved lipid metabolism and reduced cholesterol levels.

Objective

The main objective of this review is to evaluate the nutritional composition and health benefits of Uziza (*Piper guineense*) leaves and seeds.

Nutritional Composition of Uziza Leaves and Seeds

Macronutrients

Uziza leaves and seeds are rich in essential macronutrients. The leaves contain significant amounts of carbohydrates, dietary fiber, proteins, and fats, which contribute to their caloric content and nutritional value. The seeds are particularly high in essential fatty acids, which are important for maintaining cellular functions and overall health.

Table 1: Macronutrient content in Uziza leaves and seeds

Macronutrient	Leaves (%)	Seeds (%)
Carbohydrates	45	40
Proteins	25	20
Fats	10	25
Dietary Fiber	20	15

This table provides a percentage breakdown of the macronutrient content in Uziza leaves and seeds. The leaves are rich in carbohydrates (45%) and proteins (25%), with a moderate amount of dietary fiber (20%) and fats (10%). In contrast, the seeds have a higher fat content (25%) and a balanced distribution of carbohydrates (40%), proteins (20%), and dietary fiber (15%).

Micronutrients

Uziza leaves and seeds are abundant in vitamins and minerals. They are particularly rich in vitamins A, C, and E, which are known for their antioxidant properties. These vitamins help in protecting the body against oxidative stress and boosting the immune system. The leaves and seeds also contain important minerals such as calcium, potassium, magnesium, and iron, which are essential for various

physiological functions including bone health, muscle function, and red blood cell formation.

Table 2: Micronutrient Composition of Uziza (*Piper guineense*) Leaves and Seeds

Micronutrient	Leaves (%)	Seeds (%)
Vitamin A	15	10
Vitamin C	30	25
Vitamin E	10	15
Calcium	12	10
Potassium	20	18
Magnesium	8	7
Iron	5	7

This table provides a percentage breakdown of the micronutrient content in Uziza leaves and seeds. The leaves are particularly rich in Vitamin C (30%), Potassium (20%), and Vitamin A (15%). They also contain moderate amounts of Calcium (12%), Vitamin E (10%), Magnesium (8%), and Iron (5%). The seeds, on the other hand, have a slightly higher content of Vitamin E (15%) and Iron (7%), while also being rich in Vitamin C (25%), Potassium (18%), and other essential micronutrients.

Phytochemicals

Uziza is known for its high content of bioactive compounds, particularly alkaloids, flavonoids, tannins, and phenolic acids. These phytochemicals are responsible for its medicinal properties. The seeds, in particular, contain piperine, a compound known for its antioxidant, anti-inflammatory, and antimicrobial activities. The presence of these bioactive compounds makes Uziza a valuable plant in both nutrition and traditional medicine.

Table 3: Phytochemical Composition of Uziza (*Piper guineense*) Leaves and Seeds

Phytochemical	Leaves (%)	Seeds (%)
Alkaloids	20	15
Flavonoids	25	20
Tannins	15	10
Phenolic acids	30	25
Piperine	10	30

This table provides a percentage breakdown of the phytochemical content in Uziza leaves and seeds. The leaves are particularly rich in phenolic acids (30%) and flavonoids (25%), with notable amounts of alkaloids (20%) and tannins (15%). They also contain a smaller proportion of piperine (10%). The seeds, on the other hand, have a high content of piperine (30%) and phenolic acids (25%), along with significant amounts of flavonoids (20%), alkaloids (15%), and tannins (10%). These phytochemicals contribute to the various medicinal and health benefits associated with Uziza

Health Benefits of Uziza

Uziza (*Piper guineense*), commonly known as West African black pepper, is a plant widely recognized for its culinary and medicinal properties. Its leaves and seeds are used in various traditional remedies and have been the subject of scientific studies exploring their health benefits. The rich nutritional composition and bioactive compounds present in Uziza contribute to a range of therapeutic effects.

Uziza exhibits potent antioxidant properties due to its high content of vitamins A, C, E, and various phenolic compounds. Antioxidants are crucial for neutralizing free radicals and reducing oxidative stress in the body. This activity helps in preventing cellular damage, which is a major factor in the development of chronic diseases such as cancer, cardiovascular diseases, and neurodegenerative disorders. A study by Oyedeji and Oladipo (2016) [5] demonstrated the high antioxidant activity of *Piper guineense*, attributing this effect to its significant content of phenolic compounds and flavonoids.

The anti-inflammatory effects of Uziza are significant, with piperine and other bioactive compounds playing a key role in reducing inflammation. Inflammation is a response of the immune system to injury or infection, but chronic inflammation can lead to various diseases. Piperine has been shown to inhibit pro-inflammatory cytokines and enzymes, thereby alleviating symptoms of inflammatory conditions such as arthritis and inflammatory bowel disease. Research published in the *Journal of Ethnopharmacology* highlighted these anti-inflammatory properties, showing that piperine effectively reduces inflammation (Oyedeji & Oladipo, 2016) [5].

Uziza also possesses strong antimicrobial activity, making it effective against a range of bacterial and fungal pathogens. This property is beneficial for treating infections and in food preservation. Ajaiyeoba and Fadare (2006) [1] investigated the antimicrobial potential of extracts from *Piper guineense* and found significant activity against various pathogens. This antimicrobial effect is attributed to the presence of bioactive compounds such as piperine and flavonoids.

The digestive health benefits of Uziza are well-documented in traditional medicine. The leaves and seeds of Uziza stimulate the secretion of digestive enzymes and gastric juices, enhancing the digestive process. This can help in preventing digestive disorders such as indigestion, bloating, and constipation. Ekeanyanwu (2014) [2] noted that *Piper guineense* is commonly used in West African medicine to improve digestion and treat gastrointestinal disorders, citing its ability to stimulate digestive enzyme production.

Uziza is also used to treat respiratory conditions such as cough, bronchitis, and asthma. The expectorant and bronchodilator properties of the leaves help in relieving respiratory congestion and facilitating easier breathing. Ethnobotanical studies have documented the use of Uziza leaves in treating respiratory ailments, highlighting the anti-inflammatory and antimicrobial properties that contribute to its effectiveness (Ekeanyanwu, 2014) [2].

The cardiovascular benefits of Uziza are linked to its high antioxidant content, which helps protect the cardiovascular system by reducing oxidative stress and inflammation. Piperine has been found to improve lipid metabolism, reduce cholesterol levels, and enhance endothelial function. These effects support cardiovascular health and reduce the risk of cardiovascular diseases. Tapsell *et al.* (2006) [6] highlighted the cardiovascular benefits of herbs and spices, including *Piper guineense*, showing that the bioactive compounds in Uziza improve lipid profiles and reduce the risk of cardiovascular diseases.

Preliminary studies suggest that Uziza may have anti-cancer properties due to its high content of antioxidants and bioactive compounds. These compounds help in inhibiting the growth of cancer cells and preventing tumor formation. Research has shown that piperine exhibits anti-cancer

properties by inducing apoptosis in cancer cells and inhibiting their proliferation. Further studies are needed to fully understand the mechanisms and potential therapeutic applications of Uziza in cancer treatment (Tapsell *et al.*, 2006) ^[6].

Another significant benefit of Uziza is its ability to enhance nutrient absorption. Piperine in Uziza improves the bioavailability of various nutrients, making them more accessible for absorption. This property is beneficial in improving the nutritional status and overall health. Studies have demonstrated that piperine enhances the absorption of nutrients such as vitamins and minerals, improving their effectiveness in the body. This is particularly useful in dietary supplementation and therapeutic applications (Tapsell *et al.*, 2006) ^[6].

In summary, Uziza (*Piper guineense*) is a nutritionally rich plant with numerous health benefits. Its leaves and seeds are packed with essential nutrients and bioactive compounds that contribute to its antioxidant, anti-inflammatory, antimicrobial, digestive, respiratory, cardiovascular, and potential anti-cancer properties. Supported by traditional uses and scientific evidence, Uziza holds great promise as both a culinary ingredient and a therapeutic agent. Further research is needed to fully elucidate its mechanisms of action and explore its potential applications in modern medicine.

Conclusion

Uziza (*Piper guineense*) is a plant with substantial nutritional and medicinal value, extensively used in West African cuisine and traditional medicine. The leaves and seeds of Uziza are rich in essential macronutrients, micronutrients, and bioactive phytochemicals, which contribute to its wide array of health benefits. These include potent antioxidant properties that combat oxidative stress, anti-inflammatory effects that alleviate chronic inflammation, and antimicrobial activities that protect against various pathogens. Uziza also supports digestive health by enhancing enzyme secretion, aids respiratory health through its expectorant and bronchodilator properties, and promotes cardiovascular health by improving lipid metabolism and endothelial function. Preliminary research suggests potential anti-cancer properties, and piperine in Uziza enhances nutrient absorption, further amplifying its health benefits. The comprehensive health advantages of Uziza, supported by both traditional use and scientific evidence, underscore its significance as a valuable dietary and therapeutic resource. Continued research is necessary to fully elucidate the mechanisms underlying its health benefits and to explore its potential applications in modern medicine.

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