

Review Article

Nutritional and medicinal values of common green leafy vegetables consumed in Delta State, Nigeria: a review

Taiwo Esther Dada^{1*}, Kekere Otitolaju², Randy Adjonu³, Judith Crockett¹, Ezekiel Uba Nwose¹

¹School of Community Health, Charles Sturt University, Orange, Australia

²Department of Agronomy, Faculty of Agriculture, Adekunle Ajasin University, Akungba-Akoko, Ondo State, Nigeria

³School of Biomedical Sciences, Charles Sturt University, Wagga Wagga, Australia

Received: 04 January 2021

Revised: 30 March 2021

Accepted: 01 April 2021

*Correspondence:

Taiwo Esther Dada,

E-mail: tdada@csu.edu.au

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ABSTRACT

Green leafy vegetables (GLVs) play an important role in human nutrition. In sub-Saharan African countries, GLVs are a vital source of essential micronutrients, and their consumption has long been a part of the cultural heritage of African households. In Nigeria, GLVs are either cooked as a stew or consumed raw and used as a main or a supporting dish. These GLVs have great nutritional and medicinal value. It is hypothesized that providing knowledge about the botanical description, nutritional and medicinal benefits to consumers could improve consumption, but much of existing knowledge is poorly documented and inaccessible. This paper aims to address this gap by collating information on some consumed in Delta State, Nigeria: African jointfir (*Gnetum africanum*, locally known as Ukazi), jute mallow, (*Corchorus olitorius*, locally known as Malafiya), and cassava (*Manihot esculenta*, Crantz), giant yellow mulberry (*Myrianthus arboreus*), okra (*Abelmoschus esculentus*), clove (*Syzygium aromaticum*) and bush buck, (*Gongronema latifolium*, locally known as Utazi) leaves.

Keywords: Nutritional value, Medicinal value, Green leafy vegetables, Indigenous foods, Malnutrition, Nigeria

INTRODUCTION

The global strategy on diet recommends at least 400 g of fruit and vegetables daily to support consistent nutrition and human health. Sub-Saharan Africans are known to consume green leafy vegetables (GLVs) as part of their diets.¹ These GLVs are rich in macro- and micronutrients, which significantly impacts people's nutritional status-including vitamins such as A, C, K, and carotene (provit A).² They are also sources of essential minerals such as iron, potassium, zinc, iodine, and calcium.³

Commonly consumed GLVs in Nigeria include waterleaf (*Talinum fruticosum*), fluted pumpkin (*Telfaira occidentalis*), bitter leaf (*Vernonia amygdalina*), jute mallow (*Corchorus olitorius*), and clove (*Syzygium aromaticum*). GLVs display varied sensory attributes and

may be bitter, aromatic, or bland to taste tasteless.⁴ The consumption of GLVs has been a part of the cultural heritage among rural African households during meal times, and are considered an essential part of their diet.⁵ Despite the medicinal, nutritional, and economic benefits of these vegetables, they are still underutilized by the population. This limitation may be due to the lack of awareness regarding the nutrition and health benefits of these GLVs.

It is argued that the provision of the necessary information about the nutritional and medicinal benefits of GLVs that are commonly consumed may encourage low-income populations in rural Nigeria to cultivate and consume more of these GLVs. The consumption GLVs as part of a balanced diet can contribute to the prevention of nutrient deficiencies and the consequent malnutrition

among these vulnerable population groups.⁶ There has been limited research and documentation on the medicinal and nutritional values of GLVs consumed by the indigenous people of this Delta State, Nigeria. This paper reviews the nutritional and medicinal values of selected GLVs, including African jointfir (*Gnetum africanum*), jute mallow (*Corchorus olitorius*), cassava (*Manihot esculenta*), giant yellow mulberry (*Myrianthus arboreus*), okra (*Abelmoschus esculentus*), clove (*Syzygium aromaticum*) and bushbuck (*Gongronema latifolium*).

NUTRITIONAL AND MEDICINAL VALUE OF SELECTED GLVS CONSUMED IN DELTA STATE, NIGERIA

African jointfir (*Gnetum africanum*-Welw) leaves

Botanical description

African Jointfir (*Gnetum africanum*) is an evergreen, shade-tolerant vine, perennial with woody stems found in humid tropical forests, belonging to the family of *Gnetaceae* and genus *Gnetum* L. jointfir. It has different local names in different parts of the world. In Nigeria, common names are “wild spinach” (English name), “Afang leaves” (Ibibio), “Okazi/Ukazi” (Igbo) and “Nkani” (Northern cross Riverians).^{7,8} It is also cultivated in central Africa, South America, and tropical and subtropical part of Asia. During the dry season, *G. africanum* continues to grow new shoots and develop, especially when the side shoots or stem has been cut removed (Figure 1).



Figure 1: Leaves of *Gnetum africanum*.⁹

Nutritional value

The fruit, leaves, root sap, and seed are the edible parts of the plant. The leaves of *G. africanum* can be consumed as a vegetable and cooked to prepare Afang and okazi soup.⁷ They are also widely used as an ingredient in stews due to their nutritional and therapeutic properties.¹⁰ The leaves of the plant are a rich source of protein, iron, calcium, and iodine, with the presence of fibre mitigates iron bioavailability and calcium, creating an essential nutritional property.⁷

Medicinal value

Locally, *G. africanum* has been used as remedy for sore throats, nausea, and pain management among women during childbirth.¹⁰ *G. africanum* leaves contain phytochemical properties like anti-carcinogenic, anti-inflammatory, and antioxidant.^{8,10}

Jute mallow (*Corchorus olitorius* L.) leaves

Botanical description

Corchorus olitorius L. is an annual, much-branched with young, tender with green leaves, belonging to the family belonging to Tiliaceae and genus *Corchorus*. It is commonly called jute mallow, bush okra, or West African sorrel.¹¹ In Nigeria, it has many local names- ‘ewedu’ in Yoruba, ‘malafiya’ in Igbo, and ‘rama’ in Hausa.¹² The plant thrives in warm conditions and grows naturally in abandoned fields, grass, and fallow lands. It is cultivated in Asia, Latin America, Australia, and Africa.¹³

C. olitorius in the Africa continent includes Nigeria, Kenya, Uganda, Cameroon, Sudan, and Zimbabwe.¹⁴ The leaves have alternate, ovate, lanceolate, and dentate shapes, flowers occur as single or two to three flower cymes in the leaf axil opposite to the leaf, and their fruit are usually brown, gray, or green (Figure 2).¹²



Figure 2: Leaves and flowers of jute mallow.

Nutritional value

C. olitorius leaves are source of carbohydrates, proteins, essential amino acids, vitamin B, C, E, and β -carotene (vitamin A).¹⁵ The young fresh leaves of this plant are also high in fibre and minerals (e.g., calcium and iron) needed for good health.^{16,17} The leaves and tender shoots

are the edible parts of the crop. The leaves either being eaten raw or be used to make a sticky sauce, which can be cooked in a stew/soup that accompanies the main dishes.¹⁸ The consumption of jute mallow provides excellent sources of antioxidants.

Medicinal value

The leaves, roots, and seeds part of the plant are also used for folk remedies and herbal medicines, to treat various disease conditions such as gonorrhoea, aches and pains, dysentery, fever, piles, tumours, and chronic cystitis and to act as a purgative (Figure 3).^{18,19} Moreover, the leaves' cold infusion is said to restore appetite and strength in humans.²⁰

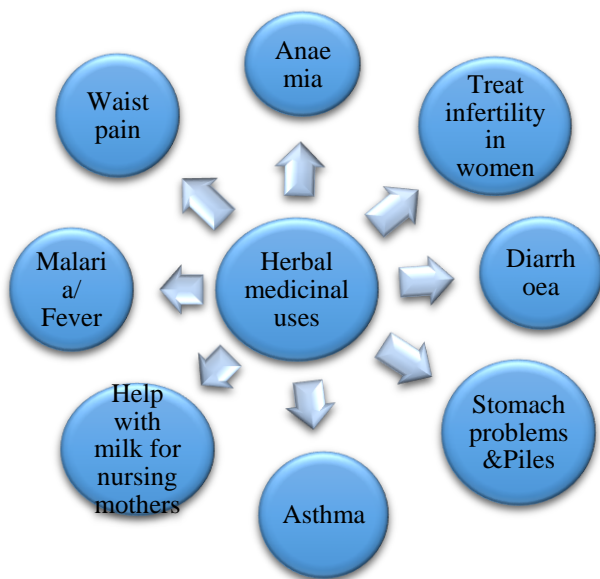


Figure 3: Herbal medicinal uses of jute mallow.

The leaves of jute are well known as a diuretic and emollient. The decoction made from these leaves is used as a tonic to support human health.^{21,22} Figure 3 illustrates various ways the plant can be used for curing illness, such as the leaves used as herbal pharmacopeia to prevent typhoid fever or malaria. The root scraping from *C. oltorous* is used for the treatment of toothache.¹⁸ The leaf part of jute mallow is consumed at cultural events such as marriages and naming ceremonies in Nigeria. Despite the significant contribution of jute mallow to medicine, nutrition, and local economies, it is still a neglected crop within the scientific research and national agricultural development policies.²³

Cassava (*Manihot esculenta*, Crantz) leaves

Botanical description

Manihot esculenta, Crantz is a starch-tuber, tropical root vegetable, and a perennial woody shrub belonging to Euphorbiaceae and genus *Begomovirus*. In Nigeria, it is

locally called “Ganyen rogo” in Hausa, “Akrukwo ji akpu” or Mpoto, ipoto in Igbo, “Ewe ege” in Yoruba, “Nfang iwa” in Ibibio, and “Ikong iwa” in Efik. It is a well-known leafy vegetable widely grown in tropical and subtropical countries such as Asia, Africa, and Latin-America.²⁴ Leaves are used for both culinary purposes and in folk medicines. Cassava is one of the most edible root vegetables in some Sub-Saharan Africa countries, with the cassava tuber most commonly consumed. Cassava leaves are also consumed in Tanzania, Nigeria, Sierra Leone, Liberia, and Zaire, where they are readily available throughout the year.²⁴ They are used for both culinary purposes and in folk medicines (Figure 4).^{25,26}



Figure 4: Cassava leaves.

Nutritional value

Cassava leaves' nutritional value contains vitamins like B1, B2, C, and carotenoids, minerals, and protein.²⁷ As a result, the consumption of cassava leaves can be used to combat malnutrition. For example, In Brazil, the cassava leaf powder is used as a food supplement named Multimistura to combat malnutrition among children and pregnant women.²⁶

Medicinal value

The micronutrients found in cassava leaves have several medicinal values in human health. Cassava leaves are used to help pregnant women increase breast milk production and treat diarrhoea in most sub-Saharan countries like Sierra Leone, Nigeria, and Liberia.²⁸

Giant yellow mulberry (*Myrianthus arboreus*) leaves

Botanical description

Myrianthus arboreus is a dioecious shrub or tree with branches belonging to the family Urticaceae and genus *Myrianthus*. The plant grows up to a 20 m tall shrub or tree with spreading branches. The massive leaves tend to reach up to 70cm in diameter, with 7 to 9 leaflets.²⁹ Giant yellow mulberry is originated in forest

zones of tropical Africa, including Angola, Ethiopia, Sierra Leone, Guinea, and Sudan.³⁰ Among Nigerian ethnic communities, it is known as “Ujuju” in the Southern part of Nigeria.

Nutritional value

Young leaves are mostly consumed as indigenous vegetables with a native delicacy in the South-Eastern part of Nigeria.²⁹ The fruits of the plant can be eaten raw while the young leaves are cooked as vegetable soup. The leaves of *M. arboreus* plant are a source of protein, seasonally available among communities in the Southern part of Nigeria, including Delta and Edo states.³¹

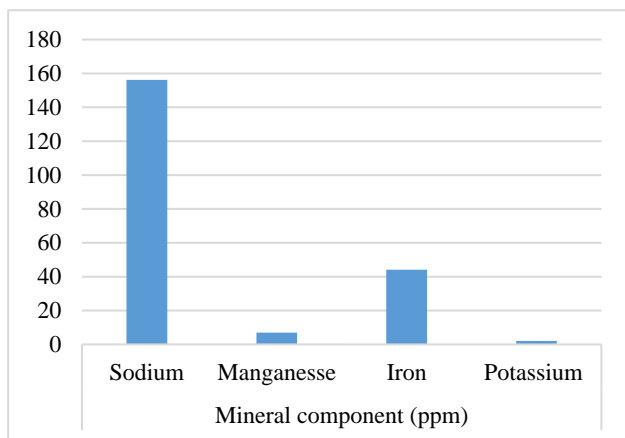


Figure 5: Some of the mineral composition of *Myrianthus arboreus* leaf with a high content level of sodium, iron, manganese, and potassium, which are essential for human health.³¹

Medicinal value

M. arboreus is a medicinal plant used to treat various disease conditions in African countries, including Nigeria. Common ailments treated with the leaves or leafy shoots of plant extracts include malaria, wounds, dysentery, skin infections, and diarrhea.³⁰ The leaves are also used in traditional medicine, which can be in a powdery form or consumed in liquid form when boiled to heal muscle pain and relieve back pain.³² The leaf stalks are mashed as a dressing for boils and as a medicinal ingredient to alleviate fever and treat dysentery among infants. The bark of the plant has its medicinal usage in Nigeria, mostly to expel intestinal parasites.

Okra leaves (*Abelmoschus esculentus*)

Botanical description

Abelmoschus esculentus, also known as ladies' fingers or gumbo, is a warm-season vegetable crop belonging to Malvaceae and genus *A. esculentus* is cultivated in the tropical and warm temperate parts of the world. Okra is a green, finger-shaped vegetable (Figure 6) with a characteristic viscous juice.³⁴ The okra fruit/pod is a

greenish capsule and leaves grow in an alternating pattern, which has up to 4-7 lobes on each stem

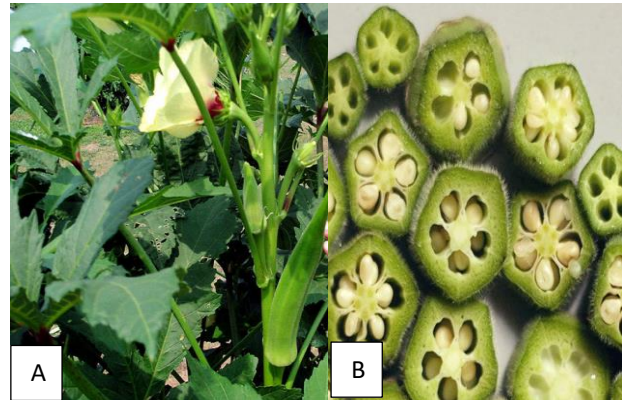


Figure 6: (A) Okra leaves, with one mature pod (*Abelmoschus esculentus*), (B) Cut okra fruits showing seeds.³⁴

Medicinal value

The consumption of okra has been associated with high fibre content, which can result in various beneficial health outcomes.³⁸ Besides its nutritional role, its high fibre content regulates the body's sugar level and acts as a dietary medicine source. The presence of okra mucilage is assumed to impact significantly regulating the blood sugar of the human body.³⁹ It has been proven to be linked to hypoglycemic, antimicrobial, anticancer, and anti-ulcer activities.⁴⁰ The high intake of *A. esculentus* is related to risk reduction in chronic health diseases such as diabetes, ulcers, and haemorrhoids.⁴¹ *A. esculentus* helps in recovery from cardiovascular disorders due to its antioxidants component.⁴² The leaves provides tumour remedies and furnish an emollient poultice.⁴²



Figure 7: (A) Clove leaves and (B) flower bud.

Clove (*Syzygium aromaticum*) leaves

Botanical description

Syzygium aromaticum, commonly known as clove, most valued spices globally and is a tropical evergreen tree that belongs to *Myrtaceae* family, cultivated in countries like Brazil, Madagascar, Sri Lanka, and throughout the

African continent.⁴⁴ Although the clove plant may thrive in subtropical zones, it may not flower in cooler temperatures with consistently high humidity areas. Collection of flower buds are carried out during the maturation phase before flowering then sun-dried for 4-5 days.

Clove flower buds are waxy, changing from green to pinkish-red over 5-6 months (Figure 7). Both the flowers and leaves are very similar to the Australian gum tree, showing their *Myrtaceae* connection.⁴⁴

Nutritional value

Clove contains potassium, iron, magnesium, and vitamins, including vitamin A, vitamin-K, vitamin-C, and riboflavin. It has been recognized as a food preservative and pharmacological agent for centuries due to its antimicrobial and antioxidant properties that may help the body's immune systems against infectious agents.⁴⁴

Medicinal value

The medicinal value of cloves includes their antimicrobial, antiviral, antifungal, and antioxidant properties.⁴⁵ Cloves are used to enhance digestive health through their carminative and stimulant properties, improve blood circulation, reduce blood pressure, and boost the body's immune system.⁴⁶

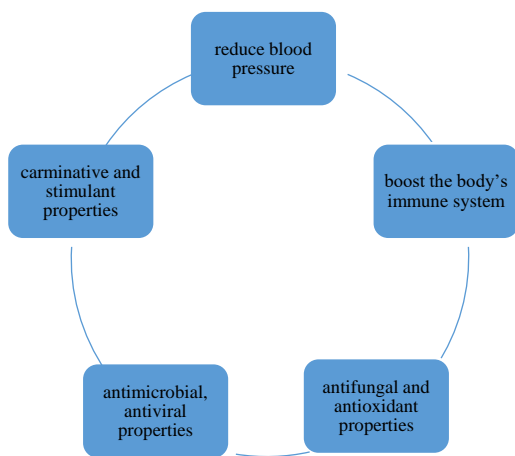


Figure 8: Herbal and medicinal uses of clove leaves.

Bushbuck (Gongronema latifolium) leaves

Botanical description

Gongronema latifolium is an annual non-woody climbing forest shrub with glabrous stems underneath reaches up to 5 m long (Figure 8), belonging to the family of *Asclepiadaceae*.⁴⁷ It is mostly found in the tropical rainforest regions, such as in Nigeria, where it is commonly called Bushbuck (English name), 'utazi' in Igbo, 'arokeke' or 'madumaro' in Yoruba, and 'utasi' by the Efik/Ibibio people living in South-eastern Nigeria.

Gongronema latifolium is a climbing shrub. Its leaves are heart-shaped, broad, and slightly oval in appearance with a deeply cordate base (Figure 9).



Figure 9: Bushbuck leaves (*G. latifolium*).

Nutritional value

G. latifolium leaves are consumed popularly in the South-eastern part of Nigeria, which is used as a spice and a leafy vegetable for preparing Nsala soup, African salad (Ugba and also in accessories dishes like Abacha and Nkwobi in Delta State Nigeria. This plant's nutritional importance depends on its usefulness as a seasoning ingredient because of its aromatic flavour.⁴⁸ It is also a significant source of high protein and mineral components, which are useful in controlling weight gain and crucial for digestion, organ function, bone and muscle development, and strengthening.

Medicinal value

G. latifolium leaf can be infused, chewed, or cooked for medicinal reasons. The root part of the plant cannot be chewed directly; it must subject to decoction. In Africa, the decoction is made by infusing the root and the leaves in hot water for a period, then allowed it to cool down. The liquid extracted from this decoction and the leaves themselves are used as a medicinal treatment for constipation, reduce symptoms of colds and the flu, improve digestion, and control blood pressure for people with hypertension. Among lactating mothers, utazi has value in maintaining body weight.⁴⁹ The fresh part of utazi leaves can be chewed directly; the plant stem acts like an old method of dental care and reported with medicinal values including anti-diarrheal, anti-bacterial, and antifungal activities.^{48,50}

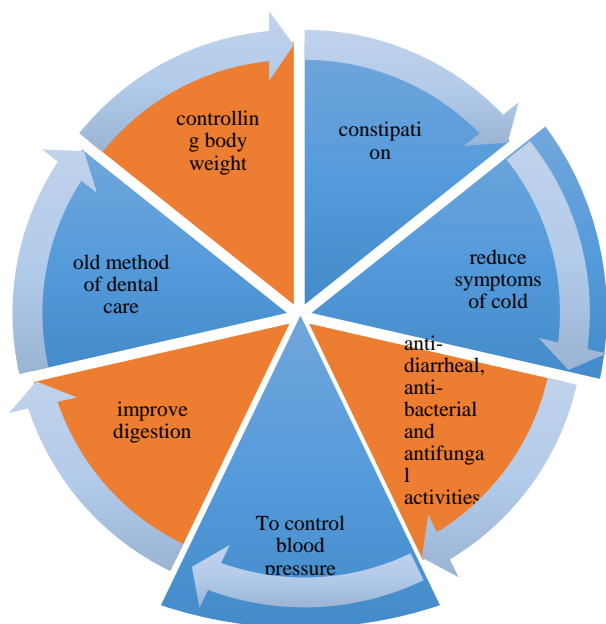


Figure 10: Herbal and medicinal uses of Bushbuck leaves.⁴⁹

CONCLUSION

Green leafy vegetables are essential sources of nutrients, and as a part of a healthy diet may be an effective strategy to reduce malnutrition in Nigeria. This paper provides a botanical description and outlines the nutritional and medicinal importance of a number of GLVs. Notably, the knowledge contained in this paper has the potential to contribute to public education about the benefits of GLV as part of a healthy diet, especially among people living in Delta State, Nigeria. The value of GLVs requires that policymakers, nutritionists, food scientists, clinicians, and other stakeholders pay critical attention to promoting the consumption among people living in Sub-Saharan Africa, especially in Delta State Nigeria.

ACKNOWLEDGEMENTS

Author would like to thank supervisory team-NEU, JC, RA (Australia), and (KO in Nigeria); for helping to review and providing suggestions to the manuscript.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required.

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Cite this article as: Dada TE, Otitolaju K, Adjonu R, Crockett J, Nwose EU. Nutritional and medicinal values of common green leafy vegetables consumed in Delta State, Nigeria: a review. *Int J Community Med Public Health* 2021;8:2564-71.