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**RESEARCH ARTICLE**

# The Ilaje People, Their Traditional Medical System and the Interconnection Between Culture and Usage of Medicinal Plants in The Treatment of Disease Conditions

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**ABSTRACT**

The history of Ilaje people is defined by a unique mixture of coastal traditions, rich cultural practices, and interactions with external forces such as colonial powers and modern economic challenges. Their traditions, connection to the sea and the resilience in the face of adversity has made the Ilaje people a distinct and important group within the Yoruba ethnic group. The Ilaje people have a rich traditional knowledge of medicinal plants, which are deeply integrated into their culture and health practices. The plants are used for the treatment of various disease conditions such as malaria, hypertension, digestive disorders and diabetes. The Ilaje people depend on the biodiversity of their environment to gather medicinal herbs from knowledge that have been passed down from one generation to another. This knowledge is deeply rooted in oral traditions and is vital for the primary healthcare of the people, especially in rural and remote areas where access to modern healthcare services is limited. The medicinal plants used by the Ilaje people are usually prepared in various forms such as infusions and decoctions combined with spiritual practices. Despite the wealth of knowledge about the plants, there is a growing need for scientific research to validate the efficacy of some of the plants and explore their potential in modern medicine. This paper examines, the Ilaje people, their traditional medical system, culture and the influence of culture on the use of medicinal plants in the treatment of various disease conditions.

## INTRODUCTION

The Ilaje people are an ethnic group principally found in the coastal area of Ondo State, southwestern region of Nigeria. They belong to the Yoruba ethnic group with distinct cultural and historical characteristics that make them unique. Their ancestral lineage can be traced to the ancient kingdom of Ife, the spiritual and cultural heart of the Yoruba people. The Ilaje people migrated along the coastal region- southwestern Nigeria (Fadipe, 1970; Nwokeji, 2007). They developed their own specific dialect, traditions, and ways of life with deep connection with the Atlantic Ocean, which has played a central role in their economic, cultural, and social development (Lawal, 2004). The coastal environment has significantly influenced their lifestyle, with majority of Ilaje people being fisher men and women, traders, and boat builders (Ogunmoriti, 1989; Olomola, 1991; Oyenuga, 2005; Akintola & Fakoya, 2017). The Ilaje people are known for their expertise in fishing, remaining a vital part of their economy and are engaged in farming, growing crops such as cassava, yam, plantain, and coconut (Lawal, 2004).

The Ilaje people have a rich cultural heritage, with their own traditional music, dance, festivals, and religious practices and worship various gods and deities and practice traditional African religion alongside Christianity (Akinyemi, 1982; Oyekan, 2010). It is important to note that in this age and time, most Ilaje people practice Christianity although some combine it with African religion (Akinyemi, 1982). The Ilaje people celebrate various traditional festivals, marked by music, dance, rituals, and prayers, an expression of their gratitude to the gods for protecting them and providing for their livelihoods (Smith, 1983). The Ilaje people speak the Ilaje dialect of the Yoruba language.

However, due to their coastal location and historical interactions with foreign traders, they also have words and phrases derived from Portuguese, English, and other languages (Nwokeji, 2007).

The Ilaje people operate a decentralised political system, with local leaders known as Baales (chiefs) governing individual towns or villages. The leaders play an important role in resolving disputes and maintaining peace and order within the communities. There are also Kings who govern various kingdoms within Ilaje land and have been influential in the history of Ilaje people (Lawal, 2004). The European colonial powers have an enduring impact on the cultural and economic life of the Ilaje people, including the spread of Christianity and Western education (Oyekan, 2010; Ogunmaike, 2012). The discovery of oil in the Niger Delta, including Ilaje land, has brought both opportunities and challenges to the Ilaje people. This has promoted economic development in the area but also resulted into environmental damage, displacement, and conflicts related to the distribution of oil wealth (Emeagwali, 2007).

The Ilaje people continue to maintain a balance between tradition and modernisation. The area is increasingly integrated into the national economy, with involvement in the oil and gas industry, fishing and agriculture. However, challenges such as environmental degradation, the displacement of communities due to oil exploration, and tensions over the fair distribution of oil revenue continue to have negative impact in the area (Akinyemi, 1982). Notwithstanding, the Ilaje people remain proud of their heritage and cultural identity and continue to celebrate their traditions through festivals and other cultural expressions (Oyekan, 2010).

**Influence of culture on medicinal plants used by the Ilaje people**

Culture plays a significant role in defining the medicinal plant practices of the Ilaje people, influencing both the selection and use of medicinal plants in their traditional medical and healing systems (Fagbemi et al., 2019; Akinmoladun et al., 2015). For the Ilaje people, cultural beliefs, values, and practices are deeply interrelated with their interactions with the natural environment. For the Ilaje people, medicinal plants are linked to spiritual beliefs and practices. Certain plants are believed to have spiritual properties, and their use is accompanied by rituals, prayers, or offerings to ancestral spirits or deities. For example, the ability of the plant to heal could be perceived as a gift from the gods, or healing may be seen as a spiritual endeavour that connects the healer with ancestral knowledge. In such cases, healing is not just physical act but spiritual and cultural (Luseba et al., 2017). The Ilaje people also believe in the doctrine of signature in herbal prescriptions and usage (Aworinde et al., 2018). To confirm this, Aworinde et al (2018) evaluated the knowledge and application of the doctrine of signature among Ilaje people in Ondo State, Nigeria. The authors obtained information relevant to the belief of the doctrine of signature from the participants using questionnaire and reported that plants such as Kigelia Africana and Ipomoea batatas were used in the treatment of breast disorder due to the shapes of their fruits and tubers based on the doctrine of signature. The study confirmed the application of the doctrine of signature in plant knowledge and use among Ilaje people.

Cultural concepts of health, wellness, and disease among the Ilaje people influence the use of medicinal plants. For example, diseases are seen as not only physical but also spiritual or social in nature. This implies that plant-based treatments may be combined with cultural healing practices such as divination, herbal baths, or incantations (Mandal et al., 2019). The idea that disease can be caused by spiritual imbalance or ancestral displeasure leads to a holistic approach to healing, where medicinal plants are used not just for their physical properties but to restore spiritual harmony (Akintola and Fakoya, 2017; Mshiu et al., 2019).

The Ilaje people pass down their knowledge of medicinal plants through oral traditions, apprenticeship, experiences and stories, songs, and teachings from the elders in families and in the communities (Oyenuga, 2005). The stories convey important cultural values, beliefs about the plants' effectiveness, and specific rituals for their use (Akinmoladun et al., 2019). Elders and community healers act as the gatekeepers of traditional wisdom, ensuring that the right plants are used in the appropriate manner and for the right purpose. The transfer of this knowledge is governed by cultural norms and social structures, such as the role of elders in the community and the respect accorded to traditional healing and practices (Albuquerque et al., 2013; Fagbemi et al., 2019).

The Ilaje people have a strong cultural connection to the coastal and mangrove environments, which are rich in medicinal plants Oluwatuyi et al., 2015). The practices are influenced by the natural cycles, knowledge, experience, belief and seasonal availability of plants. The Ilaje people view nature as sacred, and this respect for nature influence the use of medicinal plants (Saraf et al., 2014). For example, the collection of plants could be done in a manner that is respectful of the environment, and certain plants may be considered sacred and used only in specific contexts or conditions, such as during certain festivals or healing ceremonies (Siti et al., 2017). Cultural practices also influence the use of plants for both food and medicine. Several plants used by the Ilaje people serve dual purposes, either as food or as medicinal herbs (Ried et al., 2016; Akinmoladun et al., 2015). The belief that food can also be medicine reflects a cultural understanding of the interconnection between diet, health, medicinal plants and healing. For example, some plants may be consumed in everyday meals, for example Vernonia amygdalina and Clerodendrum volubile to prevent sickness or boost immunity and health, while others are used specifically for treating diseases (Ayinde et al., 2017).

In Ilaje community, traditional healers or herbalists hold a special social status. The use of medicinal plants is mostly linked to a traditional healer's training, experience, and societal role. Cultural norms govern who can practice healing with plants, which may require a person to undergo years of learning under a mentor or elder. The status of the traditional healer within the community can influence the acceptance and trust in their traditional practices, with the use of certain plants being seen as more legitimate and authoritative than others (Ogunlade et al., 2020).

As modern medicine and external influences affect rural Ilaje communities, the cultural practice of using medicinal plants faces both challenges and transformations. There is a strong cultural understanding and motivation to preserve traditional plant knowledge. This includes recording the use of medicinal plants, teaching young generation about cultural significance of medicinal plants, and integrating traditional healing with modern health systems. Importantly, the cultural identity of Ilaje people is significantly linked to the use of medicinal plants, which remain an important part of their heritage and cultural preservation and pride (Ayinde et al., 2017; Oluwatuyi et al., 2015).

**Medicinal plants used by the Ilaje people**

The influence of culture on the use of medicinal plants by the Ilaje people is multifaceted. Traditional knowledge about medicinal plants, passed down through generations, plays a key role in defining the way and manner the Ilaje people use plants for medicinal purposes. The cultural practices are deeply interrelated with spiritual beliefs, social structures, and daily routines. Research has shown that the use of plants in ritualistic contexts could lead to the development of culturally specific pharmacological practices (Akinmoladun et al., 2019; Mandal et al., 2019). A study conducted in Nigeria noted that plant-based remedies recommended by traditional healers are interrelated with cultural beliefs and dictating the plants that are considered effective (Akinmoladun et al., 2015; 2017; 2019). Studies on ethnobotany demonstrate that indigenous people, including the Ilaje people, have a high level of botanical knowledge. This knowledge is vital for conserving biodiversity, as traditional practices emphasise sustainable harvesting. Mshiu et al. (2019) observed that indigenous communities in Nigeria, including the Ilaje, play an important role in maintaining biodiversity through their cultivation and use of medicinal plants.

The Ilaje people use medicinal plants for various health problems such as fever, malaria, diabetes, and gastrointestinal problems and reproductive dysfunction. Many plants, such as *Ricinodendron heudelotii* (African walnut), *Mangifera indica* (mango), and *Chromolaena odorata* (siam weed), are commonly used. A study by Akinmoladun et al. (2015) confirmed that many of the medicinal plants used by the Ilaje people have scientifically proven medicinal properties. For instance, *Chromolaena odorata* has been shown to have anti-inflammatory and antimicrobial effects, which align with its traditional use in treating wounds and infections. Also, Ricinodendron *heudelotii* has been reported to have antidiabetic and antioxidant properties (Fagbemi et al., 2019), supporting its cultural use in treating disease conditions. Studies in the field of ethnopharmacology have shown that the use of medicinal plants by the Ilaje people is in line with evidence of biological activity. For example, research on *Azadirachta indica* (neem), widely used for its antimicrobial properties in Ilaje culture, has shown its effectiveness in fighting bacterial infections (Mandal et al., 2019). Some of the medicinal plants used by the Ilaje people are discussed below:

## Morinda lucida

*Morinda lucida*, is a plant used in traditional medicine for various health conditions, such as diabetes, infections, and inflammatory diseases (Odugbemi et al., 2007). Research into its pharmacological properties has demonstrated significant evidence supporting its antidiabetic, antimicrobial, antioxidant, and anti-inflammatory activities (Okoye et al., 2008). Its antidiabetic effect is related to its ability to enhance insulin secretion, improve glucose uptake and reduce hyperglycaemia through the modulation of key enzymes such as α-amylase and α-glucosidase (Adewuyi et al., 2017). The plant has been found to possess antimicrobial properties, making it effective against various pathogens such as bacteria, fungi, and viruses. The antimicrobial properties are related to the presence of bioactive compounds, such as flavonoids, alkaloids, and saponins, which disrupt microbial cell walls, inhibit enzymes, and interfere with microbial metabolism (Eshun & He, 2004; Okwu & Josiah, 2006). The antioxidant activities of the plant are due to the presence of phenolic compounds such as flavonoids and tannins, which scavenge free radicals and inhibit lipid peroxidation (Okwu et al., 2012; Nwachukwu & Okechukwu, 2015). It has been shown to exhibit significant anti-inflammatory effects, which makes it useful in treating conditions associated with inflammation. The anti-inflammatory effects are believed to be due to the inhibition of inflammatory mediators like prostaglandins and cytokines (Nwafo et al., 2012; Igboh & Eshiett, 2014).

**Figure 1. Morinda lucida benth (Nwachukwu & Okechukwu, 2015)**

## Vernonia amygdalina

The plant has been shown to possess antidiabetic properties, principally through its hypoglycaemic effects (Olayanju et al., (2016). The plant improves insulin sensitivity and reduces blood glucose levels inhibiting enzymes such as α-amylase and α-glucosidase that are involved in carbohydrate digestion and absorption, leading to reduced postprandial hyperglycaemia (Nwobodo et al., 2015). Ojieh et al. (2019) investigated the hypoglycaemic effects of the plant in diabetic rats and reported that the leaf extract significantly reduced blood glucose levels in a dose-dependent manner. It was concluded that the plant's hypoglycaemic effects may be due to the stimulation of insulin secretion and improvement of insulin sensitivity. Nwobodo et al. (2015) examined the antidiabetic effects of its leaf extract on diabetic rats and observed a significant reduction in blood glucose levels and an improvement in insulin sensitivity, highlighting its potential as a natural therapeutic agent in the management of diabetes.

The plant contains bioactive compounds such as flavonoids, phenolic acids, and alkaloids that confer its antioxidant power in neutralising free radicals and reduce oxidative stress (Olayanju, 2016). Akinmoladun et al. (2018) assessed the antioxidant activity of its leaf extracts using in vitro models. The authors reported that its extracts exhibited significant free radical scavenging activity, indicating strong antioxidant properties.

The plant *has* exhibited antimicrobial properties due to its phytochemicals such as saponins, flavonoids, and tannins (Okigbo et al., 2010). Akinmoladun et al. (2015) examined the antimicrobial effects of the plant on various bacterial and fungal strains. The authors reported that the plant's extract displayed significant antibacterial activity against *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella typhi*, and antifungal activity against *Candida albicans*.

The anti-inflammatory effects of the plant are due to its ability to modulate inflammatory pathways, including the inhibition of pro-inflammatory cytokines (TNF-α, IL-1β) and cyclooxygenase enzymes (Bamidele et al., 2015). The plant's bioactive compounds suppress the expression of inflammatory

mediators and reduced the inflammatory response. Olaleye et al. (2014) examined the anti-inflammatory activity of the plant in animal models and reported that the leaf extract significantly reduced inflammation by inhibiting the production of pro-inflammatory cytokines and COX-2 expression.

**Figure 2. Vernonia amygdalina (Olaleye et al., 2014)**

## Tacca palmata

*Tacca palmata* has attracted scientific interest due to its diverse potential health benefits. Studies have reported on its antidiabetic, antioxidant, antimicrobial, and anti-inflammatory properties (Gana et al., 2017; Oluwatuyi et al., 2015: Adewuyi et al., 2017; Oluwatoyin et al., 2019; Sulaiman et al. (2020).

Gana et al. (2017) assessed the effects of its tuber extracts on glucose metabolism in diabetic rats and reported that the tuber extracts significantly reduced blood glucose levels in diabetic rats, suggesting its antidiabetic potential. Rao et al. (2011) reported that the plant has potential for lowering blood glucose levels and improving insulin sensitivity in diabetic animal models. The study noted that the plant possibly acts by reducing the activity of the enzyme α-glucosidase, which slows down carbohydrate absorption, thus preventing rapid increase in blood sugar, suggesting that the plant may have a role in managing type 2 diabetes by improving insulin sensitivity and reducing blood glucose levels.

The antioxidant properties of the plant have been evaluated and noted that its activities are due to its rich phenolic content such as flavonoids that scavenge free radicals and reduce oxidative stress (Ndhlala et al. (2014). Sivapalan et al. (2018) evaluated the antioxidant activity of its tuber extracts and found that the plant displayed significant free radical scavenging activities and a high content of phenolic compounds, suggesting that the plant can protect against oxidative stress-related diseases.

The plant has shown promising antimicrobial properties against various bacterial and fungal pathogens. Ogundele et al. (2014) examined the antimicrobial properties of the plant using methanolic extracts from the tubers and observed that the extracts demonstrated antibacterial activity against *Escherichia coli* and *Staphylococcus aureus*. The authors also reported antifungal activity against *Candida albicans*.

The anti-inflammatory effects of the plant have also been reported; shown to reduce markers of inflammation in both in vitro and in vivo models. Jin et al. (2018) examined the anti-inflammatory effects of its leaf extracts in animal models and reported that the leaf extracts significantly reduced the levels of pro-inflammatory cytokines.

**Figure 3. Tacca palmata (Jin et al. (2018)**

### Cymbopogon citratus

The plant is a commonly used in traditional medicine due to its therapeutic properties such as antidiabetic, antioxidant, antimicrobial, and anti-inflammatory activities (Javadian et al., 2012; Bashir et al., 2017; Zulaikha et al., 2020; Oluwaseun et al. 2020). The plant has been examined for its potential in managing diabetes, helping reduce blood glucose levels, improve insulin sensitivity, and reduce complications related to diabetes. Javadian et al. (2012) observed the antidiabetic effects of the plant in diabetic rats. Afolayan et al. (2015) examined the antidiabetic effects of the plant on alloxan-induced diabetic rats and reported that the plant exhibited significant antidiabetic effects by lowering blood glucose and improving liver and kidney function, inhibiting α-glucosidase enzyme (Zulaikha et al., 2020). Nawi et al. (2017) examined the antioxidant activity of the plant essential oil and reported its scavenging potential. Sulaiman et al. (2015), also reported on the antioxidant potential of the plant extracts and reported that the plant demonstrated strong antioxidant activity, primarily due to the presence of flavonoids, polyphenols and vitamin C.

Mahboubi et al. (2016) assessed the antimicrobial activity of the plant against *Escherichia coli*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa* and reported that the plant exhibited strong antibacterial properties. Bermúdez et al. (2011) showed that the plant had antifungal activity against species like *Candida albicans* and *Aspergillus flavus*. Bakkali et al. (2008) reported that the plant antiviral properties against herpes simplex virus.

The plant has shown significant anti-inflammatory effects, which may contribute to its usefulness in managing inflammatory conditions. Musa et al. (2012) examined the anti-inflammatory effects of the plant extract in animal models and noted that the plant significantly reduced inflammation by inhibiting the production of pro-inflammatory cytokines. Kong et al. (2020), noted that the plant reduced the activity of inflammatory enzymes in vitro, suggesting that the plant may be useful in reducing the inflammation associated with conditions such as arthritis.

**Figure 4. *Cymbopogon citratus (*Bashir et al., 2017)**

### Zingiber officinale

The plant is widely recognised for its various health benefits such as antidiabetic, antioxidant, antimicrobial, and anti-inflammatory properties (Thomson et al. (2002; Prakash et al., 2014). The plant has been shown to possess significant antidiabetic properties, helping to regulate blood sugar levels and improve insulin sensitivity (Al-min et al., 2006). Al-Amin et al. (2006) demonstrated that the extract of the plant significantly reduced fasting blood glucose levels in people with type 2 diabetes. It was found to enhance insulin sensitivity and reduce blood glucose levels. Vahabzadeh et al. (2013) reported that supplementation with ginger powder resulted in a significant decrease in HbA1c levels and fasting blood glucose in people with type 2 diabetes.

The plant contains bioactive compounds, such as gingerol with potent antioxidant properties that neutralises harmful free radicals in the biological system. Mahmoud et al. (2017) found that its extracts significantly increased antioxidant activity and reduced oxidative stress markers in animal models. The plant has shown antimicrobial activity against pathogenic microorganisms. Moghadamtousi et al. (2015) reported that the plant demonstrated antibacterial and antifungal effects against pathogens such as Staphylococcus aureus and Candida albicans. The plant is widely recognised for its anti-inflammatory effects. Vysakh et al. (2020) reported on the anti-inflammatory properties of the plant, showing that its bioactive compounds like gingerols and shogaols significantly reduced inflammatory markers in animal models.

**Figure 5. Zingiber officinale (Vysakh et al., 2020)**

## Alstonia boonel

The plant is a tropical tree that has been used in traditionally medicine in various parts of Africa. Its bark, leaves, and roots have been used in traditional medicine to treat disease conditions. Recent scientific studies have confirmed its potential as antidiabetic, antioxidant, antimicrobial, and anti-inflammatory agent (Salahdeen et al., 2008; Salahdeen et al., 2008; Sulaimon et al., 2019; Oloedu et al., 2012; Fasinu et al., 2012; Akinmoladun et al., 2015).

Studies have examined the antidiabetic properties of the plant and its effects on glucose metabolism (Oladipo et al., 2020; Akinmoladun & Eghuna, 2017). Olajide et al. (2016) examined the antidiabetic activity of the stem bark extract in diabetic rats and reported that the extract significantly reduced blood glucose levels and improved insulin sensitivity, suggesting its potential as an antidiabetic agent. The plant has demonstrated strong antioxidant properties due to its high content of phenolic compounds. Oloyede et al. (2014) reported that the leaf extract of the plant exhibited significant scavenging effects on free radicals, protecting against oxidative damage in vitro.

It has shown antimicrobial effects against bacteria, fungi, and protozoa. Iwalokun et al. (2006) examined the antimicrobial activity of the bark extract and noted that the extract exhibited significant antibacterial activity against common human pathogens such as Staphylococcus aureus and Escherichia coli. Gbadamosi et al. (2017) also noted that the leaf extract showed significant activity against bacterial and fungal strains, suggesting its potential as a natural antimicrobial agent. The plant has demonstrated anti-inflammatory effects. Odeyemi et al. (2011) reported that the aqueous extract of the plant exhibited significant anti-inflammatory activity in animal models of inflammation, reducing paw oedema and inhibiting pro-inflammatory cytokines.

**Figure 6. Alstonia boonei (Sulaimon et al. (2019)**

## Annona muricata

Annona muricata, commonly known as soursop, is a tropical fruit-bearing plant from the Annonaceae family. It has been documented for its pharmacological properties such as antidiabetic, antimalarial, antioxidant, antimicrobial, and anti-inflammatory activities (Taga et al., 2009; Davis et al., 2009; Adzu et al., 2005; Ajaiyelogba et al., 2005; Kuswandi et al., 2019).

The antidiabetic effects of the plant are attributed to its ability to regulate blood glucose levels and improve insulin sensitivity. The plant has been found to reduce hyperglycaemia through the inhibition of glucose absorption and by promoting the activity of insulin. Mazzafera et al. (2011) reported that extracts from the leaves of the plant possess hypoglycaemic properties, reducing blood glucose levels in animal models of diabetes and concluded that the plant could be useful in the

management of type 2 diabetes. The antimalarial properties of the plant are linked to its ability to inhibit the growth of Plasmodium falciparum. The plant contains alkaloids and other compounds that interfere with the parasite's metabolic processes. Ita et al. (2013) reported that its leaf extracts displayed strong antimalarial activity against Plasmodium falciparum.

The antioxidant activity of the plant is due to its high content of polyphenols, flavonoids, and vitamin C, helping in neutralising free radicals and reducing oxidative stress has been documented (Duarte et al., 2011; Omodanisi et al., 2017; Nethengwe et al., 2024). Sung et al. (2015) observed that the plant possesses significant antioxidant properties. Gurib-Fakim et al. (2008) found that leaf extracts and fruit parts of the plant have potent antioxidant activities, vital for protecting cells against oxidative damage and reducing the risk of chronic diseases.

Its antimicrobial activity against bacteria, fungi, and viruses has been documented. The plant is effective against Gram-positive and Gram-negative bacteria. Nwosu et al. (2017) examined the antimicrobial properties of the plant and found that its leaf and stem extracts demonstrated significant antimicrobial activity against selected pathogenic bacteria such as Escherichia coli, Staphylococcus aureus and Salmonella typhi.

The anti-inflammatory effects of the plant have been attributed to its ability to inhibit the production of pro-inflammatory cytokines and cyclooxygenase-2. Mann et al. (2015) observed that its leaf extract significantly reduced inflammation in animal models, showing its potential to treat inflammatory diseases. Alvarado et al. (2011) confirmed that the plant has anti-inflammatory effects through the inhibition of inflammatory mediators and reduction of oedema in experimental settings (Mishra et al., 2018; Hussain et al., 2013; Matsuda et al., 2013).

**Figure 7. Annona muricata (Hussain et al., 2013)**

## Carica papaya

The plant is a tropical fruit that has been widely recognised for its health benefits, both as food and in traditional medicine. Reports have shown that the plant possesses significant antidiabetic, antimalarial, antioxidant, antimicrobial, and anti-inflammatory activities due to its flavonoids, carotenoids, enzymes and alkaloids content (Mekonnen et al., 2005; Ohermeng et al., 2015; Cabrera et al., 2017; Jiang et al., 2019; Ohermeng et al., 2015; Samy et al., 2016).

It has been shown to reduce blood glucose levels by enhancing insulin sensitivity, regulating glucose absorption, and improving the function of pancreatic beta cells that secrete insulin (Jiang et al., 2019). Sharma et al. (2014) noted that its leaf extract significantly reduced blood glucose levels in diabetic rats. Akintoye et al. (2017) showed that its leaf extract exhibited antidiabetic effects by reducing blood glucose levels and improving insulin secretion in diabetic rats.

The antimalarial effects of the plant are related to its ability to inhibit the growth of Plasmodium falciparum. The plant contains compounds that can disrupt the parasite's cell membrane and inhibit its replication (Jiang et al., 2019). Akharaiyi et al. (2015) reported that its leaf extract demonstrated significant antimalarial activity against Plasmodium falciparum in vitro.

The plant is rich in vitamin C, carotenoids, and flavonoids which contribute to its antioxidant properties, helping in neutralising free radicals, reduce oxidative stress, and prevent cellular damage inked to cancer, cardiovascular diseases and diabetes. Abu et al. (2013) showed that its leaf extract exhibited significant antioxidant activity in vitro. Rani et al. (2019) also confirmed that its fruit

extract demonstrated potent antioxidant properties, effectively neutralising free radicals and reducing oxidative damage in human cells.

The plant contains flavonoids, phenolic acids, and saponins, which exhibit antimicrobial properties, helping in combating infections by inhibiting the growth of various microorganisms (Moss et al., 2011; Samy et al., 2016). Rajasekaran et al. (2011) reported that the leaf extract showed significant antimicrobial activity against Escherichia coli, Staphylococcus aureus and Salmonella typhi.

The plant showed anti-inflammatory effects by inhibiting the release of pro-inflammatory mediators such as cytokines and prostaglandins (Cabrera et al., 2017). Sankari et al. (2011) found that the leaf extract significantly reduced inflammation in an animal model by inhibiting the production of pro-inflammatory cytokines and enzymes. Bansal et al. (2014) also confirmed that its extracts reduced oedema and inflammation in experimental models of acute inflammation, demonstrating its potential for treating inflammatory conditions.

**Figure 8. Cariya papaya (Sankari et al. (2011)**

**Cucumis sativus**

Cucumis sativus, is a widely cultivated plant with various medicinal properties. It has been reported to exhibit antidiabetic properties through improved insulin sensitivity and reduced blood glucose levels (Mandal et al., 2011; Sharma et al., 2013; Liu & Sun, 2017; Jadhav et al., 2015; Ding & Bai, 2019; Ahmed & Islam, 2021). Oladipo et al. (2012) showed that the plant extract significantly reduced blood glucose levels in diabetic rats, indicating its potential in the treatment of diabetes.

Its potential in antimalarial activity has been attributed to its rich antioxidant content, helping in inhibiting *Plasmodium* parasite growth. Olayiwola et al. (2014) reported that the methanolic extract of the plant exhibited antiplasmodial activity against *Plasmodium falciparum* in vitro model. The plant has shown its ability to neutralise free radicals and protect cells from oxidative damage. Kaur et al. (2013) showed that its peel extract demonstrated significant antioxidant activity by scavenging free radicals.

It has demonstrated antimicrobial activity against bacteria and fungi (Tian et al., 2017). Ramasamy et al. (2017) showed that its extracts showed antimicrobial activity against *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella typhimurium*. Adebayo et al. (2019) found that its extracts exhibited antifungal activity against *Candida albicans*. The plant has anti-inflammatory properties, which are beneficial for treating inflammatory conditions. Sharma et al. (2015) found that the plant extract significantly reduced paw oedema in rats, indicating anti-inflammatory effects.

**Figure 9. Cucumis sativus (Tian et al., 2017)**

**Clerodendrum volubile**

It is a plant with various medicinal properties that have been examined in scientific studies. It has exhibited antidiabetic, antimalarial, antioxidant, antimicrobial, and anti-inflammatory activities (Paton & Hoffmann, 2011; Olayiwola, 2013; Akinmoladun et al., 2017; Akinmoladun et al., 2019; Ojo et al., 2019; Okaiyeto et al., 2021).

The plant has demonstrated antidiabetic effects, attributed to its bioactive compounds, which may influence insulin sensitivity and glucose metabolism (Okaiyeto et al., 2021). Ajay & Pradeep, 2011) showed that the aqueous extract of the plant exhibited a significant reduction in blood glucose levels in alloxan-induced diabetic rats, supporting its traditional use in managing diabetes.

The plant is known to contain compounds that could inhibit the growth of *Plasmodium* parasites. Adebayo et al. (2015) found that extracts of the plant exhibited significant antiplasmodial activity against *Plasmodium falciparum*, demonstrating its potential as an antimalarial agent. The plant has been shown to possess antioxidant properties, helping in protecting cells and tissues from oxidative damage and free radical-induced diseases (Olayiwola, 2013). Owolabi et al. (2013) assessed the antioxidant activity of the plant and found that the plant extracts exhibited strong free radical scavenging activity, suggesting its potential for use in preventing oxidative stress-related diseases. Adewuyi et al. (2017) examined the antimicrobial activity of the plant against *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa* and found significant antimicrobial effects in both the aqueous and ethanolic extracts of the plant.

Anti-inflammatory effects of the plant have been explored in vitro and in vivo models, showing its potential to reduce inflammation in a variety of conditions. Olowofela et al. (2016) demonstrated that the aqueous extract of the plant significantly reduced inflammation in animal models of acute inflammation, including carrageenan-induced paw oedema.

**Figure 10. Clerodendrum volubile (Olowofela et al., 2016)**

**Ocimum gratissimum**

This is a plant used in traditional medicine for various medicinal purposes (Sivropoulou et al., 1996; Nair et al., 2014). Scientific studies have provided substantial evidence supporting its pharmacological activities such as antidiabetic, antioxidant, antimicrobial, and anti-inflammatory effects as discussed below:

Diabetes mellitus, particularly type 2 diabetes, is a growing health concern worldwide (Oguntibeju, 2019; Nethengwe et al., 2024). The plant has been studied for its potential antidiabetic effects in regulating blood glucose levels and improving insulin sensitivity (El-far et al., 2017; Nwanjo et al., 2005). Animal studies have demonstrated that the plant can reduce blood glucose levels. Chaudhary et al. (2008) reported that the methanolic extract of the plant significantly reduced blood glucose levels in diabetic rats induced by alloxan. El-Far et al. (2017) reported that the plant improved insulin sensitivity in diabetic rats. The active compounds such as flavonoids, alkaloids, and phenolic compounds in the plant are believed to modulate glucose metabolism by increasing insulin secretion and enhancing the function of the pancreas.

The extracts of the plant have demonstrated strong free radical scavenging properties. Kumar et al. (2010) demonstrated that its methanolic extract displayed significant antioxidant potential in vitro

due to its rich polyphenolic compounds. Fani et al. (2012) observed that the phenolic content of the plant contributed to its antioxidant activity, reducing oxidative markers in the liver and kidneys of rats exposed to oxidative stress. Nour et al. (2014) reported that the plant extract protected against liver damage by reducing levels of malondialdehyde (MDA).

The plant has demonstrated antimicrobial activity against bacteria, fungi, and viruses, making it a potential plant for developing natural antimicrobial agents. Sankaranarayanan et al. (2010) reported that the essential oil of the plant exhibited significant antibacterial activity against multi-drug-resistant *Staphylococcus aureus*, *Escherichia coli*, and *Salmonella typhi*. Amaral et al. (2011) observed that the essential oil of the plant exhibited antifungal activity by inhibiting the growth of *Candida* species.

Inflammation is a key driver of many chronic diseases (Chatterjee et al., 2015). Chatterjee et al. (2015) reported that its extract significantly reduced levels of pro-inflammatory cytokines in animal models, suggesting that the plant may inhibit the activation of inflammatory pathways. Ali et al. (2017) showed that the plant inhibited COX-2 and reduced PGE2 production, both of which are key targets in the management of inflammation.

**Figure 11. Ocimum gratissimum (Amaral et al., 2011)**

**Future studies on plants use by the Ilaje people**

Future studies on the use of medicinal plants by the Ilaje people hold immense potential for both preserving indigenous knowledge and advancing scientific understanding of plant-based medicine. Research in the field should explore validating traditional healing practices and examining the broader implications of climate change and modernisation on the availability of medicinal plants.

A comprehensive ethnobotanical survey documenting the medicinal plants used by the Ilaje people is essential for preserving their traditional knowledge. Research should focus on identifying and documenting specific plants, their uses, the methods of preparation and the cultural context linked to usage. Such studies would ensure that valuable knowledge is not lost as older generations of traditional healers die. Also, this documentation would help bridge the gap between traditional and modern medicine by providing a foundation for further scientific study.

Future studies should involve detailed phytochemical analysis of the plants used by the Ilaje people to identify the active compounds responsible for the therapeutic properties. This would validate traditional knowledge and provide insight into the mechanisms of action of the plants.

The efficacy of some of the plants has not been scientifically proven. Future studies should involve clinical trials and efficacy testing to determine the therapeutic potential of such medicinal plants. Collaboration between traditional healers and scientists would be vital in designing studies that respect both cultural practices and scientific studies. The studies would help validate the safety and effectiveness of herbal remedies, ensuring their proper use in both traditional and modern healthcare systems.

As the Ilaje people depend on plants from their natural environment, future studies should examine the conservation of medicinal plants. Overharvesting, habitat destruction, and climate change are significant threats to the biodiversity of coastal and mangrove ecosystems. Research should explore sustainable harvesting practices, the establishment of plant nurseries, and conservation initiatives that protect the plants used in traditional medicine. Understanding the ecological impact of medicinal plant harvesting would be vital to maintaining the balance between cultural practices and environmental sustainability.

Studies should examine the role of medicinal plants in the social and economic life of the Ilaje people. This includes understanding the relationship between plant-based medicine and local healthcare systems, the economic benefits of plant trade, and the role of women and elders in the preservation and transfer of healing knowledge. Furthermore, examining how modern healthcare systems interact with traditional medicine could provide insights into the future of traditional practices in different Ilaje communities.

Climate change poses a significant threat to the availability of medicinal plants. Future studies should explore how changing weather patterns, sea level rise, and environmental degradation impact the ecosystems that the Ilaje people depend on for their medicinal plants. Understanding the impacts would be vital in developing strategies for the sustainable of cultivating certain plants in controlled environments.

Research should explore how traditional medicinal plant knowledge can be integrated into modern healthcare systems in a complementary and culturally sensitive settings. This could involve collaborative works between traditional healers and modern medical practitioners to ensure that both systems work together effectively. Understanding the benefits and limitations of both approaches would be important for designing healthcare strategies that respect cultural traditions while improving access to medical care.

The transfer of medicinal plant knowledge between generations is key for the survival of the Ilaje tradition. Future studies should focus on the methods and challenges of passing down this knowledge modern technologically driven world. Scientists should examine the role of educational programs, community-based initiatives, or technology in preserving and transferring knowledge about medicinal plants to younger generations.

Because of the increasing global interest in herbal medicine, future studies should explore the potential for the commercialisation of medicinal plants used by the Ilaje people, both for local use and international markets.

Future studies on the medicinal plants used by the Ilaje people offer great opportunities for enhancing our understanding of ethnobotany, advancing pharmacology, and preserving cultural heritage. By integrating traditional knowledge with modern scientific research, it is possible to create a more holistic and sustainable approach to healthcare. It is important to ensure that the environmental and cultural heritage of the Ilaje people are protected for future generations. Through these different initiatives and strategies, the significant role of medicinal plants in Ilaje communities can continue to be appreciated, validated, and shared with the global community.

## CONCLUSION

The Ilaje people, have a long-standing tradition of utilising medicinal plants for a variety of therapeutic purposes. The culture of the Ilaje people deeply influences their knowledge and use of medicinal plants This traditional knowledge of plant-based remedies is deeply rooted in their culture, with many Ilaje people depending on locally sourced plants to treat and prevent diseases and manage other health issues. The people possess a rich repository of knowledge related to medicinal plant use, passed down one generation to another via various means. This includes detailed knowledge of plant identification, preparation methods, and the specific conditions for which certain plants are most effective. Many of these plants have been used for centuries, and their healing properties are well-known within the community. Medicinal plant use by the Ilaje people is not limited to physical healing but also involves spiritual and cultural dimensions. Several plants are believed to have spiritual significance and are used in rituals or as part of religious practices. The use of plants is integrated into the social and spiritual life of the community, reinforcing their cultural heritage. Recently, there has been an increasing integration of traditional plant-based remedies with orthodox medicine. While some Ilaje people still depend exclusively on medicinal plants, many also seek conventional medical treatments. This blending of traditional and modern medicine provides a more holistic approach to health and well-being of the Ilaje people. The continued cultural reverence for medicinal plants ensures that they remain an essential aspect of the Ilaje people's health and wellbeing practices.

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