*Review Article*

Overview of the Anti-Inflammatory and Anticancer Properties of Five Medicinal Plants Used in Burkina Faso by Traditional Healers in the Formulation of Herbal Remedies for Inflammatory Diseases – A Review

ABSTRACT

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| --- |
| **Background:** Inflammation, this physiological process, is a natural defense mechanism that plays an essential role in tissue repair. However, if it is not properly regulated, it is possible that it can contribute to the development of chronic diseases, including cancers. Inflammatory diseases are a major public health issue because of their impact on patients' lives. In sub-Saharan Africa, limited access to conventional anti-inflammatory treatments, combined with the rise in inflammatory diseases, reinforces the use of medicinal plants. In Burkina Faso, traditional healers use several mixtures of medicinal plants to formulate recipes used in the management of certain pathologies. This review focuses on five plants, *Guiera senegalensis, Acacia nilotica, Faidherbia albida, Zanthosxylum zanthoxyloides and Zingiber officinale* belonging to different botanical families and traditionally used in Burkina Faso to treat inflammatory conditions.  **Objectives:** The aim of this paper is to provide an overview of the available scientific data and the ethnopharmacological use of these plant species.  **Method:** Bibliographic research was carried out using PubMed Central and Google Scholar databases.  **Results:** Phytochemical studies performed on these plants revealed the presence of various groups of bioactive compounds, such as polyphenols and flavonoids, which could explain their listed antioxidant, anti-inflammatory and cytotoxic properties.  **Conclusion:** These results suggest an interesting therapeutic potential for these plants studied. It could be an accessible and culturally accepted alternative for the prevention and management of inflammatory diseases and conditions related to oxidative stress. |

*Keywords: Plants, phytochemistry screening, antioxidants, anti-inflammatory, cytotoxicity*

1. INTRODUCTION

Inflammation is a physiological response of the body to an attack of infectious, traumatic or chemical origin. It involves a cascade of reactions aimed at restoring tissue integrity. However, when this response becomes chronic or poorly regulated, it can promote the emergence and progression of various pathologies, including cancers (Medzhitov, 2008). This is because chronic inflammation creates an environment conducive to the development and spread of cancer cells (Greten & Grivennikov, 2019). In Africa, although epidemiological data is insufficient, it is recognized that inflammatory and autoimmune diseases are on the rise, mainly due to rapid urbanization and lifestyle changes. In Burkina Faso, a few studies conducted in hospitals have highlighted an upsurge in cases of chronic inflammatory diseases, particularly among young adults (Dd et al. 2014; Kaboré, 2021). The conventional management of inflammatory diseases is based on anti-inflammatory and immunosuppressive drugs, which are often expensive and sometimes responsible for significant side effects, which limits their accessibility in low-income countries (Zhang & An, 2007). In this context, many populations, particularly in sub-Saharan Africa, are turning to traditional medicine and the use of medicinal plants to prevent or relieve inflammatory diseases, including certain cancers. The World Health Organization (WHO) estimates that 80% of African populations use traditional medicine or plants to meet their primary health needs (OMS, 2022). Several ethnobotanical surveys and pharmacological studies have highlighted the therapeutic potential of various plant species rich in natural antioxidant compounds, such as flavonoids, tannins and saponins (Belete, 2025; Agyare et al., 2018). These secondary metabolites play a key role in the neutralization of reactive oxygen species (ROS), the regulation of pro-inflammatory cytokine expression, and the inhibition of oncogenic signaling pathways (Hassan et al., 2025; Mahomoodally et al., 2022). The strategy for the WHO African Region, adopted in 2000, promotes the integration into health systems of medical practices and traditional medicines that have been shown to be safe, effective and of good (Haidara et al., 2024). However, the available scientific data on their pharmacological properties remain insufficiently documented. This gap hinders their integration into evidence-based therapeutic strategies and hinders their valorization in a modern biomedical framework.

This review highlights five plants commonly used in Burkina Faso: *Guiera senegalensis, Acacia nilotica, Faidherbia albida, Zanthoxylum zanthoxyloides and Zingiber officinale* by presenting their traditional uses, chemical composition and biological effects. The objective is to bring together the available knowledge to encourage its development as accessible, effective and safe therapeutic alternatives against inflammatory diseases and certain cancers.

2. methodology

A literature review was carried out using Google sholar, Pubmed central. Keywords used included “anti-inflammatory”, “analgesic”, “antipyretic”, “antioxidant”, “phytochemical”, ‘cytotoxic’ and “sub-Saharan Africa”. The scientific name of each plant was then combined separately with the preceding terms and synonyms used. Sources used in this review included articles in French and English, covering academic research as well as journal articles. Exclusion criteria were studies published before 2012 and those not from sub-Saharan Africa.

3. results

**3.1 *Guiera senegalensis***

**3.1.1 Traditional use**:

*Guiera senegalensis* J.F. Gmel, belonging to the Combretaceae family (Figure 1.A), is regarded by traditional health practitioners of Burkina Faso, Senegal, and Mali as a "miracle remedy" due to its notable and diverse medicinal properties. The most common form of preparation for internal use is decoction, or incorporation into food preparations. Traditionally, it is used to treat a wide range of ailments including malaria, dysentery, diarrhea, cough, common cold, abdominal pain, leprosy, hypertension, diabetes, hemorrhoids, eczema, impotence, epilepsy, breast cancer, jaundice, and depression (Fadimu, 2014; Ibrahim et *al,* 2022; Momoh et *al*, 2021; Traore et *al,* 2017).

**3.1.2 Phytochemistry**

Several studies report that the plant's leaves contain alkaloids, carbohydrates, flavonoids, steroids, terpenoids, saponins, tannins, proteins and carbohydrates (Bulakarima et al., 2022). In galls, alkaloids, polyphenols and saponins have been detected. (Denou et *al*., 2016; Jigam et *al.*, 2011). These compounds confer the biological properties attributed to it (Abigail et al., 2024), such as antituberculosis, antidiarrheal, antiplasmodium, analgesic, antifungal, antioxidant, antimalarial, anti-acetylcholinesterase, lipid antiperoxidation (Abdullahi, 2019; Bulakarima et *al.*, 2022).

**3.1.3 Antioxidant and Anti-Inflammatory Properties**

Shehu et al. reported in their study the DPPH radical scavenging potential of different G. senegalensis leaf extracts, which ranged from 47,748 to 66,154% (Shehu et al., 2019) . Oladimeji et *al.* in their study evaluated the antioxidant activity of the crude, hexane, ethyl acetate and methanol fractions of G. senegalensis leaves by the hydrogen peroxide and hydroxyl radical scavenging method. All fractions showed a percentage of inhibition between 78,23% and 88,32% at a concentration of 1 mg/mL (Oladimeji et al., 2019). In Nigeria, the in vivo study of methanolic leaf extract showed a significant increase in antioxidant enzymes (SOD, CAT, GSH, GPx) and a decrease in MDA (p < 0.05) in plasma, liver and kidney, indicating a scavenging effect compared with the control (Gabriel et al., 2020). The decocted, ethanolic and hydroethanolic extracts of the leaves showed an inhibitory effect on 15-lipoxygenase activity (74,46 to 95,99% at 100 µg/mL) (Lema et al., 2024). Methanolic extract of G. senegalensis stem was found to inhibit abdominal contortions (5,60 ± 2,45 at a concentration of 1500mg/kg) induced in mice in a dose-dependent manner compared with the positive control group (2,80 ±3,51) (Yakubu et al., 2016). Olutu et *al* in 2016 reached the same conclusion with methanolic stem extract (Olotu et al., 2016).

**3.1.4 Cytotoxicity**

Ethanolic extract at a concentration of 13 µg/mL induced 100% inhibition of Ehrlich Ascites carcinoma (EACC) cell growth (Abubakr et al., 2013), and marked cytotoxic activity against the human lung fibroblast cell line (MRC-5) (IC₅₀ < 5 µg/mL) (Dirar & Devkota, 2021). Investigation of the antiproliferative effect of silver nanoparticles (AgNPs) synthesized from *Guiera senegalensis* leaf extract shows that the effect is cell-line dependent and varies with concentration. The results revealed a more marked efficacy of AgNPs on PC3 cells (IC₅₀ = 23,48 μg/mL), compared with MCF7 lines (IC₅₀ = 29, 25 μg/mL) and HepG2 (IC₅₀ = 33,25 μg/mL), as evidenced by the difference in their IC₅₀ values (Bello et al., 2017).

**3.2. *Acacia nilotica***

**3.2.1 Traditional use**

*Acacia nilotica* of the Fabaceae-Mimosoideae family is widely used (see figure 1.B). Almost all its parts - root, bark, leaves, flower, gum and pods - are used medicinally (Abduljawad et al., 2020) . It is used to treat wounds, burning, diarrhea, dysentery and itching (Jame, 2018).

**3.2.2 Phytochemistry**

There are several phytochemical groups including alkaloids, volatile essential oils, phenols and phenolic glycosides, resins, oleosins, steroids, tannins and terpenes, saponins, anthraquinone (Abduljawad, 2020 ; Jame, 2018). *Acacia nilotica* is a medicinal plant known to be rich in phenolic compounds, consisting of condensed tannin and phlobatannin, gallic acid, protocatechic acid, pyrocatechol, (+)-catechin, (-)epi-gallocatechin-7-gallate and (-)epigallocatechin-5, 7-digallate (Satruhan Patel et *al*., 2023; Abduljawad, 2020). Most Acacia species contain large quantities of anthocyanins, glycosides, various phenolic compounds and flavonoids. These chemical components, in particular phenolic compounds, have shown a positive correlation with high antioxidant capacity (Abdel-Farid et al., 2014).

**3.2.3 Antioxidant and Anti-Inflammatory Properties**

Several studies have reported that Acacia nilotica extracts have good antioxidant activity. The aqueous extract, butanol fraction and ethyl acetate fraction of *Acacia nilotica* bark (*Acacia nilotica* var adansonii Guill. et Perr) demonstrated high antioxidant capacity (Abdoul et al., 2019). Traoré et *al.* in their study showed that aqueous extracts of Acacia nilotica had the best antioxidant activities by both methods (DPPH and FRAP) (Traoré et al., 2023). Leaf extracts were found to possess significant antioxidant activity. The free radical scavenging capacity of the methanolic extract of Acacia nilotica pods was reported for DPPH (IC50 : 0,218 mg/mL), ABTS (64,12 ± 0,34% inhibition for a concentration of 0,5mg/ml) and H2O2 free radical scavenging activities (Lawaly et al., 2022). Aqueous extract of *A. nilotica* pods promotes wound healing in Sprague-Dawly rats by attenuating oxidative stress with activity comparable to that of trolox and suppressing pro-inflammatory cytokines (IL-1β and TNF-α in a dose-dependent manner) (Kankara et al., 2017).

The antipyretic and analgesic activity of the aqueous extract of *Acacia nilotica* bark has been demonstrated. A significant inhibition of acetic acid-induced abdominal contortions in mice and a dose-dependent reduction in rectal temperature in rats at doses of 200 mg/kg weight and 400mg/kg weight were observed (Alli et al., 2015). The N-butanol fraction of *Acacia nilotica* pods dose-dependently reduced carrageenan-induced rat paw edema. It also significantly inhibited licking activity in the first phase of nociception for doses of 160, 80 and 40 mg/kg, and in the second phase of formalin-induced nociception at 160 mg/kg, there was also a 94,4% reduction in the number of abdominal contortions for a dose of 160 mg/kg, demonstrating its central and peripheral anti-inflammatory and analgesic activity (Tanko Mahamane Salissou et al., 2022). Similarly, aqueous extract of *Acacia* bark (150 mg/kg) reduced fever, inflammation and pain in experimental mice at the dose of 50 mg/kg aqueous extract of *A. nilotica* bark exerts a significant antinociceptive effect (p<0,05) characterized by a decrease in the duration of licking and biting in the acute or early phase (0-5 min) of formalin-induced pain (Vz et al., 2016).

**3.2.4 Cytotoxicity**

The cytotoxic activity of ethanolic extract of *A. nilotica* leaves and bark on normal cell lines (Vero cell line) verified the safety of the extract examined (IC50> 100 µg/ml) (Kabbashi et al., 2015, 2016). In Niger, Methanolic extract of *A. nilotica* pods inhibited proliferation of the cell lines tested in a dose-dependent manner, with relatively high IC50 values (IC50 > 100 µg/mL) in all models. HepG2 (IC50 299,11 ±0,34), U87 (IC50 105,42 ±0,22), MCF7 (IC50 141,41 ±0,41) , L929 (IC50 65,41 ±0,22) and CHO (IC50 941,21 ±0,17) (Lawaly et al., 2022).

**3.3 *Faidherbia albida***

**3.3.1 Traditional use**

*Faidherbia albida*, also known as *Acacia albida*, is a plant of the leguminoseae-Mimosoideae family (see figure 1.C), with multiple pharmacological properties for which it is used in traditional medicine. Extracts of the plant's bark and leaves are prescribed in traditional medicine to treat respiratory infections, fertility disorders, digestive disorders, backache, malaria (Victorien et al., 2020), inflamed eyes, skin infection, rheumatism, pneumonia and vomiting (Wilson et al., 2024).

**3.3.2 Phytochemistry**

Phytochemical screening of aqueous and ethanolic extracts of Faidherbia albida bark revealed the presence of alkaloids, carbohydrates, flavonoids, saponins and tannins. However, glycoside was absent from both extracts. Carbohydrates were present in the aqueous bark extract, while alkaloids, flavonoids, saponins and tannins were present in the ethanolic extract of *Faidherbia* *albida* stem bark (Ismail et al., 2016) as well as coumarins, gall tannins, leucoanthocyanins, mucilage and saponins (Victorien et al., 2020).

**3.3.3 Antioxidant and Anti-Inflammatory Properties**

A study carried out in Cameroon showed the antioxidant power of crude and fractional extracts of *Faidherbia albida* leaves and roots (Bruno et al., 2020). Ethanolic extracts of *F. albida* fruits showed high antioxidant activity comparable to that of propyl gallate used as a reference. In contrast, F. albida stem bark showed low antioxidant activity (Ahmed et al., 2019).

There were no studies investigating the anti-inflammatory and analgesic activity of *F. albida* in sub-Saharan Africa, but the phenolic compounds highlighted in previous studies could justify its antioxidant and anti-inflammatory properties.

**3.3.4 Cytotoxicity**

Cytotoxicity assay against human embryonic kidney (HEK) 293 cells showed that leaf and stem bark extracts were toxic at 0,1059 and 0,1179 μg/ml, respectively (Oni et al., 2021). Compounds isolated from *F. albida* bark were evaluated for cytotoxicity against two human cancer cells using the MTT method. Albidosides E and F showed a cytotoxic effect with IC50s of 18,6 µM and 46,7 µM, respectively on HeLa and 13,3 µM and 15,8 µM, respectively on HL60 (Tchoukoua et al. , 2018).

**3.4 *Zanthozylome zanthoxyloides***

**3.4.1 Traditional use**

*Zanthozylome zanthoxyloides* of the Rutaceae family (see figure 1.E) is better known as candlewood. The root of *Z. zanthoxyloides* is used as an antibacterial toothbrush in south-western Nigeria, and the decoction of its leaves and roots is used to wash wounds for healing. In addition, the plant's bark is used in the treatment of intestinal worms and edema (Ogunbolude et al., 2014). Further west, in Mali, Burkina Faso and Benin, the bark and roots are used to treat sickle-cell anemia and malaria (Ogunrinade et *al*., 2021; Togola et *al.*, 2023).

**3.4.2 Phytochemistry**

Phytochemical analysis of the plant extract showed the presence of tannins, saponins, alkaloids and flavonoids, glycosides, terpenoids and phenols (Fatai, 2023; Ikumawoyi, 2016). HPLC-MS analysis identified numerous phytochemical compounds such as coumarins, flavonoids, alkaloids, lignans and triterpenes, which were found in different VLC fractions of the n-butanol-soluble fraction of *Z.zanthoxyloides* leaves (Ayoka et *al*., 2020; Togola et *al*., 2023).

**3.4.3 Antioxidant and Anti-Inflammatory Properties**

The antioxidant potential by the ABTS+ method of leaf (IC50 : 24,96 µg/ml) and bark (IC50: 33,32 µg/ml) extracts were moderate compared with the reference trolox (4,158µg/ml) (Tine & Yin, 2017). The ethanolic extract of *Z. zanthoxyloides* stem barks showed increased absorbance with higher concentrations in the test for reduction of the Fe 3+ /ferricyanide complex to the Fe 2+ form in the presence of antioxidant, indicating ferric reducing power. However, the reducing potential of the extract was lower than that of ascorbic acid used as a standard antioxidant (Ogunbolude et al., 2014). *Z. zanthoxyloides* stem bark significantly increased antioxidant activity in rat tissue under cadmium chloride-induced oxidative stress (Oyewole & Akinbamijo, 2015). Root bark extract also showed antioxidant activity in vitro (Motto et al., 2019). In the study by Togola et *al.* hydroethanol extracts of *Z. zanthoxyloides* fruit showed the best DPPH free radical scavenging activity with an inhibitory concentration (IC50) of 20,80 ± 0,11 µg/mL, followed by hydroethanol extracts of bark with IC50 = 22,9 ± 0,14 µg/mL (Togola et *al.,* 2023). The n-butanol fraction of *Z.zanthoxyloides* leaf extracts showed moderate antioxidant activity by DPPH (IC50 ranged from 21,38 ± 5,43mg/L to 29,43 ± 5,85mg/L), FRAP (IC50 ranged from 36, 70 ± 1,33µg/L and 52,87 ± 0,11 µg/ml) and TAC (IC50 ranged between 31,80 ± 1,58µg/ml and 202,03 ± 0,21µg/ml) which was lower than that of ascorbic acid the reference (Ayoka et al., 2020). The alkaloid-rich fraction of *Z.zanthoxyloides* leaves also showed antioxidant activity (Olusola et al., 2023). The aqueous extract of stem bark showed a significant reduction in edema from 90 minutes after induction with egg albumin and from 150 minutes after induction with formalin. There was also a significant reduction in rectal temperature from the second hour of fever induction until the fourth hour of the experiment (Tougoma et al., 2021). Ogunrinade et *al.* in their experiment demonstrated that *Z.* *zanthoxyloides* root extract inhibited neuroinflammation in LPS-stimulated BV-2 microglia and synthetic hemozoin. Secretion of pro-inflammatory cytokines (TNF-alpha, IL-6, IL-1beta) was significantly reduced in a dose-dependent manner, while production of anti-inflammatory cytokine (IL-10) was increased compared to LPS-stimulated cells. the plant extract targets the NF-κB activation pathway to produce anti-inflammatory activity against LPS and hemozoin, in addition to blocking NLRP3 inflammasome activation to suppress hemozoin-induced IL-1β production (Ogunrinade et al., 2021).

**3.4.4 Cytotoxicity**

In Uganda, five compounds extracted from *Z. zanthoxyloides* bark were evaluated for their cytotoxicity. Among them, dihydrochelerythrine demonstrated significant growth inhibition of BT549 breast cancer cells (IC50 of 21,2 μM) and hepatocellular carcinoma (HCC) cells (IC50 of 8,9 μM), while showing weak cytotoxicity against HeP2 cervical cancer cells (IC50 of 64,0 μM). Sesamin showed moderate cytotoxicity against BT549 breast cancer cells (IC50 of 47,6 μM). In contrast, hesperidin showed weak inhibitory activity against A549 lung and HeP2 cervical cancer cells (IC50 64,7 and 67,5 μM respectively). However, it revealed notable toxicity against BEAS immortalized lung cells (IC50 of 7,1 μM) and LO2 normal liver cells (IC50 of 30,6 μM). The compounds skimmianine and tridecan-2-one showed no significant inhibitory activity against the cells tested (Andima et al., 2019). The alkaloid extract of *Z.* *zanthoxyloides* stem and root demonstrated concentration-dependent cytotoxicity against HepG2 liver cancer cells, and this effect was comparable to that of capecitabine (Boye et al., 2024).

**3.5 *Zingiber officinale***

**3.5.1 Traditional use**

*Zingiber officinale* Rosc (ZO) (see image 1.E), better known as ginger, belongs to the Zingiberaceae family. It is a highly sought-after tropical medicinal plant with a wide range of culinary and medical uses worldwide. It is renowned for its anti-nausea, anti-emetic, anti-diabetic, anti-inflammatory, antimicrobial and antioxidant properties, due to its long history of medicinal use and its rich bioactive constituents such as gingerols, paradols, shogaols and essential oil (Deme et al., 2021) . It has long been used in Chinese, Tibb-Unani and Ayurvedic herbal treatments for rheumatism, catarrh, neurological diseases, gingivitis and dental discomfort, stroke, asthma, diabetes and constipation (Ibeabuchi et al., 2023).

**3.5.2 Phytochemistry**

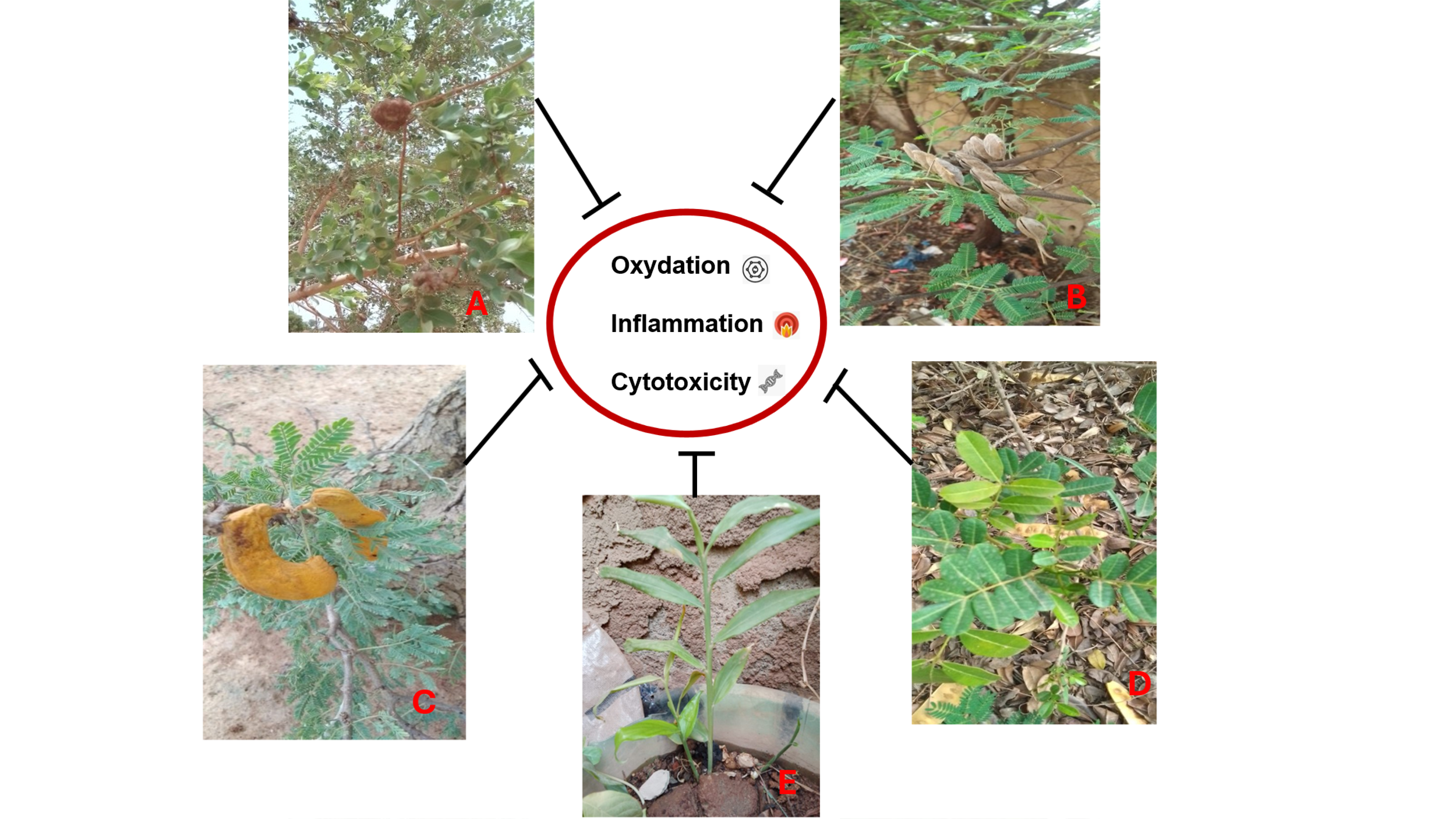
Ginger contains several therapeutically active secondary metabolites. It is attributed with antioxidant, antimicrobial, cardioprotective, anti-inflammatory, blood glucose-lowering, and anticancer activities. (Taoheed et al., 2017). The qualitative analysis of phytochemical compounds revealed the presence of phenols, tannins, alkaloids, saponins, glycosides, terpenoids, anthraquinones, flavonoids, steroids, and terpenes. (Ibeabuchi et al., 2023; Yusuf et al., 2018).

**3.5.3 Antioxidant and Anti-Inflammatory Properties**

Recent studies have demonstrated that ginger possesses anti-inflammatory properties by inhibiting the production of inflammatory compounds such as cytokines and chemokines. It also acts directly on inflammation by partially reducing the activity of the enzymes cyclooxygenase (COX) and 5-lipoxygenase (LOX), which play a key role in chronic inflammatory processes. In addition, ginger stimulates the activity of reducing antioxidant enzymes, helping to mitigate inflammatory diseases and prevent their complications (Taoheed et al., 2017). Yousfi et *al.* worked on ethyl acetate, ethanol and water extracts of Z. officinale. Ethanolic extracts were the most active against the DPPH free radical, with CI 50s of 98,62 and 77,23 µg/mL (Yousfi et al., 2021). Aqueous extract of *Z. officinale* showed dose-dependent antioxidant capacity by DPPH and FRAP methods (Ibeabuchi et al., 2023). Studies report Zingiber's analgesic and anti-inflammatory properties (Mbaveng & Kuete, 2017). Ethanolic extract of Zingiber reduces oedema in the legs of rats with Freund's Complete Adjuvant (CFA)-induced arthritis and produces a significant decrease in proinflammatory cytokine levels (TNF-α, IL-1β and IL-6) (Alolga, 2017; Edo et al., 2024; Z. Shaban et al., 2019). In Sudan, petroleum ether and chloroform; methanol (1:1) extracts of *Z. officinale* rhizome and calus were shown to significantly (P < 0.05) and dose-dependently suppress LPS-induced TNF-α, IL-1 and IL-6 production. However, calus extracts showed a significantly (P < 0.05) greater capacity than rhizome extracts (Ali et al., 2019).

**3.5.4 Cytotoxicity**

Chloroform: methanol (1:1, v/v) (CM) and petroleum ether (PE) rhizome extracts demonstrated marked cytotoxicity against a range of tested cancer cell lines. The CM extract was particularly effective against HT29 cells, exhibiting the highest activity (IC₅₀ = 20,4 ± 3,0 µg/mL; *p* < 0,05). In contrast, the PE extract showed significantly greater toxicity (*p* < 0,05) against MCF-7 cells (IC₅₀ = 40,7 ± 2,9 µg/mL) compared to the CM extract (IC₅₀ = 50,7 ± 7,0 µg/mL) (Ali et al., 2022). Against HCT116 cells, both extracts displayed comparable efficacy, with IC₅₀ values of 27,9 ± 1,4 µg/mL (CM) and 28,2 ± 0,2 µg/mL (PE). In contrast, ginger peel extracts did not exhibit notable cytotoxic effects (IC₅₀ > 100 µg/mL) against any of the evaluated cancer cell lines (Ali et al., 2022).



**Figure 1**: The plants of the study

Simplified diagrams illustrating the pharmacological potential of the five plants. A: *Guiera senegalensis*, B: *Acacia nilotica*, C: *Faidherbia albida,* D: *Zingiber officinale*, E: *Zanthozylome zanthoxyloides (Source: Annick Madinatou OUEDRAOGO, Burkina Faso)*

A: *Guiera senegalensis*, B: *Acacia nilotica*, C: *Faidherbia albida,* D: *Zingiber officinale*, E: *Zanthozylome zanthoxyloides (Source: Annick Madinatou Ouédraogo)*

A: *Guiera senegalensis*, B: *Acacia nilotica*, C: *Faidherbia albida,* D: *Zingiber officinale*, E: *Zanthozylome zanthoxyloides (Source: Annick Madinatou Ouédraogo)*

**TABLE 1**: antioxidant and anti-inflammatory properties of the plants

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Plants** | **Family** | **Type of Extracts** | **Activities** | **Tests** | **Results** | **References** |
| *Guiera senegalensis* | Combretaceae | Ethanolic | Antioxidant | ABTS | IC50 7,39 ± 0,5µg/ml | (Lema et al., 2024) |
| DPPH | IC50 12,20 ± 0,02µg/ml |
| FRAP | IC50 32,80 ± 0,55µg/ml |
| Anti-inflammatory | % inhibition Lox | 95,99 ± 0,02% |
| % inhibition of oedema | 74,21% |
| Hydroethanolic | Antioxidant | ABTS | IC50 6,74 ± 0,72µg/ml |
| DPPH | IC50 7,27 ± 0,20µg/ml |
| FRAP | IC50 36,40 ± 1,42µg/ml |
| Anti-inflammatory | %inhibition Lox | 84,94 ± 1,47% |
| Methanol | Anti-inflammatory | Anti analgesic/mice | 79.10% for 1500 mg/kg 92.54% for 2500mg/kg | (Olotu et al., 2016) |
| Anti analgesic/mice | 44% Moderate | (Jigam et al., 2011) |
| Anti-edema/mice | No potential |
| Aqueous | Antioxidant | ABTS | IC50 12,75 ± 0,38 µg/ml | (Adebayo et al., 2019) |
| DPPH | IC50 18,83 ± 0,67µg/ml |
| Hydroacetonic | Antioxidant | FRAP | 10,88 ± 0,86 mmol AEAC | (Tine et al., 2019) |
| Anti-lipid peroxidation | 75,06 ± 2,42% [1,25 mg/ml] |
| DPPH | 6,02 ± 0,13 mmol/AEAC/g |
| Anti-inflammatory | % Uric acid inhibition | 50,9 % |
| %inhibition lipoxygenase | 98,95 % |
| *Acacia nilotica* | Fabaceae-Mimosoideae | Methanolic | Antioxidant | DPPH | IC50: 0,218 mg/ml | (Yusuf et al., 2018) |
| ABTS | IC50: 0,23 mg/ml |
| %inhibition lipoxygenase | %d’inhibition 5,12 ± 1,61% |
| Aqueous | Antioxidant | DPPH | 81.33% at 1000 μg/ml concentration | (Kankara et *al*. 2017) |
| Ethanol | DPPH | IC50: 13,15 ± 0,55 μg/mL |
| ABTS | IC50: 7,88 ± 0,20 μg/mL |
| *Faidherbia albida* | leguminoseae-Mimosoideae | Ethanolic | Antioxidant | DPPH (fruit)  DPPH (bark) | % d’inhibition : 87 ± 0,04 %  % d’inhibition : 17 ± 0,06 % | (Ahmed et *al.*, 2019) |
| *Zanthoxylome zanthoxyloides* | Rutaceae | Aqueous | Antioxidant | DPPH (fruit) | IC50: 23,70±0,11µg/mL | (Fatai, 2023; Togola, et *al*., 2023) |
| DPPH (Stem Bark) | IC50: 22,93±0,14 µg/mL |
| DPPH (Roots) | IC50: 24,97±0,25 µg/mL |
| Hydroethanolic | Antioxidant | DPPH (fruit) | IC50: 20,83±0,11 µg/mL |
| DPPH (Stem Bark) | IC50: 25,80±0,56 µg/mL |
| DPPH (Roots) | IC50: 24,72±0,15 µg/mL |
| FRAP (Fruit) | IC50: 20,80 ± 0,11 µg/mL |
| FRAP (Bark) | IC50: 22,9 ± 0,14 µg/mL |
| FRAP (Roots) | IC50: 30 µg/ml |
| OH | IC50: 0,08 mg/ml |
| NO | IC50: 0,20 mg/ml |
| Methanolic | Antioxidant | DPPH | IC50: 40,22 mg/ml | (Ayoka et *al.*, 2022) |
| FRAP | IC50: 34,14 µg/ml |
| Alkaloid extract | Antioxidant | DPPH | IC50: 19,46 mg/ml |
| FRAP | IC50: 28,37 µg/ml |
| *Zinziber officinale* | Zingiberaceae | Methanol | Antioxidant | DPPH | 47,05 ± 2,03 µg/ml | (Yusuf et al., 2018) |
| FRAP | 89,15 ± 0,29 µg/ml |
| Essential oil | Antioxidant | DPPH | 36,10 ± 3,51 µg/ml | (Bayala et al., 2014) |
| ABTS | 0,34 ± 0,03 µg/ml |

A: *Guiera senegalensis*, B: *Acacia nilotica*, C: *Faidherbia albida,* D: *Zingiber officinale*, E: *Zanthozylome zanthoxyloides (Source: Annick Madinatou Ouédraogo)*

A: *Guiera senegalensis*, B: *Acacia nilotica*, C: *Faidherbia albida,* D: *Zingiber officinale*, E: *Zanthozylome zanthoxyloides (Source: Annick Madinatou Ouédraogo)*

**4.** **DISCUSSION**

The World Health Organization (WHO) estimates that 80% of Africa's population depends on traditional medicine or medicinal plants to meet their primary health care needs (WHO, 2022). This dependence is largely due to the recognition of plants as an important source of biologically active natural compounds. Knowledge of the benefits and risks associated with medicinal plants comes from traditional beliefs specific to each culture. These bodies of knowledge have evolved gradually over the centuries, thanks to repeated experiential uses. Therefore, they have developed in various ways in different parts of the world. Although medicinal plants have been used for centuries, only a limited number of species have been studied for their medical applications. Information on their safety and efficacy remains scarce, whether for the plants themselves, their extracts, their active compounds, or the preparations that contain them (Tine et *al.*, 2019). This gap hinders their integration into modern health systems, despite their immense potential. However, recent advances in pharmacognosy and phytochemistry have highlighted the richness of medicinal plants in antioxidant, anti-inflammatory and anti-cancer compounds, reinforcing their interest in biomedical research (Odongo, 2016). In this context, this study mainly focused on the antioxidant, anti-inflammatory and cytotoxic activities of the plants composing two traditional herbal formulations: GUISE**,** composed only of *Guiera senegalensis*, and ACAZY, composed of four plants: *Acacia nilotica*, *Faidherbia albida*, *Zanthoxylum zanthoxyloides* and *Zingiber officinale*. These species are well-known throughout Africa and are traditionally used in the treatment of various conditions such as malaria, respiratory conditions, pain management, and inflammatory diseases such as diabetes, rheumatism, edema, and skin infections (Abdelwahab et *al*., 2024; Adebayo et *al.*, 2019; Zerbo et *al*., 2011).The data collected indicate that the most used parts of the plant are the leaves (36.47%), followed by the bark and stems (23.52%), the rhizomes (11.76%) and the roots (10.58%). (Table 1) summarizes the anti-inflammatory and antioxidant properties of the plants of interest. Phytochemical studies on these plants have revealed a rich content of secondary metabolites, particularly phenolic compounds. Polyphenols, the main plant-based antioxidants, are known to protect against cancer, cardiovascular disease, and inflammatory conditions. Flavones also exhibit anti-inflammatory properties, while anthocyanins improve the oxidative stability of foods. Tannins, which are classified into condensed and hydrolysable types, represent another important group of phenolic antioxidants (Abeyrathne et *al.*, 2022).The anti-inflammatory properties of these herbs are attributed to several mechanisms, including antioxidant activity, immunomodulation, and inhibition of enzymes related to inflammation. A significant positive linear correlation was observed between antioxidant activity and total phenol content, suggesting that these compounds likely contribute to the antioxidant and anti-inflammatory properties of the plant extract (Ujah et *al.,* 2021). In addition, it has been reported that medicinal plants with high antioxidant activity also tend to exhibit anti-cancer properties (Mwamatope et *al.,* 2020).

**4. Conclusion**

This review highlights the widespread use of several medicinal plants in sub-Saharan Africa for the management of numerous diseases, including inflammatory conditions. It underscores the significant pharmacological potential of these species, which are rich in bioactive compounds particularly polyphenols such as flavonoids known for their antioxidants, anti-inflammatory, antibacterial, antimutagenic, and anticancer properties. Available scientific data supports the biological activity of these plant extracts, thereby validating their traditional uses. These natural biomolecules may offer new therapeutic avenues, particularly in the treatment of chronic diseases associated with oxidative stress, such as diabetes, hypertension, premature aging, inflammatory disorders, and cancer.

However, despite their long-standing traditional use, these species remain relatively underexplored. Further research is needed to isolate and characterize their active compounds, assess their safety, and scientifically confirm their traditional efficacy. Such investigations are essential to sustainably valorize these African medicinal resources and to promote their integration into modern healthcare strategies.

**DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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