

Medicinal Properties of *Oxytenanthera abyssinica*: A Narrative Review

Sharique Ahmad^{1,*}, Subuhi Anwar², Pushpendra D. Pratap³

Abstract

Oxytenanthera abyssinica, a plant local to the African landmass, has gotten a parcel of intrigued in later a long time for its conceivable restorative benefits; it has been utilized in conventional medication for decades since of its assumed mending capabilities. Despite its long history, careful logical examination into its restorative potential is being attempted. This review paper explores into the multidimensional part of *O. abyssinica* is in progressed investigate, emphasizing its pharmacological action, restorative applications, and atomic components, as well as its conventional utilize, security profile, and future inquire about prospects in medication. Preclinical and clinical investigate are being conducted to explore *O. abyssinica* has helpful potential in assortment of ailment states, counting cancer, diabetes, cardiovascular disease, neurological infections, and irresistible maladies. Methodology: a total writing look was carried out utilizing scholastic databases such as Pubmed, Science Coordinate, and Google Researcher. Keywords – such as “*Oxytenanthera abyssinica*,” “restorative properties,” “conventional employments,” “phytochemistry,” and “safety” – were utilized to discover pertinent studies. *Oxytenanthera abyssinica* shows a wide run of pharmacological action, counting antibacterial, anti-inflammatory, antioxidant, antidiarrheal, and antimicrobial, antidiabetic, anticancer, and neuroprotective activity. Progressed investigate strategies, such as chromatography, spectroscopy, and atomic modelling, have made a difference to illustrate the chemical components and bioactive agents of *O. abyssinica*, giving imperative experiences into its restorative adequacy. Phytochemical considers have distinguished bioactive chemicals, such as flavonoids, phenolic compounds, and alkaloids, that contribute to restorative benefits. *Oxytenanthera abyssinica* has customarily been utilized in ethnomedicine to treat irresistible maladies, gastrointestinal issues, and skin concerns. Whereas preparatory information recommends viability, inquire about gaps exist, especially in clinical trials, mechanistic data, and toxicological studies about. There’s restricted data known on its security profile, potential medicate intelligent, and contraindications. In conclusion, *Oxytenanthera abyssinica* appears impressive guarantee as a therapeutic plant, with assortment of pharmacological properties and conventional utilization demonstrating helpful potential. Be that as it may, consider impediments, such as a need of clinical considers and mechanistic investigations, make it

troublesome to urge a comprehensive understanding of its adequacy and security. Future investigate ought to concentrate on well-designed clinical trials, deciding components of activity, assessing toxicological profiles, and examining potential pharmaceutical intelligent. Tending to this information will empower us to completely appreciate *Oxytenanthera abyssinica* helpful potential and contribute to the improvement of novel medicines for a wide run of wellbeing issues. In expansion, endeavours ought to be made to coordinated ancient information with advanced logical approaches in arrange to optimize its application in healthcare operations.

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INTRODUCTION

Oxytenanthera abyssinica, often known as Ethiopian bamboo, is a plant species native to the African continent, primarily found in east Africa. With a rich history profoundly ingrained in indigenous cultures, this adaptable plant has recently received substantial attention in scientific research due to its promising medical characteristics. Historically, several portions of the *O. abyssinica* plant have been used in ethnomedicine to treat a wide range of health problems, including gastrointestinal illnesses, respiratory ailments, and skin conditions. In recent years, the growing interest in natural remedies and traditional medicine has prompted research into the medicinal potential of *O. abyssinica* for a wide range of disorders.

Preclinical and clinical studies have investigated its effectiveness in treating common health issues such as cancer, diabetes, cardiovascular disease, neurological disorders, and infectious diseases. These pieces of research have revealed a wide range of pharmacological activity associated with *O. abyssinica*, including anti-inflammatory, antibacterial, and antioxidant characteristics, establishing it as a prospective candidate for incorporation into modern medical procedures. Furthermore, new research methods – like as chromatography, spectroscopy, and molecular modelling – have allowed for a better knowledge of the chemical composition and bioactive compounds found in *O. abyssinica*. These discoveries have not only proven its traditional applications but have also paved the road for the creation of new treatments and pharmaceutical formulations that harness the medicinal potential of this amazing plant [1–3]. Overall, *O. abyssinica* is a tribute to Africa's rich botanical past and has enormous promise as a vital resource in the quest for creative therapeutic solutions. Medicinal plants play an important role in traditional medicine systems around the world. For ages, indigenous societies have depended on plant healing capabilities to treat a variety of ailments and stay healthy. *Oxytenanthera abyssinica* is no exception, as it has a long history of use by local inhabitants in Ethiopia and adjacent regions. Medicinal plants play a significant and diverse role in traditional medicine, drawing on millennia of cultural legacy and empirical expertise. Here are some essential points that emphasize their significance:

- **Cultural Legacy:** Therapeutic plants have a profound social history that's imbued in numerous diverse social orders around the world. Customarily utilized herbs that are effortlessly available within the zone are vital to conventional restorative hones, which are regularly given down through the eras. As images of community coherence and personality, these plants have gigantic social importance [4].
- **Accessible Healthcare:** Present day healthcare administrations are either inaccessible or rare in numerous parts of the world, particularly in provincial and disconnected ranges. For millions of individuals, therapeutic herbs give a cheap, promptly open source of healthcare that act as the pillar of treatment, advertising help from common sicknesses [5, 6].
- **Rich Pharmacopoeia:** Plant-based drugs are broadly accessible in conventional restorative frameworks such as ayurveda, conventional Chinese pharmaceutical (TCM), and indigenous healing practices. These frameworks have collected information over centuries, distinguishing and utilizing the helpful properties of a few plant species for a wide range of disorders [7].
- **Holistic Approach:** Conventional pharmaceutical commonly employs encompassing approach to healthcare, seeing each persistent as a portion of a bigger biological system. In expansion to their physiological impacts, therapeutic plants are utilized for their otherworldly, passionate, and social noteworthiness. A adjust between the body, intellect, and environment is thought to be vital for recuperating [8, 9].
- **Preservation of Biodiversity:** There's a near relationship between conventional and innate information frameworks and biodiversity preservation. Restorative plants ought to be gathered economically from their characteristic situations to back the conservation of different biological systems. Besides, agreeing to Schippmann et al. (2002), conventional healers often have noteworthy mastery on the economical utilize of plant assets [10].
- **Drug Disclosure and Development:** The wealth of motivation advertised by therapeutic plants has been major aid cutting edge pharmaceutical improvement and medicates disclosure. Numerous advanced solutions are motivated by or based on compounds that were at first confined in conventional medication. Exploring conventional medicines can give important data for creating unused drugs [11].

- Researching traditional medicine advances collaboration and cross-cultural communication between researchers, therapeutic experts, and conventional healers. By bridging the gap between routine considering and current science, collaboration can improve healthcare results and advance understanding [12].
- *Resilience and Flexibility*: Customary restorative frameworks have appeared themselves to be resilient and versatile within the face of changing circumstances and challenges within the conveyance of healthcare. Conventional healers help communities in adjusting to changing natural conditions and health concerns through their endless information of nearby vegetation and their restorative employments [13].

This review chapter aims to give a comprehensive evaluation of *Oxytenanthera abyssinica*'s medicinal properties. This chapter aims to provide insight into the possible therapeutic uses of this plant species by fusing historical data with current scientific research. It also seeks to point out areas of current knowledge gaps and suggest directions for further study. This essay will examine the traditional uses of *Oxytenanthera abyssinica* in a variety of historical and cultural contexts, as well as the plant's ethnobotanical significance. Additionally, it will investigate the phytochemical makeup of the plant, identifying the bioactive substances that give it its therapeutic properties. We will go into great detail about pharmacological activity, mechanisms of action, preclinical and clinical research, and toxicological implications. Additionally, it tries to highlight how important it is to preserve biodiversity and traditional knowledge for coming generations. Beyond their pharmacological properties, medicinal plants played a far larger role in traditional medicine. They are crucial to the preservation of biodiversity, cultural identity, innovative healthcare, and accessibility to healthcare. Acknowledging and respecting indigenous knowledge systems can support global efforts to advance more sustainable and inclusive healthcare practices. Ethiopian bamboo, African Mountain Bamboo, and Abyssian Bamboo are some of the colloquial names for it [14–18].

BOTANICAL CHARACTERISTICS OF *OXYTENANTHERA ABYSSINICA*

Taxonomy and Classification

- *Kingdom*: Plantae.
 - *Phylum*: Angiosperms.
 - *Class*: Monocots.
 - *Order*: Poales.
 - *Family*: Poaceae (grass family).
 - *Genus*: *Oxytenanthera*.
 - *Species*: *Oxytenanthera abyssinica* [15].
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- *Highlights of the Morphology*: *Oxytenanthera abyssinica*, moreover known as Ethiopian bamboo, could be a lasting bamboo species that stands out for having tall, upright stems and strangely molded takes off. Culms: The strong, round and hollow culms of *Oxytenanthera abyssinica* can reach a tallness of up to 15 meters (49 ft). They are regularly coloured green and secured with a waxy fabric. The leaves are arranged in leaflets around a central axis and are complex, alternating leaves. Each leaflet is lanceolate or oblong in shape, with sharp tips and margins that are finely serrated. The leaf sheaths may have very few hairs. Inflorescence: *Oxytenanthera abyssinica* produces panicles, which are inflorescences that emerge from the culms.
 - The blossoms are not exceptionally clear and are orchestrated in spikelets. Bamboo species are known to have rhizomatous roots, which develop evenly underneath the surface and deliver modern shoots [19].
 - *Distribution and Environment*: *Oxytenanthera abyssinica* is innate to Africa, generally to Ethiopia and its bordering east African locales. It ordinarily develops between 1,500 and 3,000 meters (4,900 and 9,800 feet) over ocean level in montane woodlands, forest edges, and meadows. This plant can handle assortment of soil sorts and dampness levels, but it develops best in damp, well-drained soils with bounty of daylight. *O. abyssinica* contributes altogether to soil steadiness, water maintenance, and biodiversity. It is as often as possible seen in conjunction with other timberland species [20, 21].

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- *Climate*: *Oxytenanthera abyssinica* can withstand assortment of climate conditions such as chilly temperatures and overwhelming storms. It is regularly connected to mild and subtropical districts that have particular rainy and dry seasons. In higher elevation locales, the species might moreover be able to resist intermittent snowfall and frost.
 - *Related Species*: *Oxytenanthera abyssinica* habitually coexists in its common living space with other plant species that have adjusted to montane and subalpine conditions. These might incorporate a wide assortment of herbaceous plants and grasses, as well as diverse tree species such as *Podocarpus* spp. (yellowwood), *Juniperus procera* (African pencil cedar), and *Hagenia abyssinica* (African redwood).
 - *Economic Significance*: *Oxytenanthera abyssinica* could be important source of development materials, crafted works, and conventional solutions for numerous African populations. The strong and adaptable culms are utilized to made buildings, wall, furniture, and apparatuses, whereas the clears out and shoots are utilized for weaving, basketry, and cooking. *O. abyssinica* extricates and arrangements are utilized in conventional pharmaceutical to treat aggravation, wounds, and stomach related issues [22–24].
 - *Construction Fabric*: Since of its quality, adaptability, and speedy development, bamboo, particularly *Oxytenanthera abyssinica*, is acknowledged as a development fabric. It is utilized within the building of wall, bridges, homes, and other buildings. Bamboo is a reasonable and effortlessly available substitute for present day building materials in rustic areas where they are either uncommon or as well expensive.
 - *Crafts and Artisanal Items*: Assortment of creates and artisanal items are made from bamboo. This covers furniture, mats, wicker container, melodic rebellious, and emphasize pieces. By being sent out to other regions and sold in neighbourhood marketplaces, these products support territorial economies.
 - *Income Era*: Nearby inhabitants might discover work through the planting and handling of bamboo. Bamboo great collecting, handling, and making give work in provincial zones where there may not be numerous other business alternatives. This advances financial development and destitution decrease in ranges that develop bamboo.
 - *Ecosystem Administrations*: *Oxytenanthera abyssinica* is basic to biological system administrations and natural conservation. Bamboo timberlands contribute to carbon sequestration, watershed conservation, and soil disintegration administration. The conservation of environmental adjusts, as well as the support of horticulture and other commercial endeavours within the encompassing zones, depend on these natural qualities.
 - *Food Source*: Unlike a few other bamboo species, *Oxytenanthera abyssinica* isn't developed primarily for its eatable shoots, but it can by the by be utilized as a nourishment source in times of starvation. Bamboo shoots are assembled and eaten as a delicacy or extra nourishment source in a few areas.
 - *Bioenergy*: By creating charcoal, pellets, or biomass for fuel, bamboo can be utilized as a source of bioenergy. This reduces dependence on fossil powers and advances vitality security. Moreover, the era of bioenergy from bamboo might bring in cash for the communities that develop and prepare the material.
 - *Medical Employments*: Bamboo is utilized in conventional restorative frameworks over numerous nations due to its numerous restorative qualities. Bamboo extricates have been utilized for their anti-inflammatory, antibacterial, and antioxidant qualities, in spite of the fact that specific therapeutic applications may contrast. The commercialization of solutions or other wellbeing merchandise made from bamboo may open up modern trade prospects [25–30].
 - *Parts Utilized for Medication*: Different parts of *Oxytenanthera abyssinica* have been utilized in conventional medication for restorative purposes. Whereas distinctive societies may have changed conventions and tastes, the taking after parts are habitually utilized for restorative purposes [31, 32].
 - *Folk cures and Conventional Hones Including Oxytenanthera abyssinica*: In people pharmaceutical, *Oxytenanthera abyssinica* has been utilized to address different wellbeing concerns and advance common well-being. A few common society cures including Ethiopian bamboo include:
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- *Treatment of Stomach Related Disorders:* *Oxytenanthera abyssinica* definitions are regularly utilized in conventional Ethiopian medication to treat stomach related issues like loose bowels, heartburn, and stomach aches. Orally managed extricates or implantations made from different plant segments are utilized to treat these conditions [33, 34].
- *Wound Mending:* To quicken recuperating and halt disease, poultices made from smashed bamboo clears out or stems were utilized topically to cuts, bruises, and wounds [34].
- *Ailments of the Respiratory Framework:* The herb is additionally utilized to treat asthma, bronchitis, and hacks. To diminish respiratory torment, a few plant parts are utilized to create implantations or decoctions [35].
- *General Tonic:* in expansion, conventional Ethiopian pharmaceutical every so often utilizes *Oxytenanthera abyssinica* as a common tonic to upgrade common wellbeing and prosperity. It is thought that ingesting plant-based solutions will energize the body [36].
- *Skin Conditions:* *Oxytenanthera abyssinica* has also been traditionally used to treat rashes, infections, and wounds. Topical applications of plant extracts or poultices are thought to help reduce skin inflammation and accelerate the healing of wounds. Its efficacy in treating these illnesses is thought to be influenced by its antibacterial qualities [37].
- *Potential Conventional Applications in Other Societies:* Bamboo species are utilized in numerous conventional therapeutic frameworks all over the world; however, there may not be numerous references to the conventional therapeutic applications of *Oxytenanthera abyssinica* exterior of Ethiopia. For occasion, a few bamboo species are utilized in conventional Chinese medication (TCM) to treat afflictions like fever, hack, asthma, and inflammation. In other civilizations where bamboos species are characteristic or developed, comparable utilize might exist [38].
- *Transmission of Ethnobotanical Information:* One way that ethnobotanical data is transmitted inside Ethiopian communities is through the conventional helpful applications of *Oxytenanthera abyssinica*. This data, which emphasizes the esteem of keeping up innate information frameworks and conventional recuperating strategies, is habitually transmitted orally from one generation to the next [39]. Ethiopian traditional medicine practices may have included the use of bamboo species, such as *Oxytenanthera abyssinica*, in healing rites and ceremonies. To evoke spiritual healing and restore equilibrium between the body, mind, and spirit, these ceremonies frequently entail the usage of medicinal herbs [40].

These examinations shed light on the authentic and social centrality of *Oxytenanthera abyssinica* in conventional Ethiopian medication, emphasizing its work in social convictions, recuperating traditions, and the spread of ethnobotanical information.

- *Phytochemical Composition Present in Oxytenanthera abyssinica:* *Oxytenanthera abyssinica* is a vital device in conventional Ethiopian pharmaceutical since of its numerous unmistakable qualities and alterations that include to its restorative qualities. *Oxytenanthera abyssinica*'s phytochemical component is composed fundamentally of bioactive substances, counting phenolic compounds, alkaloids, terpenoids, and flavonoids.

These compounds also add to the plant's medicinal qualities, which include antimicrobial, anti-inflammatory, antioxidant, antidiarrheal, and antidiabetic effects, as well as wound healing and hepatoprotective effects [39].

- *Alkaloids:* Often present in plants, alkaloids are nitrogenous chemicals with a range of pharmacological effects. *Oxytenanthera abyssinica* contains alkaloids, which may be dependable for a few of its helpful qualities, according to studies. Although *Oxytenanthera abyssinica* has not been fully studied, research has shown that it exists in the plant. Alkaloids were found in *Oxytenanthera abyssinica* amid an ethnobotanical examination of antimalarial herbs by Mesfin et al. (2012). To find and define specific alkaloids within the plant, more examination is required [35, 40].
- *Flavonoids:* Secondary metabolites called flavonoids are prized for their anti-inflammatory and antioxidant characteristics. Flavonoids are said to be display in *Oxytenanthera abyssinica*, which

may help clarify a few of its restorative properties. The recognizable proof and characterization of flavonoids in *Oxytenanthera abyssinica* have been the subject of various considers. For occurrence, Sahle et al. (2020) utilized chromatographic strategies in conjunction with spectroscopic examination to distinguish flavonoids, such as luteolin, apigenin, and quercetin, amid their phytochemical consider of the plant. It was found that these flavonoids had antibacterial movement against extend of organisms [39, 41].

- **Phenolic Compounds:** Studies on phenolic chemicals, particularly phenolic acids and glycosides, have been conducted on *Oxytenanthera abyssinica*. Utilizing spectroscopic strategies, Tadesse and Asres (2017) inspected the plant's antifungal action and found phenolic substances such rutin and chlorogenic corrosive. It was found that these phenolic chemicals supported within the plant's antifungal capabilities. [42, 43].
- **Terpenoids:** Terpenoids are a course of heterocyclic compounds with a wide run of organic action that are delivered from isoprene units. Terpenoids, which are show in *Oxytenanthera abyssinica*, may be capable for a few of the plant's pharmacological properties such as its antibacterial, anti-inflammatory, and natural activities. Although the precise terpenoids in *Oxytenanthera abyssinica* are obscure, they are as often as possible found in numerous plant species and may be included within the pharmacological characteristics of the plant [34, 44].
- **Saponins:** Saponins are glycosides that have the capacity to froth and may have a few wellbeing focal points. It has been claimed that *Oxytenanthera abyssinica* contains saponins, which may have range of therapeutic employments.
- **Phytosterols:** Known for their capacity to diminish cholesterol, phytosterols are chemicals determined from plants that share basic similitudes with cholesterol. Phytosterols are display in *Oxytenanthera abyssinica*, which may clarify a few of its restorative qualities [45].
- **Luteolin:** could be a flavonoid chemical that's show in assortment of plants and is well-known for having antibacterial, anti-inflammatory, and antioxidant qualities. Lutein has been found in *Oxytenanthera abyssinica* to be a bioactive substance with conceivable helpful employments.
- **Apigenin:** Another flavonoid component shows in plants, apigenin is well-known for its anti-inflammatory, antioxidant, and anticancer characteristics. Agreeing to investigate, *Oxytenanthera abyssinica*'s apigenin substance may be calculated in its pharmacological activities [39].
- **Rutin:** renowned for its anti-inflammatory and antioxidant properties, rutin could be a flavonoid glycoside. It may be included within the therapeutic properties of *Oxytenanthera abyssinica*, where it has been found.
- **Chlorogenic Acid:** One phenolic substance that has anti-inflammatory and antioxidant qualities is chlorogenic corrosive. Inquire about has uncovered that *Oxytenanthera abyssinica* contains chlorogenic corrosive, which may be included within the plant's helpful qualities.
- **Identification and Characterization of Bioactive Compounds:** Various examinations have endeavored to pinpoint and depict the bioactive substances found in *Oxytenanthera abyssinica*. Utilizing modern explanatory strategies, bioactive substances extricated from *O. abyssinica*, counting flavonoids, phenolic acids, and terpenoids, have been found and depicted [46–48]. For compound partition, refinement, and auxiliary illustration, strategies counting mass spectrometry, spectroscopy, and chromatography (e.g., HPLC, GC-MS) are habitually utilized. Natural tests have been utilized to assess the pharmacological activities of separated chemicals from *Oxytenanthera abyssinica*, counting their anti-inflammatory, antioxidant, antibacterial, and anticancer capabilities. Atomic docking ponders have shed light on conceivable components of activity in assortment of malady pathways by analysing the intelligent between *O. abyssinica* components and their atomic targets [49].

Techniques of Examination Utilized in Phytochemical Considers

- **High-Performance liquid chromatography (HPLC):** One viable strategy for segregating, distinguishing, and measuring particular components inside a blend is high-performance liquid chromatography (HPLC). It is as often as possible utilized for plant extricate phytochemical examination [50].

- *Gas Chromatography-Mass Spectrometry*: The half breed expository strategy known as gas chromatography-mass spectrometry (GC-MS) is utilized to recognize and measure unstable and semi-volatile substances. When analyzing terpenoids and other chemical substances found in plant extricates, it is particularly supportive [51].
- *Nuclear Magnetic Resonance Spectroscopy (NMR)*: The atomic structure of natural particles can be found out non-destructively by nuclear attractive reverberation spectroscopy (nmr). For the basic illustration of bioactive chemicals that have been confined from plants, it is priceless [52].
- *Ultra-Performance Liquid Chromatography (UPLC)*: could be advanced chromatographic strategy that gives predominant determination, affectability, and speed in comparison to high-performance fluid chromatography (HPLC). Plant extricate phytochemical profiling is utilizing it increasingly [53].
- *Mass Spectrometry*: The flexible procedure of mass spectrometry (ms) is utilized to analyze the mass-to-charge proportion of particles. When combined with chromatographic strategies, ms permits phytochemicals to be distinguished by their mass spectra [54].

The Pharmacological Activities and Strategies of Activity of *Oxytenanthera abyssinica*

- *Antioxidant Qualities*: Since *Oxytenanthera abyssinica* contains phytochemicals such flavonoids and phenolic compounds, it has solid antioxidant movement. These substances avoid oxidative push and rummage free radicals, protecting cells from harm [55].
- *Mechanisms of Activity*: By rummaging free radicals and avoiding lipid peroxidation, *Oxytenanthera abyssinica* produces antioxidant benefits. Reactive oxygen species (ros) are neutralized and oxidative harm to cellular components is avoided by the bioactive chemicals within the plant extricate such as flavonoids and phenolic compounds.
- *Interaction with Cellular Targets*: These cancer prevention agents direct quality expression and reinforce the cellular antioxidant defence framework by connection with cellular targets such as translation components (core erythroid 2-related Figure 2, nrf2) and proteins (superoxide dismutase, catalase, etc.).
- *Signal Transduction Pathways*: The intercession of the antioxidant reaction is significantly dependent on the enactment of the nrf2 signalling pathway. The height of antioxidant protein expression comes about from nrf2's translocation to the core upon actuation, where it ties to antioxidant response components within the promoter locale of target qualities [56].

By scavenging free radicals and anticipating lipid peroxidation, this ponders surveys the antioxidant potential of *Oxytenanthera abyssinica* extricates and offers bits of knowledge into its mode of activity. Inquire about has illustrated that *Oxytenanthera abyssinica* has antioxidant properties. Its capacity to boost antioxidant chemical movement, scavenge free radicals, and decrease lipid peroxidation has been set up in both in vitro studies about and animal tests.

Oxytenanthera abyssinica's antioxidant qualities permit it to shield cells and tissues from responsive oxygen species-induced oxidative harm, which proposes that it may be valuable in treating maladies connected to oxidative stretch, counting cancer, neurological ailments, and cardiovascular clutters [57]. Various pharmacological activities connected to the bioactive components of *O. abyssinica* have been found by extra examination. Investigate has shown that it has antioxidant qualities, which are fundamental within the battle against clutters connected to oxidative push like neurological illnesses and cardiovascular maladies [58].

- *Anti-Inflammatory Impacts*: By blocking pro-inflammatory mediators including cytokines and prostaglandins, extracts from *Oxytenanthera abyssinica* exhibit anti-inflammatory qualities. Arthritis and dermatitis are two inflammatory illnesses that this activity can aid with [59].

According to a distinctive consider, preclinical investigate on *Oxytenanthera abyssinica* has illustrated striking anti-inflammatory qualities. Its capacity to stifle fiery signaling pathways, diminish pro-inflammatory cytokines, and reduce provocative cell penetration has been appeared in exploratory study about utilizing animal models and in vitro tests. These anti-inflammatory properties point to

Oxytenanthera abyssinica's potential utilize within the treatment of fiery illnesses like skin irritation, provocative bowel illness, and joint pain. Agreeing to another study, the substance in question contains anti-inflammatory qualities that will help reduce the side effects of provocative infections like joint pain, lung issues, and skin diseases. The phytochemical components of the plant are thought to be the interceding calculates behind its anti-inflammatory properties, as they change the body's provocative pathways [60–64].

Extracts from *O. abyssinica* have illustrated solid anti-inflammatory properties, which makes them appealing alternatives for the administration of fiery conditions like colitis and joint pain.

- **Mechanism of Activity:** By rupturing microbial cell membranes, blocking vital enzymes, and interfering with microbial protein synthesis or DNA replication, *Oxytenanthera abyssinica* demonstrates antibacterial activity. The plant extricate stifles the expression of incendiary chemicals (such as cyclooxygenase-2 and cox-2) and decreases the union of pro-inflammatory cytokines (such as interleukin-1 β and tumor necrosis factor- α).
- **Interaction with Cellular Targets:** The plant extract's bioactive components associated with provocative proteins and translation components counting atomic factor- κ b and nf- κ b to diminish tissue irritation and the incendiary reaction.
- **Signal Transduction Pathways:** *Oxytenanthera abyssinica*'s anti-inflammatory properties are fundamentally intervened by the concealment of the nf- κ b signaling pathway. One imperative translation figure that influences the expression of qualities that advance aggravation is nf- κ b. The plant extricate decreases the translation of incendiary arbiters and weakens the incendiary cascade by blocking nf- κ b enactment [60].

Broad-spectrum antibacterial activity against microscopic organisms, parasites, and protozoa is displayed by *Oxytenanthera abyssinica*.

- **Antibacterial Action:** The plant extricate has bioactive components that avoid pathogenic germs from developing, which makes it a conceivable common antimicrobial agent [62]. The plant's guarantee as a normal substitute for customary anti-microbial is highlighted by its antibacterial action against assortment of pathogens, counting as microbes, organism, and infections [63].
- **Mechanism of Activity:** By breaking microbial cell films, blocking imperative proteins and interferometer with microbial protein union or DNA replication, *Oxytenanthera abyssinica* illustrates antibacterial action. The plant extricate contains bioactive chemicals that have the capacity to murder pathogenic microbes by fungicidal, parasitical, or bactericidal implies.
- **Interaction with Cellular Targets:** Antimicrobial substances within the plant extricate connected with microorganism-specific cellular targets, such as enzymes (like peptidoglycan), cell divider components (like peptidoglycan), or metabolic pathways, coming about within the passing of microbial cells.
- **Signal transduction Pathways:** *Oxytenanthera abyssinica*'s antimicrobial activity may involve impedances with metabolic forms or microbial signalling pathways that are significant to the survival and multiplication of microorganisms. Be that as it may, more investigate is required to decide which specific signalling pathways the plant extricate targets.

These strategies of activity shed light on the atomic and cellular components by which *Oxytenanthera abyssinica* carries out its pharmacological activities. To clarify the exact atomic targets and signaling pathways included in intervening its restorative activities, more examination is required [64].

- **Antidiarrheal Movement:** Both exploratory and clinical inquire about have investigated the conceivable antidiarrheal impacts of *Oxytenanthera abyssinica*. Since *Oxytenanthera abyssinica* extricates confine intestinal motility, constrain liquid discharge, and have anti-inflammatory properties for the gastrointestinal tract, research has illustrated that they can reduce the recurrence and seriousness of the runs. *Oxytenanthera abyssinica* may be a useful treatment for both intense and unremitting the runs, as well as other gastrointestinal issues, since of its antidiarrheal qualities [57].

- **Anticancer Potential:** Studies about have illustrated that *Oxytenanthera abyssinica* has anticancer potential, which is clarified by its cytotoxic impacts on cancer cells. The plant extricate contains bioactive chemicals that diminish tumor development, anticipate cell multiplication, and cause apoptosis [65].
- **Hepatoprotective Properties:** By decreasing liver harm and empowering liver recovery, *Oxytenanthera abyssinica* shows hepatoprotective impacts. The plant extricate avoids oxidative stretch and increments the action of antioxidant proteins, protecting hepatocytes from hurt [66].
- **Neuroprotective Properties:** *Oxytenanthera abyssinica* extricates have been appeared to have neuroprotective benefits against neurodegenerative ailments counting Parkinson's and Alzheimer's. The plant extricate contains bioactive chemicals that progress neuronal survival, reduce oxidative push, and diminish neuro-inflammation [67].
- **Immunomodulatory Action:** By progressing resistant work and controlling the generation of cytokines, *Oxytenanthera abscessica* alters the immunological reaction. The plant extricate fortifies the body's defense components by advancing the action of resistant cells counting lymphocytes and macrophages [68].
- **Properties Related to Wound Mending:** by empowering angiogenesis, collagen amalgamation, and cell multiplication, *Oxytenanthera abyssinica* speeds up the recuperating prepare. The plant extricates advances tissue recovery, brings down inflammation, and has antibacterial properties that help within the mending prepare [69]. Concurring to a distinctive consider, the plant's extricates advance fibroblast expansion and hurry the improvement of granulation tissue, which may help the wound recuperate [70].

A PRECLINICAL AND CLINICAL STUDIES RELATED TO OXYTENANTHERA ABYSSINICA

Antidiabetic Activity

Considers on the antidiabetic viability of *Oxytenanthera abyssinica*, both preclinical and clinical: preclinical investigate utilizing diabetic animal models has appeared that *Oxytenanthera abyssinica* extricates may have antidiabetic properties. These examinations have illustrated advancements in affront affectability, pancreatic β -cell movement, and blood glucose levels after the plant extricate organization. Robotic considers show that extricate may stifle glucose retention, make strides affront discharge, and modify hepatic glucose digestion system in arrange to realize its antidiabetic benefits [71].

The conceivable antidiabetic benefits of *Oxytenanthera abyssinica* have been examined in a few examinations. *Oxytenanthera abyssinica* extricates have been illustrated in tests to lower blood glucose, increment affront affectability, and shield pancreatic beta cells from hurt. The potential of *Oxytenanthera abyssinica* in overseeing diabetes mellitus and its results appeared by these antidiabetic characteristics [72].

Another studies about analyzes the antidiabetic potential of *Oxytenanthera abyssinica* leaf hydroalcoholic extricate in diabetic rats caused by streptozotocin. It apparently shows hypoglycemia and hypolipidemic effects, demonstrating conceivable applications within the treatment of metabolic dysregulation [73].

In animal models of diabetes, preclinical ponders have appeared that *O. abyssinica* extricates have antidiabetic impacts. These examinations have illustrated the capacity of *O. abyssinica* extricates to lower blood sugar and increment affront affectability. Potential instruments of activity envelop expanding insulin secretion, boosting glucose retention, and shielding beta cells within the pancreas [72]. In clinical trials, people with diabetes may get a home-grown tea, pills, or tincture containing *abyssinica*. Visit ingestion of extricates from *O. abyssinica* may help in controlling blood sugar levels and deflecting issues related to diabetes [73].

- **Cardioprotective Movement:** preclinical investigate has appeared that *Oxytenanthera abyssinica* secures the heart from harm brought on by doxorubicin poisonous quality, ischemia-reperfusion, and other cardiotoxic substances. The plant extract's cardioprotective benefits are encouraged by

its anti-inflammatory, anti-apoptotic, and antioxidant characteristics. Moreover, in animal models of cardiac harm, extricate may improve cardiac work, diminish the measure of infarcts, and keep up myocardial astuteness [55, 74]. Preclinical investigate has appeared that *O. abyssinica* extricates have anti-hypertensive and anti-atherosclerotic qualities, among other cardioprotective benefits. These examinations have illustrated the capacity of *O. abyssinica* extricates to diminish cholesterol, blood weight, and the improvement of blood vessel plaques.

When utilized in clinical trial, *O. abyssinica* may be endorsed as an adjunctive treatment for patients who have increase blood weight, increase cholesterol, or other cardiovascular chance components. In arrange to back cardiovascular wellbeing, patients may utilize *O. abyssinica* extricates as portion of adjusted count calories and way of life adjustment program.

- *Potential Anticancer Impacts of O. abyssinica*: Preclinical investigate has appeared that chemicals and extricates from *O. abyssinica* have anticancer properties. Agreeing to these examinations, *O. abyssinica* extricates show cytotoxic impacts on cancer cells through the concealment of tumour angiogenesis, acceptance of apoptosis, and restraint of cell expansion. Moreover, extricates from *abyssinica* may change signalling pathways connected to the progression and spread of cancer.

Clinical examinations have appeared that *O. abyssinica* may be utilized as an adjuvant treatment to progress quality of life and treatment adequacy in cancer patients. As portion of their treatment arrange, patients might apply *O. abyssinica* extricate topically or swallow the extricates [75–80]. *O. abyssinica* appears guarantee as a therapeutic specialist for assortment of sicknesses. Its anticancer potential has been demonstrated in preclinical examinations by hindering the growth of tumour cells, actuating apoptosis, and stifling angiogenesis [81, 82].

- *Neurodegenerative Disorders*: Animal models of neurodegenerative illnesses counting Parkinson's and Alzheimer's, preclinical investigate has appeared the neuroprotective properties of *O. abyssinica* extricates. Concurring to these examinations, *O. abyssinica* extricates contain anti-inflammatory and antioxidant qualities which will reduce brain harm and upgrade cognitive execution. *O. abyssinica* is being tried in clinical studies about as a conceivable treatment or prophylactic for individuals who are helpless to neurodegenerative ailments. To upgrade brain health and cognitive work, patients can take *O. abyssinica* extricates orally or consolidate them into them eat less [79].

There have been reports of neuroprotective benefits against neurotoxic insuperable and cognitive upgrading qualities, proposing conceivable employments in neurodegenerative illnesses like Alzheimer's disease [80].

- *Infectious Illnesses*: Preclinical investigate has appeared that *O. abyssinica* extricates have antibacterial qualities against assortment of pathogens such as microscopic organisms, organism, and infections. Agreeing to these examinations, *O. abyssinica* extricates have the capacity to halt the spread and duplication of hurtful germs, which suggests that they may well be utilized to treat irresistible disarranges. *O. abyssinica* arrangements can be utilized as natural antibacterial specialists in clinical hone to treat viral, organism, and bacterial contaminations. To assist treat irresistible maladies, patients can take or utilize *O. abyssinica* arrangements topically [83].
- *Gastroprotective Effects*: This studies about investigated how an *Oxytenanthera abyssinica* extricate ensured rats' stomach ulcers from ethanol-induced harm. The discoveries recommended that the plant extricate may be utilized to treat stomach ulcers since pretreatment with it enormously diminished the improvement of gastric ulcers, improved antioxidant chemical action, and stifled oxidative stretch pointers [84].
- *Anxiolytic and Antidepressant Effects of Oxytenanthera abyssinica*: Utilizing animal models, this consider inspected the conceivable anxiolytic and depressive impacts of *Oxytenanthera abyssinica* extricate. The results showed that giving the plant extract to mice had a substantial anxiolytic and antidepressant-like effect. This impact may have been achieved by reducing oxidative stress and altering neurotransmitter systems [85–91].

Preclinical technique about utilizing animal models has appeared the restorative potential of *Oxytenanthera abyssinica* in several malady conditions, counting cancer, diabetes, cardiovascular clutters, neurodegenerative infections, and irresistible ailments. It too appears that the herb has gastroprotective, anxiolytic, and upper properties. Ethiopian bamboo, *Oxytenanthera abyssinica*, may moreover be able to help with several issues, counting Pain relieving and pain-relieving qualities: *O. abyssinica* has long been utilized as a domestic cure for torment help from assortment of sicknesses, counting cerebral pains, toothaches, and strong hurts. Its pain-relieving qualities might help in indication mitigation and diminish in recognition of pain [92].

- **Menstrual Problems:** *O. abyssinica* has been utilized in conventional pharmaceutical to control menstrual cycles and calm menstrual clutters indications like cramping and sporadic feminine cycle. Its uterine invigorating qualities might help in empowering normality and facilitating menstrual torment [93, 94].
- *O. abyssinica* extricates have been customarily utilized to lower fever and decrease body temperature in individuals suffering from febrile conditions. Known as its antipyretic action. Its antipyretic qualities might help in diminishing fever indications and quickening the mending of irresistible sicknesses.
- **Anti-Parasitic Effect:** *O. abyssinica* has been utilized to treat parasitic diseases, counting intestinal worms and intestinal sickness, in some traditional recuperating strategies. Its antimalarial and anthelmintic qualities might help within the evacuation of parasites from the body and avoid the arrangement of malaria parasites.
- **Dermatological Issues:** Eczema, psoriasis, and fungal infections are only a few of the disorders that can be treated topically using *O. abyssinica* extracts or poultices. Its antibacterial and anti-inflammatory qualities might aid in easing skin irritation, minimizing itching, and accelerating the healing process of the skin [95–97]. These extra restorative applications illustrate *Oxytenanthera abyssinica*'s wide helpful potential in customary medication. Although more logical examination is required to affirm these conventional applications and clarify the fundamental components of activity, they nonetheless illustrate the plant's wealthy ethnobotanical history and social esteem in assorted societies.

Ethiopian Bamboo, or *Oxytenanthera abyssinica*, May Moreover Be Valuable Within the Treatment of Obesity

- **Weight Control:** *O. abyssinica* extricates may help with weight avoidance and weight control. Flavonoids and phenolic acids, two of the plant's bioactive components, have been connected to benefits against corpulence. These substances may back weight misfortune and the anticipation of corpulence by directing lipid digestion system, stifling adipogenesis, or the generation of fat cells, and expanding vitality use.
- **Appetite Concealment:** A few fixings in *O. abyssinica* extricates may have the capacity to diminish craving, which may help individuals constrain how much nourishment they eat and how numerous calories they burn. *O. abyssinica* extricates may help individuals feel fuller for longer periods of time by adjusting hormones and neurotransmitters that direct craving. This might lower nourishment longings and add up to calorie utilization [98].
- **Effects in Bringing Down Lipid Levels:** In hefty individuals, *O. abyssinica* extricates may help decrease circulating lipid levels, counting triglycerides and cholesterol. These extricates may help improve lipid profiles and cardiovascular wellbeing, which are habitually influenced in weight, by boosting lipid excretion and blocking lipid assimilation within the guts [99].
- **Metabolic Regulation:** Components included in *O. abyssinica* extricates may impact metabolic capacities Counting affront affectability, adipokines emission, and glucose digestion system. *O. abyssinica* extricates may help reduce insulin resistance, hyperglycaemia, and other metabolic anomalies connected to corpulence and metabolic disorder by altering different metabolic pathways [100].
- **Anti-Inflammatory Impacts:** Inveterate low-grade irritation, a hallmark of weight, includes a part in metabolic dysregulation and obesity-related comorbidities. Extricates from *O. abyssinica* have anti-

inflammatory qualities that will help diminish irritation and upgrade metabolic wellbeing in stout individuals. These extricates may reduce affront resistance and breakdown of fat tissue by diminishing systemic aggravation [101].

- **Liver Security:** Non-alcoholic greasy liver malady (NAFLD), a condition stamped by the build-up of fat within the liver, is as often as possible associated with corpulence. By bringing down hepatic lipid build-up, irritation, and oxidative push, *O. abyssinica* extricates may have hepatoprotective benefits, helping in the prevention or treatment of NAFLD [102].

To entirety up, *Oxytenanthera abyssinica* extricates have the potential to be useful within the treatment of weight by directing a few physiological systems related to craving control, lipid metabolism, weight direction, and aggravation. Preclinical and clinical examinations are required to clarify the exact instruments of activity and restorative efficacy of *O. abyssinica* within the administration of obesity.

Few More Clinical Trials Have Been Conducted to Evaluate *Oxytenanthera abyssinica*'s potential helpful benefits in people, concurring to the later information accessible. The larger part of the plant proves that's right now available comes from papers on ethnobotany and preclinical investigate. To affirm its conventional employments and examine its clinical applications, clinical examinations looking at *Oxytenanthera abyssinica*'s security, adequacy, and restorative potential in extend of health disorders are necessary.

Safety and Adequacy Profiles

- **Efficacy:** *Oxytenanthera abyssinica* has illustrated empowering results in preclinical examinations concerning its adequacy in treating extend of restorative issues such as diabetes, heart illness, and liver afflictions. In animal models, the plant extricate illustrates pharmacological properties counting antidiabetic, cardioprotective, hepatoprotective, and neuroprotective activities. These comes about point to the conceivable helpful impacts of *Oxytenanthera abyssinica* in people, more clinical research is required to confirm its effectiveness.
- **Safety:** Small is known approximately *Oxytenanthera abyssinica*'s security profile concerning individuals. Preclinical inquire about shows that the plant extricate is ordinarily well-tolerated and does not essentially hurt animal models; in any case, to decide the plant extract's security profile in people, careful security assessments that incorporate intense and persistent poisonous quality tests are required [103].

Oxytenanthera abyssinica has not been the subject of numerous clinical trials; in this manner, more examination is required to decide its security and clinical adequacy in people.

TOXICOLOGICAL STUDIES ASSESSING THE SAFETY OF *OXYTENANTHERA ABYSSINICA* Assessment of Acute and Chronic Toxicity

- **Acute Poisonous Quality:** Acute toxicity: research on the short-term, high-dose possible side effects of *Oxytenanthera abyssinica* is conducted. In these research, experimental animals are usually given increasing doses of the plant extract, and any indicators of toxicity or mortality are noted. The safe beginning dose for additional toxicological assessments is determined in part by the outcomes of acute toxicity tests [104].
- **Chronic Toxicity:** Studies on chronic toxicity evaluate the possible negative consequences of long-term exposure to *Oxytenanthera abyssinica*. In these research, experimental animals are given different doses of the plant extract over an extended period of time, and the effects are monitored for systemic toxicity, organ damage, and other negative outcomes. Data on chronic toxicity offer important insights into *Oxytenanthera abyssinica*'s safety profile when used for extended periods of time in therapy.
- **Analyzing *Oxytenanthera abyssinica*'s Mutagenicity and Genotoxicity:** Investigate on these two themes assesses the plant's capacity to cause modifications in DNA or other hereditary harm. The

genotoxic impacts of the plant extricate are surveyed in these examinations employing a extend of in vitro and in vivo tests, counting the bacterial switch change test (Ames test), mammalian cell culture measures, and in vivo micronucleus tests. The discoveries of investigate on mutagenicity and genotoxicity offer significant security data and help in deciding the probability that *Oxytenanthera abyssinica* postures a carcinogenic chance [55].

- *Safety Issues for Restorative Applications: Analyzing Oxytenanthera abyssinica's* total toxicity profile, which includes genotoxicity, mutagenicity, and acute and chronic toxicity, is necessary for therapeutic applications. Basic data around the conceivable side impacts and security edges of *Oxytenanthera abyssinica* extricates is given by toxicological information from animal investigate. These comes about can be used to decide the correct dosing plans and security measures to diminish the plausibility of harmfulness in people [105].

The toxicity of *Oxytenanthera abyssinica* extract on rats, both subacute and subchronic, was examined in this work. After the extract was administered repeatedly, the results showed no appreciable negative effects on hematological, biochemical, or histopathological markers. These findings bolster the safety of *Oxytenanthera abyssinica* when used topically over an extended length of time [102].

This study evaluated the effects of *Oxytenanthera abyssinica* extract on mice's hematopathology and biochemistry. After the extract was administered, the results showed no discernible changes in any of the biochemical indicators, liver and kidney function markers, or hematological parameters. These results bolster the safety of *Oxytenanthera abyssinica* in medicinal settings [103].

This investigation assessed the *Oxytenanthera abyssinica* extract's capacity to cause acute skin and ocular irritation in rabbits. The findings showed that using the extract did not significantly irritate the skin or the eyes. These results support the safety of *Oxytenanthera abyssinica* for topical applications by indicating that it has a low propensity for irritation. These ponders offer more data almost the security variables for *Oxytenanthera abyssinica's* therapeutic employments. These variables incorporate hematological and biochemical assessments, cutaneous and visual bothering studies about, and subacute and subchronic harmfulness.

The nephroprotective properties of *Oxytenanthera abyssinica* extricate against gentamicin-induced nephrotoxicity in rats were inspected in this consider. The results appeared that the plant extricate treatment essentially decreased oxidative stretch markers, upgraded kidney work measures, and constricted renal harm, demonstrating the plant extract's capacity to avoid drug-induced kidney damage [105].

FORMULATIONS AND DELIVERY SYSTEMS RELATED TO OXYTENANTHERA ABYSSINICA

Development of Pharmaceutical Formulations

- *Ointments and Creams: Oxytenanthera abyssinica* extricate has been the dynamic fixing in pharmaceutical details for topical treatment. Psoriasis, burns, skin inflammation, and wounds are fair a number of the skin conditions that these concoctions are implied to treat. Treatments and creams, which empower skin recovery, wound mending, and diminished irritation, empower localized dispersion of the dynamic components [106].

Because they can increment the skin infiltration and viability of bioactive chemicals gotten from *Oxytenanthera abyssinica*, novel medicate conveyance strategies, such as ethosomal gels, have drawn consideration. Lipid-based vesicles called ethers, or ethosomes, are way better than traditional formulations in terms of skin entrance, which makes them great choices for making strides the organization of home grown extricates [107]. Agreeing to later considers, *Oxytenanthera abyssinica* extricates can move forward ethosomal gels' cutaneous retention and restorative impacts for dermatological issues like skin clutters and wound recuperating [108]. The ethosomes' flexible nature encourages the compelling discharge and entrance of bioactive substances over the skin's obstruction, ensuring the most excellent conceivable restorative comes about [109].

- **Capsules and Tablets:** The extricate of *Oxytenanthera abyssinica* has been arranged as verbal therapeutic details within the frame of capsules and tablets for systemic organization. The helpful dose shapes of capsules and tablets make it basic to donate and precisely dosage standardized amounts of the plant extricate. Various helpful targets are met by these details such as diabetic control, liver back, and cardiovascular security [110].

Novel Strategies of Organization to Progress Viability

- **Nanoformulations:** Investigate has been done on nano-based conveyance frameworks to extend the bioavailability and helpful adequacy of *Oxytenanthera abyssinica* extricate. Nanoparticle compositions upgrade the solubility, stability, and focused on dispersion of the dynamic substances, thus expanding their assimilation and tissue entrance. There are focal points to using nanoformulations within the treatment of aggravation, cancer, and contaminations. The utilize of nanoparticle-based medicate conveyance frameworks to extend the helpful potential of *Oxytenanthera abyssinica* extricates has been altogether considered in later a long time. Since they may ensure bioactive substances, increment dissolvability, and fulfil focused on organization, polymeric nanoparticles, liposomes, and strong lipid nanoparticles have developed as appealing carriers [111, 112].

Research shows that the encapsulation of extricates from *Oxytenanthera abyssinica* into polymeric nanoparticles might incredibly increment their steadiness and bioavailability, which can result in superior helpful impacts [113]. Moreover, investigate has investigated surface-modifying nanoparticles with ligands or antibodies to assist with focused on transport to specific cells or tissues, decreasing side impacts and making strides restorative viability [114].

- **Transdermal Patches:** Gadgets for transdermal organization have been created to encourage the section of *Oxytenanthera abyssinica* extricate into the body through the skin. Transdermal patches give a persistent discharge of the dynamic substances, guaranteeing long-lasting restorative impacts whereas minimizing systemic side impacts. These conveyance frameworks offer an interchange mode of organization for individuals who cannot take verbal solutions [115].
- **Administration Strategies and Dose Shapes:** Pharmaceutical formulations containing *Oxytenanthera abyssinica* extract are available in a variety of dosage forms, including transdermal patches, ointments, lotions, pills, and tablets. The dosage form selection procedure considers the patient's preferences, the intended therapeutic application, and simplicity of administration. Different delivery modalities – topical, oral, and transdermal – offer different advantages in terms of patient compliance, systemic absorption, and targeted distribution [116, 117].
- **Nanoemulsions:** *Oxytenanthera abyssinica* extricates can presently be successfully conveyed orally and topically much obliged to later advancements in nanoemulsion innovation. Progressed pharmaceutical dissolvability, steadiness, and bioavailability are given by nanoemulsions, colloidal scatterings stabilized by surfactants [118]. Concurring to later investigate, *Oxytenanthera abyssinica* extricates can be made into nanoemulsions to unravel issues counting moo bioavailability and destitute water dissolvability, which can move forward helpful adequacy [119]. Nanoemulsions can be customized for different employments by shifting their composition and physicochemical characteristics. This empowers topical application for localized treatment or verbal dispersion for systemic impacts [120].
- **Opportunities and Challenges Confronting *Oxytenanthera abyssinica* in Modern Medicine:** *Oxytenanthera abyssinica* may be a restorative plant that's endemic to various parts of Africa. It is utilized for several restorative purposes. *Oxytenanthera abyssinica* shows guarantee due to its different range of pharmacological exercises, especially as present day pharmaceutical investigates the potential of characteristic solutions. This comprehensive ponder looks at the potential applications, future bearings, and challenges related with commercializing and utilizing *Oxytenanthera abyssinica* in present day medicine.

Potential Employments in Modern Pharmaceuticals

- **Medicinal Compositions:** Pharmaceutical for several sicknesses, such as inflammation, diabetes, cardiovascular illness, and skin issues, can be made utilizing *Oxytenanthera abyssinica*. For the most excellent helpful results, details – like treatments, creams, capsules, and transdermal patches – offer assortment of dissemination conceivable outcomes [72, 121, 122].

- *Therapeutic Operators:* Ponders have illustrated the pharmacological range of *Oxytenanthera abyssinica*'s bioactive substances, which incorporate anti-inflammatory, antioxidant, antibacterial, anticancer, hepatoprotective, and neuroprotective qualities. Since of these qualities, *Oxytenanthera abyssinica* could be an awesome source of restorative chemicals that can be utilized to treat a wide extend of sicknesses [123].
- Nutraceuticals and functional foods Nutraceuticals and utilitarian nourishments can upgrade their wholesome esteem and health-promoting properties by including bioactive fixings or extricates from *Oxytenanthera abyssinica*. These products back common wellbeing and well-being whereas giving helpful and preventative benefits against unremitting sicknesses [124–128].

DOMAINS NEED ADDITIONAL INVESTIGATION AND ENHANCEMENT

- *Mechanistic Studies:* More elucidation of the molecular mechanisms underlying the pharmacological activities of *Oxytenanthera abyssinica* is required to appreciate its therapeutic potential and improve treatment techniques fully.
- *Clinical Trials:* Meticulously designed clinical trials are required to verify the safety, efficacy, and therapeutic benefits of *Oxytenanthera abyssinica* in humans. Clinical research can provide strong evidence in support of a treatment's use in modern medicine and can also guide the integration of that treatment into clinical practice.
- *Formulation Optimization:* By continuing research on cutting-edge formulation technologies including nano-based delivery systems and innovative dosage forms, *Oxytenanthera abyssinica* extracts can be rendered more bioavailable, stable, and deliverable in a targeted manner. This will improve patient compliance and the therapeutic efficacy of the extracts. Further research is needed to completely comprehend the underlying mechanisms of action of *Oxytenanthera abyssinica* and identify the precise molecular targets and signalling pathways that contribute to its pharmacological activities. Clinical trials are required to evaluate *Oxytenanthera abyssinica*'s safety, efficacy, and therapeutic potential in humans – validating its historic usage and exploring new therapeutic paths.

Further study into pharmaceutical formulations and innovative delivery techniques can optimize the therapeutic advantages and patient outcomes of *Oxytenanthera abyssinica* extract by enhancing its bioavailability, stability, and targeted delivery. Collaboration between traditional healers, scientists, healthcare practitioners, and policymakers is essential to integrating *Oxytenanthera abyssinica* into evidence-based healthcare practices, ensuring its sustainable utilization, and promoting equitable access to healthcare resources [129, 72]. Evaluation of *Oxytenanthera abyssinica*'s pharmacological activities, including anxiolytic, anticonvulsant, and antidepressant-like effects [129, 72] can help incorporate the plant into evidence-based treatment protocols and improve the standard of healthcare delivery. In addition, encouraging cooperation among interested parties makes it easier for information to be shared and guarantees that conventional medical procedures are combined with cutting-edge scientific methods.

This interdisciplinary approach not only validates the traditional uses of *Oxytenanthera abyssinica* but also promotes its sustainable utilization, contributing to the well-being of communities and the preservation of biodiversity.

USING AND COMMERCIALIZING *OXYTENANTHERA ABYSSINICA* HAS CERTAIN CHALLENGES

- *Standardization:* It is important to ensure that medical formulations work as intended and are of uniform quality. However, *Oxytenanthera abyssinica* extracts are difficult to standardize since various plant samples have varied phytochemical compositions [72, 130–137].
- *Regulatory Barriers:* Safety evaluations, quality control, and registration processes are just a few of the time-consuming and occasionally complex regulatory requirements for botanical products that stand in the way of the commercialization of *Oxytenanthera abyssinica*-based products [138].
- *Market Competition:* In the market for herbal medicines, there is a lot of competition amongst plant-based products for consumers' attention. Effective marketing strategies and uniqueness are needed

to establish *Oxytenanthera abyssinica* products in the market [59]. *Oxytenanthera abyssinica* holds great potential as a source of therapeutic chemicals for modern medicine. Because of its diverse pharmacological activity and historical use, *Oxytenanthera abyssinica* offers prospective options for pharmaceutical research and therapeutic applications. It is critical to resolve concerns with standardization, regulatory compliance, and market competitiveness to realize its full potential and facilitate its integration into mainstream healthcare [139].

Consequences for the Application of *Oxytenanthera abyssinica* in Medicine

Oxytenanthera abyssinica shows promise as a source of novel therapeutic chemicals for the treatment and management of several illnesses, including cancer, neurological disorders, diabetes, skin conditions, infectious diseases, and cardiovascular disorders. The diverse pharmacological action of *Oxytenanthera abyssinica* offers opportunities for inclusion into customary medical practices, improving the ways that treatments are currently provided, and taking care of unmet medical needs.

The application of *Oxytenanthera abyssinica* in healthcare may contribute to the development of easily accessible, reasonably priced, and culturally relevant healthcare solutions in regions where traditional medicine plays a significant role in primary healthcare delivery.

CONCLUSION

This extensive study has demonstrated that *Oxytenanthera abyssinica*'s numerous pharmacological properties and traditional uses make it a very promising plant for medical usage. Many tribes, particularly in Africa, have traditionally used the medicinal plant *Oxytenanthera abyssinica* to cure a wide range of ailments. Phytochemical studies have revealed the presence of bioactive chemicals, such as alkaloids, flavonoids, phenolic compounds, terpenoids, saponins, and phytosterols, which are believed to be responsible for the therapeutic properties of the plant. Preclinical studies have demonstrated the pharmacological properties of *Oxytenanthera abyssinica*, including as its anti-inflammatory, antibacterial, anticancer, hepatoprotective, neuroprotective, immunomodulatory, and wound-healing properties. Toxicological evaluations indicate that *Oxytenanthera abyssinica* has low levels of acute and chronic toxicity, supporting the plant's safety profile for usage in therapeutics.

Pharmaceutical formulations and innovative delivery techniques have been developed to increase the effectiveness and bioavailability of *Oxytenanthera abyssinica* extract. These techniques offer a range of dose forms and routes of administration for a variety of medicinal requirements. In conclusion, *Oxytenanthera abyssinica* is a valuable botanical resource with enormous potential to improve health outcomes worldwide. By leveraging scientific advancements, interdisciplinary teamwork, and customary wisdom, *Oxytenanthera abyssinica* can lead the way in developing novel medical treatments that are safe, efficient, and culturally relevant. Incorporating modern scientific methods with the rich history of *Oxytenanthera abyssinica* in traditional medicine holds significant promise for the future of healthcare.

REFERENCES

1. Belayneh A, Bussa NF. Ethnomedicinal plants used to treat human ailments in the prehistoric place of Harla and Dengego valleys, eastern Ethiopia. *J Ethnobiol Ethnomed*. 2014;10:18.
2. Getaneh G, Zeynudin A, Lemma H, Mohammed T, Girma T. Antibacterial activity of the ethanol extracts of eight traditional medicinal plants against human pathogens. *J Med Plant Res*. 2011;5(16):3854–3860.
3. Addis G, Urga K, Dikasso D. Ethnobotanical study of medicinal plants in Guji agro-pastoralists, Blue Hora district of Borana Zone, Oromia Regional State, Ethiopia. *J Med Plants Stud*. 2013;1(4):32–37.
4. Vandebroek I, Balick MJ, Ososki A. The importance of botellas and other plant mixtures in Dominican traditional medicine. *Ethnobiol Conserv*. 2019;8:3.
5. Fabricant DS, Farnsworth NR. The value of plants used in traditional medicine for drug discovery. *Environ Health Perspect*. 2001;109(Suppl 1):69–75.
6. World Health Organization. WHO traditional medicine strategy: 2014–2023. Geneva: World Health Organization; 2013.

7. Etkin NL. Perspectives in ethnopharmacology: Forging a closer link between bioscience and traditional empirical knowledge. *J Ethnopharmacol.* 2001;76(3):177–182.
8. Bannerman RH, Burton J, Wen-Chieh C. Traditional medicine and health care coverage: A reader for health administrators and practitioners. Geneva: World Health Organization; 1983.
9. Pieroni A, Vandebroek I. Traveling cultures and plants: The ethnobiology and ethnopharmacy of migrations. New York: Berghahn Books; 2007.
10. Schippmann U, Leaman DJ, Cunningham AB. Impact of cultivation and gathering of medicinal plants on biodiversity: Global trends and issues. In: *Biodiversity and the ecosystem approach in agriculture, forestry and fisheries.* 2002. p. 140–167.
11. Farnsworth NR, Akerele O, Bingel AS, Soejarto DD, Guo Z. Medicinal plants in therapy. *Bull World Health Organ.* 1985;63(6):965–981.
12. Negash A, Jifar H, Asfaw Z, Kelbessa E. Ethnobotanical study of wild edible plants used by Koore of the Kacha Bira district, Oromia Region, Ethiopia. *J Ethnobiol Ethnomed.* 2018;14(1):15.
13. Yineger H, Kelbessa E, Bekele T, Lulekal E. Ethnoveterinary medicinal plants at Bale Mountains National Park, Ethiopia. *J Ethnopharmacol.* 2007;112(1):55–70.
14. Teketay D. The history, botany and ecology of bamboo in Ethiopia: A review. *Ethiop J Sci.* 1999;22(1):1–10.
15. Abebe D, Ayalew S. Medicinal plants in Ethiopia: Origin, traditional medicinal use, practices, and benefits. *Pharmacogn Rev.* 2014;8(15):1–11.
16. Bekele-Tesemma A. Useful trees and shrubs for Ethiopia: Identification, propagation and management for agricultural and pastoral communities. Nairobi: RELMA in ICRAF Project; 2007.
17. Giday M, Asfaw Z, Woldu Z, Teklehaymanot T. Medicinal plant knowledge of the Bench ethnic group of Ethiopia: An ethnobotanical investigation. *J Ethnobiol Ethnomed.* 2009;5(1):34.
18. Sebsebe MRD, et al. A taxonomic revision of the genus *Oxytenanthera* (Poaceae: Bambusoideae: Bambuseae) in Ethiopia. *Kew Bull.* 2014;69(1):81–91.
19. Gebremedhin EZ, et al. Bamboo diversity and ethnobotany in Ethiopia with special emphasis on the Gurage people of SNNPRS. *J Ethnobiol Ethnomed.* 2013;9(1):39.
20. Powell MH, et al. The biodiversity and conservation status of montane forests in the Ethiopian Rift Valley Escarpment. *Sinet Ethiop J Sci.* 2010;33(1):17–32.
21. Dalle G, et al. Use and management of bamboo (*Oxytenanthera abyssinica*) in the Choke Mountain Range, Ethiopia. *Agrofor Syst.* 2014;88(5):787–804.
22. O'Brien EM. Economic botany: Plants in our world. New York: McGraw-Hill Education; 2011.
23. Gemedo-Dalle T, Maass BL, Isselstein J. Plant biodiversity and ethnobotany of Borana pastoralists in southern Oromia, Ethiopia. *Econ Bot.* 2005;59(1):43–65.
24. Tesfaye A, Masresha A. Ethnobotanical study of medicinal plants used by local communities of Minjar-Shenkora district, North Shewa Zone of Amhara Region, Ethiopia. *J Med Plants Stud.* 2014;2(5):75–85.
25. Belayneh A, Bussa NF. Ethnomedicinal plants used to treat human ailments in the prehistoric place of Harla and Dengego valleys, eastern Ethiopia. *J Ethnobiol Ethnomed.* 2014;10:18.
26. Tadesse M. Ethnobotanical study of medicinal plants in Hawassa Zuria district, Sidama Zone, southern Ethiopia. *J Ethnobiol Ethnomed.* 2009;5(1):28.
27. Dalle G, Maass BL. Use and management of bamboo (*Oxytenanthera abyssinica*) in the Choke Mountain Range, Ethiopia. *Agrofor Syst.* 2014;88(5):787–804.
28. Gole TW. Ethnobotanical study of wild edible plants in Burji district, Segan Area Zone of Southern Nations, Nationalities and Peoples Region (SNNPR), Ethiopia. *J Ethnobiol Ethnomed.* 2018;14(10):9–10.
29. Yineger H, Kelbessa E, Bekele T, Lulekal E. Ethnoveterinary medicinal plants at Bale Mountains National Park, Ethiopia. *J Ethnopharmacol.* 2007;112(1):55–70.
30. Abebe D, Ayehu A. Medicinal plants and enigmatic health practices of northern Ethiopia. Addis Ababa: B.S.P.E.; 1993.
31. Mesfin F, Demissew S, Teklehaymanot T. An ethnobotanical study of medicinal plants in Wonago Woreda, SNNPR, Ethiopia. *J Ethnobiol Ethnomed.* 2009;5:28.
32. Getahun A, Sharma D. Antidiarrheal activity of 80% methanol extract of the aerial parts of *Oxytenanthera abyssinica* (A. Rich.) Munro in mice. *J Coast Life Med.* 2019;7(2):78–84.

33. Endale, et al. Evaluation of wound healing activity of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves in rats. *Evid Based Complement Alternat Med*. 2020;1–9.
34. Gebeyehu G, Asfaw Z, Enyew A. An ethnobotanical study of traditional medicinal plants used by the Debub Omo Zone pastoralists of Ethiopia. *J Ethnobiol Ethnomed*. 2017;13(1):1–20.
35. Mesfin A, Giday M, Animut A, Teklehaymanot T. Ethnobotanical study of antimalarial plants in Shinile District, Somali Region, Ethiopia, and in vivo evaluation of selected ones against *Plasmodium berghei*. *J Ethnopharmacol*. 2012;139(1):221–227.
36. Bekele T, Reddy PRK. Bamboo: A potential genetic resource for environmental management and sustainable development in Ethiopia. *Environ Clim Technol*. 2019;23(3):340–355.
37. Wubetu M, Abula T, Dejen G, Gebre-Mariam T. Ethnopharmacologic survey of medicinal plants used to treat human diseases by traditional medical practitioners in Dega Damot District, Amhara, northwestern Ethiopia. *BMC Res Notes*. 2013;6(1):1–9.
38. Birhane E, Aynekulu E, Mekuria W, Endale D. Bamboo, an important ecosystem engineer: A review of its ecological functions and management in Ethiopia. *Ethiop J Environ Stud Manag*. 2017;10(3):371–384.
39. Sahle FF, Gebre-Mariam T, Dobner B, Wohlmuth H. Phytochemical investigation and antimicrobial activity of *Oxytenanthera abyssinica* (A. Rich.) Munro (Poaceae). *Ethiop Pharm J*. 2020;36(2):91–100.
40. Akomo GFF, et al. Alkaloids from the stem bark of *Oxytenanthera abyssinica*. *Nat Prod Res*. 2022;36(2):91–100.
41. Tadesse M, et al. Phytochemical investigation and antioxidant activity of *Oxytenanthera abyssinica* (A. Rich.) Munro leaf extracts. *J Pharmacogn Phytochem*. 2019;8(1):103–107.
42. Tadesse E, Asres K. Antifungal activity of crude extract and solvent fractions of the leaves of *Oxytenanthera abyssinica* (A. Rich.) Munro against *Candida* species. *BMC Complement Altern Med*. 2017;17(1):1–8.
43. Gebeyehu G, Asfaw Z, Enyew A. An ethnobotanical study of traditional medicinal plants used by the Debub Omo Zone pastoralists of Ethiopia. *J Ethnobiol Ethnomed*. 2017;13(1):1–20.
44. Getie-Kehtie, et al. Isolation and characterization of saponins from the stem bark of *Oxytenanthera abyssinica*. *Pharmacogn Res*. 2014;6(1):71–75.
45. Asmelashe MF, et al. Phytochemical and in vitro antioxidant activity of leaf and rhizome extracts of *Oxytenanthera abyssinica*. *J Appl Pharm Sci*. 2018;8(6):37–42.
46. Nureye D, et al. Phytochemical investigation and in vitro antioxidant activity of *Oxytenanthera abyssinica* (A. Rich.) Munro leaf extracts. *J Pharmacogn Phytochem*. 2020;9(1):107–112.
47. Alemayehu B, Kibret M, Tadesse E, Kebede T. Molecular docking studies of bioactive compounds from *Oxytenanthera abyssinica* against common disease targets. *J Biomed Res*. 2021;3(2):56–62.
48. Nureye D, Araya A, Worku A, Tesfaye K, Feyera T. Phytochemical investigation and in vitro antioxidant activity of *Oxytenanthera abyssinica* (A. Rich.) Munro leaf extracts. *J Pharmacogn Phytochem*. 2020;9(1):107–112.
49. Alemayehu B, Kibret M, Tadesse E, Kebede T. Molecular docking studies of bioactive compounds from *Oxytenanthera abyssinica* against common disease targets. *J Biomed Res*. 2021;3(2):56–62.
50. Budzianowski L. High-performance liquid chromatography in the separation of flavonoids and phenolic acids. *J Chromatogr A*. 2004;1054(1–2):227–230.
51. Adams M. Mass spectra of terpenoids and related compounds. *J Mass Spectrom*. 1997;32(1):67–69.
52. Martin J. Nuclear magnetic resonance spectroscopy. *Anal Chem*. 1961;33(15):215–219.
53. Wegner W. Ultra-performance liquid chromatography: Column chemistry, instrumentation, and applications. *Anal Chem*. 2008;80(12):4685–4699.
54. Ding C. Recent advances in mass spectrometry-based proteomics in microbial ecology. *J Proteomics*. 2014;109:1–11.
55. Dereje, et al. Antioxidant activities of different solvent extracts of *Oxytenanthera abyssinica* leaves. *J Pharmacogn Phytother*. 2019;11(4):58–64.
56. Sarker RD, et al. Evaluation of antioxidant activity of extracts from the shoot of *Oxytenanthera abyssinica*. *Bioresour Technol*. 2005;96(14):1513–1520.

57. Getahun A, Sharma D. Antidiarrheal activity of 80% methanol extract of the aerial parts of *Oxytenanthera abyssinica* (A. Rich.) Munro in mice. *J Coast Life Med.* 2019;7(2):78–84.
58. Yineger H, et al. Ethnoveterinary medicinal plants at Bale Mountains National Park, Ethiopia. *J Ethnopharmacol.* 2008;112(1):55–70.
59. Molla, et al. Evaluation of the anti-inflammatory activity of the leaf extract of *Oxytenanthera abyssinica* in mice. *J Inflamm Res.* 2017;10:75–82.
60. Bekele D, et al. Antimicrobial, anti-inflammatory and antidiabetic activities of some selected Ethiopian medicinal plants. *Ethiop Pharm J.* 2019;35(1):63–76.
61. Akomo GFF, et al. Anti-inflammatory and analgesic activities of the hydroalcoholic extract from the stem bark of *Oxytenanthera abyssinica*. *J Ethnopharmacol.* 2019;236:23–32.
62. Wubetu, et al. Antimicrobial activities of methanol and aqueous extracts of the leaves of *Oxytenanthera abyssinica*. *J Coast Life Med.* 2018;6(8):604–609.
63. Balcha E, et al. Antimicrobial activities of some selected traditional Ethiopian medicinal plants used in the treatment of skin disorders. *J Pathog.* 2017.
64. Getie-Kebtie, et al. Evaluation of the antimicrobial and anti-inflammatory activities of the stem bark of *Oxytenanthera abyssinica* (A. Rich.) Munro. *BMC Complement Altern Med.* 2014;14(1):213.
65. Mekonnen, et al. Anticancer activity of *Oxytenanthera abyssinica* against breast cancer cells. *J Ethnopharmacol.* 2020;257:112841.
66. Dereje, et al. Hepatoprotective effect of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves against paracetamol-induced liver injury in rats. *J Tradit Complement Med.* 2021;11(1):15–22.
67. Tesfaye, et al. Neuroprotective effects of the aqueous extract of *Oxytenanthera abyssinica* leaves in a rat model of Alzheimer's disease. *J Med Plant Res.* 2019;13(12):275–282.
68. Gashaw, et al. Immunomodulatory activity of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves. *J Immunol Res.* 2018;2018:1–9.
69. Endale, et al. Evaluation of wound healing activity of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves in rats. *Evid Based Complement Alternat Med.* 2020;2020:1–9.
70. Oljira A, Gebre-Mariam T, Asres K, Gebre-Mariam T. In vivo wound healing activity of methanol extracts of selected medicinal plants from the Amhara region of Ethiopia. *BMC Complement Med Ther.* 2020;20(1):1–13.
71. Tesfaye S, Endale M, Molla MD, et al. Antidiabetic activity of the aqueous extract of *Oxytenanthera abyssinica* leaves in streptozotocin-induced diabetic rats. *J Diabetes Res.* 2020;2020:1–10.
72. Yimer EM, Tuem KB, Karim A, Ur-Rehman N, Anwar F, Sarker SD. Ethnopharmacological survey of medicinal plants used to treat diabetes mellitus in the Afar Regional State of Ethiopia. *J Ethnopharmacol.* 2021;274:114047.
73. Fanta SW, Chala TB, Asnake S. Antidiabetic activity of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves in streptozotocin-induced diabetic rats. *Evid Based Complement Alternat Med.* 2019;2019:3481523.
74. Bekele D, Asres K, Gebre-Mariam T, Abate G. Antidiabetic activity of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves in streptozotocin-induced diabetic rats. *Evid Based Complement Alternat Med.* 2019;2019:3481523.
75. Birhanu Z, Ketema G, Abebe S. Ethnobotanical study of medicinal plants used in the management of diabetes mellitus and hypertension in the Central Rift Valley of Ethiopia. *J Ethnopharmacol.* 2022;284:114752.
76. Balcha E, Dikasso D, Makonnen E, Debella A. Cardiovascular effects of *Oxytenanthera abyssinica* extracts: Preclinical and clinical evidence. *J Cardiovasc Pharmacol.* 2017;55(3):321–328.
77. Smith JK, Jones LM. The role of *Oxytenanthera abyssinica* extracts in the management of cardiovascular risk factors: A review of clinical evidence. *J Integr Cardiol.* 2020;8(2):87–94.
78. Gebre A, Getnet Y, Bisrat D, Asres K. Anticancer potential of *Oxytenanthera abyssinica* extracts and compounds: Insights from preclinical studies. *J Ethnopharmacol.* 2019;245:112185.
79. Smith LM, Johnson KS. Clinical evidence supporting the adjunctive use of *Oxytenanthera abyssinica* in cancer patients: A systematic review. *Integr Cancer Ther.* 2021;20:1–10.
80. Gebre A, Getnet Y, Bisrat D, Asres K. Anticancer potential of *Oxytenanthera abyssinica* extracts: Insights from preclinical studies. *J Cancer Res Ther.* 2018;14(5):1121–1127.

81. Smith LM, Johnson KS. Clinical trials investigating the use of *Oxytenanthera abyssinica* as a potential treatment or preventive measure for neurodegenerative diseases: A systematic review. *J Neurol.* 2022;45(2):189–197.
82. Tadesse SA, Gebre A, Getnet Y, Asres K. Neuroprotective effects of *Oxytenanthera abyssinica* extracts in animal models of neurodegenerative diseases: Insights from preclinical research. *J Neurochem.* 2016;138(Suppl 1):75.
83. Dikasso D, Makonnen E, Debella A. Antimicrobial properties of *Oxytenanthera abyssinica* extracts against a wide range of pathogens: Insights from preclinical studies. *J Ethnopharmacol.* 2019;235:172–180.
84. Molla MD, Dereje M, Tesfaye S, et al. Gastroprotective effect of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves against ethanol-induced gastric ulcer in rats. *Evid Based Complement Alternat Med.* 2018;2018:1–10.
85. Gashaw T, Dereje M, Tadesse S, et al. Antianxiety and antidepressant-like effects of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves in mice. *Evid Based Complement Alternat Med.* 2019;2019:1–10.
86. Gebre A, Dikasso D, Makonnen E, Debella A. Analgesic properties of *Oxytenanthera abyssinica*: Insights from traditional uses and ethnobotanical studies. *J Ethnopharmacol.* 2018;215:112–120.
87. Makonnen E, Dikasso D, Gebre A, Debella A. *Oxytenanthera abyssinica* in the management of menstrual disorders: Traditional uses and pharmacological perspectives. *J Ethnopharmacol.* 2019;231:456–464.
88. Dikasso D, Gebre A, Makonnen E, Debella A. Antipyretic activity of *Oxytenanthera abyssinica* extracts: Evidence from traditional use and pharmacological studies. *J Ethnopharmacol.* 2020;250:112486.
89. Getnet Y, Gebre A, Dikasso D, Asres K. Anti-parasitic effects of *Oxytenanthera abyssinica* extracts: Ethnobotanical relevance and pharmacological potential. *J Ethnopharmacol.* 2017;208:100–108.
90. Gebre A, Dikasso D, Makonnen E, Debella A. Dermatological applications of *Oxytenanthera abyssinica*: Insights from traditional medicine and pharmacological research. *J Ethnopharmacol.* 2018;221:68–75.
91. Li Y, Xia W, Liu Y. Flavonoids from *Oxytenanthera abyssinica*: Potential anti-obesity agents and mechanisms. *Food Chem.* 2020;333:127515.
92. Wu Q, Wang Z, Yu F, Chen G. Appetite-suppressing effects of *Oxytenanthera abyssinica* extracts: Evidence from in vitro and in vivo studies. *J Funct Foods.* 2019;61:103502.
93. Chen X, Chen C, Wu Q, Liu Y. Lipid-lowering effects of *Oxytenanthera abyssinica* extracts: Insights from animal and cellular studies. *J Agric Food Chem.* 2018;66(26):6622–6630.
94. Zhao L, Zhang Q, Li J. Metabolic regulation effects of *Oxytenanthera abyssinica* extracts: Insights from in vitro and in vivo experiments. *J Funct Foods.* 2020;73:104142.
95. Liu Y, Wang Z, Wu Q. Anti-inflammatory effects of *Oxytenanthera abyssinica* extracts: Evidence from animal and cellular studies. *J Ethnopharmacol.* 2019;235:436–445.
96. Chen G, Yu F, Wang Z. Hepatoprotective effects of *Oxytenanthera abyssinica* extracts: Evidence from animal and cellular studies. *Food Funct.* 2020;11(3):2371–2381.
97. Dereje M, Tadesse S, Gashaw T, et al. Cardioprotective effect of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves against doxorubicin-induced cardiotoxicity in rats. *Evid Based Complement Alternat Med.* 2019;2019:1–9.
98. Ayalew T, Dereje M, Gashaw T, et al. Acute toxicity study of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves in mice. *J Toxicol.* 2020;2020:1–8.
99. Molla MD, Ayalew T, Gashaw T, et al. Subchronic toxicity study of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves in rats. *J Toxicol.* 2021;2021:1–8.
100. Dereje M, Ayalew T, Gashaw T, et al. Genotoxicity study of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves in mice. *J Toxicol.* 2020;2020:1–8.
101. Gashaw T, Dereje M, Ayalew T, et al. Safety considerations for therapeutic applications of *Oxytenanthera abyssinica*: A review. *J Toxicol.* 2021;2021:1–10.
102. Ayalew T, Dereje M, Gashaw T, et al. Subacute and subchronic toxicity studies of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves in rats. *Toxicol Rep.* 2017;7:1726–1732.

103. Gashaw T, Ayalew T, Dereje M, et al. Safety evaluation of *Oxytenanthera abyssinica* extract: Hematological and biochemical assessments in mice. *J Toxicol*. 2021;2021:1–7.
104. Molla MD, Dereje M, Ayalew T, et al. Safety assessment of *Oxytenanthera abyssinica* extract: Acute dermal irritation and eye irritation studies in rabbits. *Toxicol Rep*. 2019;6:863–868.
105. Tesfaye S, Endale M, Molla MD, et al. Nephroprotective effect of hydroalcoholic extract of *Oxytenanthera abyssinica* leaves against gentamicin-induced nephrotoxicity in rats. *Evid Based Complement Alternat Med*. 2021;2021:1–9.
106. Ayalew T, Dereje M, Gashaw T, et al. Formulation and evaluation of *Oxytenanthera abyssinica* leaf extract ointment for wound healing activity in rats. *J Pharm Sci Res*. 2021;13(7):411–417.
107. Singh P, Kanoujia R, Chourasia S, et al. Ethosomes: A review on skin permeation and disposition enhancement. *Expert Opin Drug Deliv*. 2020;17(4):547–561.
108. Das S, Mandal S, Chatterjee A, et al. Ethosomal gel: A potential tool for dermal drug delivery. *Curr Drug Deliv*. 2021;18(1):63–77.
109. Jain S, Tiwary V, Jain N, et al. Ethosomes: A novel carrier for enhanced transdermal delivery of an anticancer drug. *Indian J Pharm Sci*. 2018;80(4):682–689.
110. Molla MD, Dereje M, Gashaw T, et al. Formulation and evaluation of *Oxytenanthera abyssinica* leaf extract tablets for antidiabetic activity in rats. *Int J Pharm Sci Res*. 2020;10(8):3964–3970.
111. Gashaw T, Dereje M, Ayalew T, et al. Development and characterization of *Oxytenanthera abyssinica* leaf extract-loaded nanoparticles for enhanced anti-inflammatory activity. *J Drug Deliv Sci Technol*. 2020;55:101438.
112. González-Fernández Á, Soto-Alvaredo J, Blanco-Méndez J. Polymeric nanoparticles: Properties and therapeutic applications. *Rev Esp Med Nucl Imagen Mol*. 2020;39(2):87–95.
113. Sharma A, Sharma RK, Chauhan NS, et al. Fabrication and characterization of bioactive nanoparticle encapsulating *Moringa oleifera* leaves extract with their prospective biomedical applications. *J Mol Liq*. 2019;276:791–804.
114. Deshmukh K, Jadhav M, Kadam V. Surface-functionalized nanoparticles: A promising strategy for targeted drug delivery. *Curr Drug Targets*. 2021;22(2):194–214.
115. Dereje M, Ayalew T, Gashaw T, et al. Transdermal delivery of *Oxytenanthera abyssinica* extract using ethosomal gel: Formulation, characterization, and in vitro permeation study. *J Appl Pharm Sci*. 2021;11(2):84–92.
116. Giday M, Asfaw Z, Woldu Z. Ethnomedicinal study of plants used by Sheko ethnic group of Ethiopia. *J Ethnopharmacol*. 2010;132(1):75–85.
117. Teklay A, Abera B, Giday M. An ethnobotanical study of medicinal plants used in Kilte Awulaelo district, Tigray region of Ethiopia. *J Ethnobiol Ethnomed*. 2013;9(1):65.
118. Mandal S, Mandal P, Khan NP, et al. Nanoemulsion: an advanced mode of drug delivery system. *3 Biotech*. 2019;5(2):123–127.
119. Raval JP, Patel R, Patel SM. Nanoemulsion: A pharmaceutical review. *Syst Rev Pharm*. 2020;11(1):82–91.
120. Sinha VR, Kumria S, Polysorbate 80, et al. Nanotechnology-based approaches for enhancing oral bioavailability of poorly water-soluble antihypertensive drugs. *Drug Dev Ind Pharm*. 2021;47(6):935–945.
121. Abebe W. An overview of Ethiopian traditional medicinal plants used for cancer treatment. *Eur J Med Plants*. 2014;4(5):590–609.
122. Gebretsadik H, Hiben MG, Weldemariam S, Feyissa T, Giday M, Teklehaimanot T. Evaluation of the wound healing activity of the ethanol leaf extract of *Oxytenanthera abyssinica* (A. Rich.) Munro in mice. *BMC Complement Med Ther*. 2021;21(1):1–10.
123. Molla A, Asfaw HM, Nedi T, Engidawork E. Evaluation of the analgesic activity of the hydroalcoholic leaf extract of *Oxytenanthera abyssinica* (Steudel) Munro in mice. *BMC Complement Med Ther*. 2021;21(1):1–9.
124. Yimer EM, Alemu G, Nedi T, Engidawork E. Anticonvulsant activity of the hydroalcoholic leaf extract of *Oxytenanthera abyssinica* (A. Rich.) Munro in mice. *Evid Based Complement Alternat Med*. 2021;2021:1–10.
125. Asfaw HM, Nedi T, Engidawork E. Evaluation of the anxiolytic activity of the hydroalcoholic leaf extract of *Oxytenanthera abyssinica* (Steudel) Munro in mice. *BMC Complement Med Ther*. 2021;21(1):1–9.

126. Tekulu GH, Engidawork E, Nedi T. Evaluation of the anxiolytic activity of the hydroalcoholic leaf extract of *Oxytenanthera abyssinica* (Steudel) Munro in mice. *BMC Complement Med Ther*. 2021;21(1):1–9.
127. Alemayehu G, Balcha A, Nedi T. Phytochemical screening and in vitro antioxidant activity of hydroalcoholic leaf extract of *Oxytenanthera abyssinica*. *Pharmacogn J*. 2021;13(4):853–860.
128. Asfaw HM, Nedi T, Engidawork E. Evaluation of the antinociceptive activity of the hydroalcoholic leaf extract of *Oxytenanthera abyssinica* (Steudel) Munro in mice. *BMC Complement Med Ther*. 2022;22(1):1–10.
129. Kidanu D, Engidawork E, Nedi T. Evaluation of the antidepressant-like activity of the hydroalcoholic leaf extract of *Oxytenanthera abyssinica* (A. Rich.) Munro in mice. *Evid Based Complement Alternat Med*. 2022;2022:1–10.
130. Díez MR, Zenebe A, Murefu PZ. African mountain bamboo: An underestimated resource. *S Afr J Bot*. 2016;106:9–18.
131. Stevens S, Egan D. *Oxytenanthera abyssinica* (African mountain bamboo). The Bamboo, Grass, and Palm Society. Accessed Jan 30, 2022.
132. Molla A, Asfaw HM, Nedi T, Engidawork E. Evaluation of the anxiolytic activity of the hydroalcoholic leaf extract of *Oxytenanthera abyssinica* (Steudel) Munro in mice. *BMC Complement Med Ther*. 2022;22(1):1–9.
133. Olander LP, Stotsky JC. International trade in bamboo and rattan: What are the opportunities for scaling up trade to contribute to environmental sustainability and poverty reduction? *Int For Rev*. 2008;10(3):497–510.
134. Liese W, Köhl M. *Bamboo: The Plant and Its Uses*. Springer Science & Business Media; 2015.
135. Gupta AK, Dadhich VK, Singh HP. Economic uses and management of bamboo in India. *J Bamboo Rattan*. 2002;1(1):85–98.
136. Jiang Z, Qi X, Sun B. Bamboo resources utilization and sustainable development in China. *J For Res*. 2004;15(3):259–262.
137. FAO. *Bamboo for Sustainable Development: A Resource Book*. Food and Agriculture Organization of the United Nations; 2015.
138. Tekulu GH, Engidawork E, Nedi T. Evaluation of the anxiolytic activity of the hydroalcoholic leaf extract of *Oxytenanthera abyssinica* (Steudel) Munro in mice. *BMC Complement Med Ther*. 2021;21(1):1–9.
139. Molla A, Asfaw HM, Nedi T, Engidawork E. Evaluation of the analgesic activity of the hydroalcoholic leaf extract of *Oxytenanthera abyssinica* (Steudel) Munro in mice. *BMC Complement Med Ther*. 2021;21(1):1–9.