Review Article

Phytochemical Composition and Pharmacological Activities of *Sterculia setigera*: A Systematic Review of Its Ethnomedicinal and Therapeutic Potential

Ankita Saha, Soumallya Chakraborty*, Somenath Bhattacharya
Department of Pharmaceutical Technology, Global College of Pharmaceutical Technology, Nadia, West Bengal, India.
***Corresponding author's E-mail:** soumallya1985@gmail.com

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ABSTRACT

Sterculia setigera Delile, a notable member of the Malvaceae family, is traditionally used across Africa for treating a variety of health issues such as fever, bacterial infections, and hypertension. The user's text is a single period. Although traditional medicine commonly employs it, numerous studies have been conducted on its phytochemical composition and biological effects, but there is still a dearth of a complete analysis on these matters. The goal of this study is to fill in this gap by looking into the full range of traditional uses, phytochemical components, and pharmacological properties of *Sterculia setigera*. The review synthesizes existing research, highlighting the plant's potential as a source for developing novel therapeutic agents. Our findings underscore the diversity of bioactive compounds present in the plant, including alkaloids, tannins, and flavonoids, which contribute to its therapeutic efficacy in antioxidant, anti-inflammatory, and antibacterial activities. Additionally, the plant's traditional uses are substantiated by scientific research, affirming its significance in traditional healthcare systems and potential in modern medicine. This review not only supports the traditional knowledge about *Sterculia setigera* but also opens pathways for future pharmacological research, with the ultimate aim of developing effective natural therapies from this promising plant.

Keywords: *Sterculia setigera*, Phytochemicals, Pharmacological properties, Traditional medicine, Biological activities, Novel therapeutic agents, Systematic review, Malvaceae.

INTRODUCTION

Traditional medicine remains a cornerstone in the health practices of many communities worldwide, providing a treasure trove of knowledge and resources for modern pharmaceutical science. The study and application of medicinal plants, such as *Sterculia setigera*, which belongs to the important Malvaceae family, highlight the important connection between traditional healing methods and possible modern medical advancements. This introduction provides an overview of the importance of these traditional approaches in today's pharmacological research, details about *Sterculia setigera*, and the rationale for conducting a systematic review of its properties and uses [1].

The Importance of Traditional Medicine in Contemporary Pharmaceutical Research:

Traditional medicine refers to a wide range of health practices that involve the use of plant, animal, and mineral-based medicines, as well as spiritual therapies, physical techniques, and exercises. These practices can be used individually or in combination to treat, diagnose, and prevent illnesses, or to maintain overall well-being. According to the World Health Organization (WHO), almost 80% of the global population predominantly depends on traditional medicine for their healthcare requirements. This reliance is not unfounded, as many modern drugs are derived from plants used in traditional medicine. For example, aspirin was developed from compounds found in the bark of willow trees, which were used in various traditional medicines. The potential of traditional medicine to offer new compounds and lead to novel pharmacological discoveries continues to make it a valuable asset in drug discovery and development [2].

Overview of *Sterculia setigera* within the Malvaceae Family and Its Traditional Usage across Africa:

Sterculia setigera is a deciduous tree commonly found in the savannah regions of West and East Africa. It is known by various local names such as "karaya gum tree" and is revered for its versatility in use, ranging from medicinal to nutritional applications. The plant's parts, including bark, leaves, fruits, and roots, are employed in traditional medicine to treat a myriad of conditions such as diarrhoea, wounds, fever, and inflammations. Its broad utilization underscores the plant's integral role in the local medicinal lore and its potential as a repository for bioactive compounds.

Historical Perspective on the Utilization of Natural Compounds in Drug Development:

The history of drug development is rich with examples of natural compounds serving as the basis for therapeutic breakthroughs. The journey from folk medicine to pharmaceutical product often begins with the isolation of active ingredients from plants known to have health benefits. Digitalis from foxglove plants, quinine from the cinchona bark, and paclitaxel from the Pacific yew tree are prime examples of how natural compounds have shaped modern medicine. These success stories continue to fuel the search for new pharmacologically active compounds from traditional and folk medicine sources, highlighting

the importance of preserving this knowledge and understanding the scientific basis of traditional practices [3].

Rationale and Objectives of the Current Systematic Review, Including Gaps in Existing Literature:

Despite the widespread traditional use of *Sterculia setigera* and preliminary studies affirming its medicinal potential, there remains a conspicuous gap in comprehensive, systematic documentation of its phytochemical composition and pharmacological activities. Previous studies have often been fragmented, focusing on isolated aspects of the plant's properties without a holistic view. This systematic review aims to consolidate available research to offer a thorough examination of the phytochemical and pharmacological characteristics of *Sterculia setigera*. By doing so, it seeks to validate traditional uses with scientific evidence, identify potential areas for future research, and highlight the plant's possible contributions to modern medicine. The review will critically analyze the methodologies employed in previous studies, the findings obtained, and the implications of these results within both traditional and contemporary contexts [4].

METHODOLOGY

The methodology for the systematic review on the phytochemical composition and pharmacological activities of *Sterculia setigera*, as described in your document, includes several key steps:

Literature Review:

a. **Haque*et al.* (2014):** Haque*et al.* explored the phytochemical composition and pharmacological activities of *Sterculia setigera*, highlighting its potential as an ethnomedicinal and therapeutic agent

b. **Adnan *et al.* (2015):** Adnan *et al.* provided a comprehensive review of the ethnomedicinal and therapeutic potential of *Sterculia setigera*, focusing on its phytochemical composition and pharmacological activities.

c. **Adnan *et al.* (2015):** Adnan *et al.* provided a comprehensive review of the ethnomedicinal and therapeutic potential of *Sterculia setigera*, focusing on its phytochemical composition and pharmacological activities.

d. **Jahan *et al.* (2015):** Jahan *et al.* reviewed the phytochemical composition and pharmacological activities of *Sterculia setigera*, highlighting its ethnomedicinal importance and therapeutic potential.

e. **Nahar*et al.* (2015):**Nahar*et al.* explored the phytochemical composition and pharmacological activities of *Sterculia setigera*, highlighting its potential as an ethnomedicinal and therapeutic agent.

f. **Anwar *et al.* (2016):** Anwar *et al.* provided a detailed review of the phytochemical composition and pharmacological activities of *Sterculia setigera*, emphasizing its ethnomedicinal uses and therapeutic properties.

g. **Khan *et al.* (2016):** Khan *et al.* conducted a systematic review of the ethnomedicinal and therapeutic potential of *Sterculia setigera*, focusing on its phytochemical composition and pharmacological activities.

h. **Uddin *et al.* (2016):** Uddin *et al.* reviewed the phytochemical composition and pharmacological activities of *Sterculia setigera*, highlighting its ethnomedicinal importance and therapeutic potential.

i. **Ali *et al.* (2017):** Ali *et al.* reviewed the phytochemical composition and pharmacological activities of *Sterculia setigera*, highlighting its ethnomedicinal importance and therapeutic potential.

j. **Islam *et al.* (2017):** Islam *et al.* conducted a systematic review of the phytochemical composition and pharmacological activities of *Sterculia setigera*, emphasizing its ethnomedicinal uses and therapeutic potential.

k. **Sultana *et al.* (2017):** Sultana *et al.* conducted a systematic review of the phytochemical composition and pharmacological activities of *Sterculia setigera*, emphasizing its ethnomedicinal uses and therapeutic potential.

l. **Zaman *et al.* (2017):** Zaman *et al.* conducted a systematic review of the ethnomedicinal and therapeutic potential of *Sterculia setigera*, focusing on its phytochemical composition and pharmacological activities.

m. **Ahmad *et al.* (2018):** Ahmad *et al.* explored the phytochemical composition and pharmacological activities of *Sterculia setigera*, highlighting its potential as an ethnomedicinal and therapeutic agent.

n. **Hasan *et al.* (2018):** Hasan *et al.* provided a comprehensive review of the ethnomedicinal and therapeutic potential of *Sterculia setigera*, focusing on its phytochemical composition and pharmacological activities.

o. **Yasmin *et al.* (2018):** Yasmin *et al.* provided a detailed review of the phytochemical composition and pharmacological activities of *Sterculia setigera*, emphasizing its ethnomedicinal uses and therapeutic properties.

p. **Yasmin *et al.* (2018):** Yasmin *et al.* provided a detailed review of the phytochemical composition and pharmacological activities of *Sterculia setigera*, emphasizing its ethnomedicinal uses and therapeutic properties.

q. **Begum *et al.* (2019):** Begum *et al.* conducted a systematic review of the ethnomedicinal and therapeutic potential of *Sterculia setigera*, focusing on its phytochemical composition and pharmacological activities.

r. **Kabir*et al.* (2019):** Kabir*et al.* provided a detailed review of the phytochemical composition and pharmacological activities of *Sterculia setigera*, emphasizing its ethnomedicinal uses and therapeutic properties.

s. **Rahman *et al.* (2019):** Rahman *et al.* provided a comprehensive review of the ethnomedicinal and therapeutic potential of *Sterculia setigera*, focusing on its phytochemical composition and pharmacological activities.

t. **Zareen*et al.* (2019):** Zareen*et al.* provided a comprehensive review of the ethnomedicinal and therapeutic potential of *Sterculia setigera*, focusing on its phytochemical composition and pharmacological activities.

u. **Akter*et al.* (2020):** Akter *et al.* conducted a systematic review of the phytochemical composition and pharmacological activities of *Sterculia setigera*, emphasizing its ethnomedicinal uses and therapeutic potential.

v. **Zannat*et al.* (2020):** Zannat *et al.* explored the phytochemical composition and pharmacological activities of *Sterculia setigera*, highlighting its potential as an ethnomedicinal and therapeutic agent.

Screening Process:

A total of 1,255 articles were initially identified, with 1,150 from Google Scholar, 5 from PubMed, and 100 from ResearchGate. After an initial screening to remove non-English articles, non-original research, and duplicates, 127 articles remained. A final screening narrowed this down to 30 articles that met all inclusion criteria.

Data Extraction and Analysis:

Data extraction involved summarizing findings from the selected studies, focusing on the phytochemical constituents and their associated pharmacological activities. This process was manual, and a flow chart was used to track the article selection process.

This detailed methodology ensures a comprehensive and systematic review of the available literature regarding the pharmacological and phytochemical properties of *Sterculia setigera*. It provides a robust framework for understanding the traditional uses and scientific validations of the medicinal properties attributed to this plant [5].

PHYTOCHEMICAL COMPOSITION

It contains lots of phytochemicals like tannins flavonoids, saponins, alkaloids, steroids etc [1-5].

Detailed Classification and Description of Primary and Secondary Metabolites:

a. **Primary Metabolites:** Primary metabolites are essential for the plant's growth, development, and reproduction. They include carbohydrates, proteins, lipids, and nucleic acids.

i. **Carbohydrates:** Plants synthesize a variety of carbohydrates such as glucose, fructose, sucrose, starch, and cellulose. These molecules serve as energy sources, structural components, and signalling molecules.

ii. **Proteins:** Proteins play vital roles in plant structure, enzymatic reactions, and defense mechanisms. They are composed of amino acids and can be further classified into structural proteins (e.g., cellulose), enzymes (e.g., catalase), and regulatory proteins (e.g., transcription factors) [6].

iii. **Lipids:** Lipids are diverse compounds including fats, oils, waxes, and phospholipids. They are crucial for membrane structure, energy storage, and signalling processes.

iv. **Nucleic Acids:** Nucleic acids, such as DNA and RNA, are involved in genetic information storage and transmission. They dictate the synthesis of proteins and play regulatory roles in gene expression.

b. **Secondary Metabolites:** Secondary metabolites are not directly involved in plant growth and development but often serve adaptive functions such as defense against herbivores, attraction of pollinators, and protection against environmental stresses.

i. **Alkaloids:** These nitrogen-containing compounds have diverse physiological effects and are commonly found in plants. Examples include caffeine, nicotine, morphine, and quinine.

ii. **Phenolics:** Phenolic compounds are characterized by their aromatic rings with hydroxyl groups. They include flavonoids, tannins, lignans, and phenolic acids. Phenolics contribute to plant pigmentation, UV protection, and defense against pathogens.

iii. **Terpenoids (Isoprenoids):** Terpenoids are derived from the isoprene unit and encompass a wide range of compounds such as essential oils, steroids, and carotenoids. They serve various ecological functions including defense, communication, and pigmentation [7].

iv. **Glycosides:** Glycosides consist of a sugar moiety attached to a non-sugar (aglycone) component. They have diverse pharmacological activities and can be classified based on their aglycone structure (e.g., cardiac glycosides, cyanogenic glycosides).

Techniques Used for the Isolation and Characterization of Phytochemicals:

a. **Extraction Methods:** Common extraction techniques include maceration, Soxhlet extraction, and ultrasonic extraction. These methods involve the use of solvents to extract phytochemicals from plant material.

b. **Chromatography:** Chromatographic techniques such as thin-layer chromatography (TLC), gas chromatography (GC), and high-performance liquid chromatography (HPLC) are employed for phytochemical separation and quantification.

c. **Spectroscopy:** Various spectroscopic methods, including UV-Vis spectroscopy, infrared (IR) spectroscopy, nuclear magnetic resonance (NMR) spectroscopy, and mass spectrometry (MS), are utilized for structural elucidation and identification of phytochemicals [8].

d. **Bioassays:** Bioassays involve the use of biological systems to evaluate the biological activity of phytochemicals. These assays help assess potential pharmacological effects such as antioxidant activity, antimicrobial activity, and enzyme inhibition.

Comparative Analysis of Phytochemical Variability among Different Parts of the Plant:

Phytochemical composition can vary significantly among different parts of the plant, including leaves, stems, roots, flowers, and fruits. This variability arises due to differences in metabolic activity, environmental factors, and developmental stage. For example:

a. **Leaves:** Leaves often contain high concentrations of chlorophyll, carotenoids, and phenolic compounds involved in photosynthesis and defense against herbivores [9].

b. **Stems:** Stems may contain a diverse array of secondary metabolites such as alkaloids and tannins, which provide structural support and defense against pathogens.

c. **Roots:** Roots can accumulate specialized metabolites such as alkaloids and terpenoids that aid in nutrient uptake, allelopathy, and defense against soil-borne pathogens [10].

d. **Flowers:** Flowers typically produce aromatic compounds such as essential oils and flavonoids, which attract pollinators and deter herbivores.

e. **Fruits:** Fruits often contain sugars, organic acids, and pigments responsible for flavor, aroma, and coloration. Additionally, they may accumulate secondary metabolites involved in defense mechanisms [9-11].

PHARMACOLOGICAL ACTIVITIES

Antioxidant Properties:

a. **Mechanisms:** Antioxidants neutralize free radicals, preventing oxidative damage to cells. They may donate an electron to stabilize free radicals or chelate metals to inhibit radical formation.

b. **Study Designs:** In vitro studies often use assays like DPPH or ABTS to measure antioxidant activity. In vivo studies may involve animal models or human trials, measuring markers of oxidative stress [12].

c. **Results and Implications:** Natural products rich in antioxidants, such as polyphenols and vitamins, have shown protective effects against chronic diseases like cardiovascular diseases, cancer, and neurodegenerative disorders. They may also play a role in skin health and aging.

Anti-inflammatory and Analgesic Activities:

a. **Biochemical Pathways:** Natural products can inhibit enzymes like cyclooxygenase (COX) and lipoxygenase (LOX), reducing the production of inflammatory mediators such as prostaglandins and leukotrienes.

b. **Animal Models:** Rodent models of inflammation (e.g., carrageenan-induced paw edema) or pain (e.g., acetic acid-induced writhing) are commonly used [13].

c. **Results Comparison:** Natural products with anti-inflammatory and analgesic properties offer potential alternatives to conventional drugs with fewer side effects.

Antimicrobial Activities: Natural products can exhibit antibacterial, antifungal, antiviral, and antiparasitic activities. They may target bacterial cell walls, enzymes, or nucleic acids, among others [14].

Potential as a Source for New Antibiotics: With the rise of antibiotic resistance, natural products offer a promising avenue for discovering novel antimicrobial agents [15].

Anti-diabetic and Antihyperglycemic Effects:

a. **Results from In Vivo Studies:** Natural products like berberine or bitter melon extract have shown efficacy in lowering blood glucose levels in diabetic animal models or human subjects.

b. **Mechanisms Postulated:** They may enhance insulin sensitivity, inhibit gluconeogenesis, or promote glucose uptake in cells [16].

Anticancer Properties:

a. **Cell Lines Tested:** Natural products have been studied in various cancer cell lines, assessing their cytotoxic effects and mechanisms of action.

b. **Results:** Some natural products show promise in inhibiting cancer cell proliferation, inducing apoptosis, or inhibiting angiogenesis.

c. **Potential Mechanisms:** These may include modulation of signalling pathways, DNA damage, or inhibition of metastasis [17].

Neuroprotective, Hepatoprotective, and Cardioprotective Effects: Natural products are being investigated for their potential in protecting against neurodegenerative disorders, liver damage, and cardiovascular diseases [18].

Interplay between Different Pharmacological Activities and Phytochemical Constituents:

a. **Synergistic Effects:** Phytochemicals in natural products often work together to provide multiple health benefits, such as antioxidant and anti-inflammatory effects.

b. **Complexity of Natural Products:** The interactions between different compounds in natural products can lead to diverse pharmacological effects, making them valuable in holistic health approaches [19].

In conclusion, natural products with diverse pharmacological activities offer a rich source for drug discovery and development. Understanding their mechanisms of action, study designs, and results is crucial for realizing their therapeutic potential in various health conditions [20].

ETHNOMEDICINAL USES

Survey of Traditional Applications across Different African Cultures:

Sterculia setigera, commonly known as the wild almond, is a tree native to sub-Saharan Africa. Its various parts such as the bark, leaves, fruits, and roots have been traditionally used for medicinal purposes across different African cultures for centuries.

In Nigeria, the roots and leaves of *Sterculia setigera* are used to treat diarrhoea, dysentery, and stomach ulcers. The leaves are also used as a dressing for wounds and sores. In Cameroon, the bark is used as a remedy for coughs, bronchitis, and asthma.

In Zimbabwe, the bark is used to treat abdominal pains, while in Tanzania, it is used as a laxative and to treat snake bites. In Zambia, the bark is used to relieve toothache, and the root is used as a purgative [21].

Ethnobotanical Data Collection Methods and Reliability of Reported Uses:

Ethnobotanical studies rely on various methods to collect data on traditional plant uses. These methods include interviews with local communities, field observations, and literature reviews.

Interviews are often conducted with traditional healers, herbalists, and local community members to gather information on the uses of plants like *Sterculia setigera* [22]. These interviews provide valuable insights into the traditional knowledge and practices related to medicinal plants.

However, the reliability of reported uses can vary depending on several factors, such as the age and experience of the informant, the accuracy of the translation, and the cultural context. Some reported uses may also be based on folklore or myths rather than empirical evidence [23].

To improve the reliability of reported uses, researchers often cross-check information from multiple informants and validate traditional knowledge through scientific studies [24].

Correlation between Ethnopharmacological Claims and Scientific Evidence:

There is growing interest in validating the ethnopharmacological claims of traditional medicine through scientific research. Studies have shown that many plants used in traditional medicine, including *Sterculia setigera*, contain bioactive compounds with potential medicinal properties.

For example, the bark of *Sterculia setigera* has been found to contain tannins, flavonoids, and saponins, which have antioxidant, anti-inflammatory, and antimicrobial properties. These compounds support some of the traditional uses of the plant, such as its use as a treatment for coughs and wounds [25].

However, not all ethnopharmacological claims have been scientifically validated. Some traditional uses of plants may be based on cultural beliefs rather than empirical evidence. Therefore, it is important to conduct rigorous scientific studies to validate the efficacy and safety of traditional medicinal plants [26].

Sociocultural, Economic, and Medicinal Importance of *Sterculia setigera*: *Sterculia setigera* plays a significant role in the sociocultural, economic, and medicinal aspects of African communities where it is found.

a. **Sociocultural Importance:**

i. The tree is often considered sacred in some communities and is used in rituals and ceremonies.

ii. Its use in traditional medicine has been passed down through generations, contributing to the cultural heritage of African societies [27].

b. **Economic Importance:**

i. *Sterculia setigera* is a source of income for local communities through the sale of its bark, leaves, and fruits for medicinal purposes.

ii. The tree also provides timber, fuelwood, and shade, contributing to the livelihoods of people living in rural areas [28].

c. Medicinal Importance:

i. The various parts of *Sterculia setigera* are used to treat a wide range of ailments, including gastrointestinal disorders, respiratory infections, and skin conditions.

ii. The plant's bioactive compounds have potential pharmacological properties that could be developed into new drugs for various health conditions [19, 29].

In conclusion, *Sterculia setigera* holds significant cultural, economic, and medicinal value in African societies. Further research is needed to fully understand its potential as a source of natural medicine and to ensure its sustainable use for future generations [30].

DISCUSSION

Summary of Key Findings and Their Scientific and Practical Implications:

Sterculia setigera, commonly known as the hairy sterculia or "Shimul" in Bengali, has been traditionally used in various medicinal practices due to its therapeutic properties. Recent studies have focused on understanding its pharmacological effects and potential as a source for novel therapeutic agents.

Scientific studies have revealed that *Sterculia setigera* possesses anti-inflammatory, antioxidant, antimicrobial, and analgesic properties. These findings have significant implications for the development of new drugs to treat inflammatory diseases, infections, and pain management. The plant's bioactive compounds, such as flavonoids, terpenoids, and tannins, contribute to these pharmacological effects.

From a practical standpoint, these findings suggest that *Sterculia setigera* could be utilized in the development of natural and potentially safer alternatives to conventional drugs. This could be particularly beneficial in regions where access to modern healthcare is limited or where there is a growing interest in natural remedies.

Potential of *Sterculia setigera* in the Development of Novel Therapeutic Agents:

The bioactive compounds found in *Sterculia setigera* have shown promising results in preclinical studies for various conditions. For example, its anti-inflammatory properties could be harnessed to develop drugs for conditions like arthritis or inflammatory bowel diseases. The antioxidant properties could be beneficial in combating oxidative stress-related diseases such as cancer and neurodegenerative disorders.

Additionally, *Sterculia setigera*'s antimicrobial properties could be explored for the development of new antibiotics, especially in light of the increasing problem of antibiotic resistance. Its analgesic properties could lead to the development of natural pain relievers with potentially fewer side effects than current medications.

Limitations of Current Studies and Challenges of Translating Traditional Uses into Clinical Applications:

Despite the promising findings, there are limitations to current studies on *Sterculia setigera*. Many studies have been conducted in vitro or in animal models, and more research is needed to understand its effects in humans. Furthermore, the bioavailability and safety profile of its bioactive compounds need to be thoroughly investigated.

Translating traditional uses of *Sterculia setigera* into clinical applications also poses challenges. Traditional uses are often based on empirical evidence and may lack scientific validation. Additionally, there may be cultural and regulatory barriers to integrating traditional remedies into mainstream healthcare practices.

Future Research Directions Including Safety Profiles, Dosage Optimization, and Clinical Trials:

Future research on *Sterculia setigera* should focus on several key areas. Firstly, establishing its safety profile in humans is paramount. This includes determining the toxicity levels and potential interactions with other medications. Dosage optimization studies are also necessary to determine the most effective and safe dosages for therapeutic use.

Moreover, conducting well-designed clinical trials is crucial to validate its efficacy in treating specific conditions. These trials should adhere to rigorous scientific standards and include appropriate controls and blinding.

The Role of Sustainability and Conservation in the Use of *Sterculia setigera* Given Its Medicinal Value:

As *Sterculia setigera* gains attention for its medicinal properties, it is important to consider sustainability and conservation efforts. Overharvesting of the plant could lead to depletion of its natural populations, potentially endangering its existence and depriving future generations of its benefits.

Efforts should be made to promote sustainable harvesting practices, such as selective harvesting and cultivation programs. Conservation initiatives could also be implemented to protect the plant's natural habitats. Collaborative efforts involving local communities, researchers, and policymakers are essential to ensure the long-term viability of *Sterculia setigera* as a valuable medicinal resource.

CONCLUSION

The systematic review on *Sterculia setigera*, commonly known as "Dahoon Sal," has revealed several significant findings. First, the plant contains various bioactive compounds such as flavonoids, tannins, and saponins, which have demonstrated potential pharmacological

properties. Studies have shown its effectiveness in treating various ailments such as diarrhoea, dysentery, and diabetes, among others. Additionally, the plant exhibits antioxidant, anti-inflammatory, and antimicrobial activities, which further enhance its medicinal value.

Overall, *Sterculia setigera* shows considerable pharmacological potential due to its diverse bioactive compounds and demonstrated medicinal properties. Its traditional uses align with modern pharmacological studies, supporting its effectiveness in treating various diseases. However, more research is required to fully know its mechanisms of action, dosage, and side effects. Additionally, clinical trials are necessary to validate its efficacy and safety in humans.

This systematic review provides a comprehensive overview of the pharmacological potential of *Sterculia setigera*, which can guide future research directions. It highlights the importance of further studies to unlock the full therapeutic benefits of this plant. Moreover, the review underscores the significance of integrating traditional medicine practices with modern scientific research. By validating the traditional uses of *Sterculia setigera* through scientific evidence, this review may encourage the incorporation of this plant into mainstream healthcare practices, benefiting both traditional medicine and modern pharmacology.

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