








Review Article

Traditional Medicinal Uses, Phytoconstituents, Bioactivities, and Toxicities of *Erythrina abyssinica* Lam. ex DC. (Fabaceae): A Systematic Review

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Background. Many studies have been undertaken on the medicinal values of *Erythrina abyssinica* Lam. ex DC. (Fabaceae). The details, however, are highly fragmented in different journals, libraries, and other publication media. This study was therefore conducted to provide a comprehensive report on its ethnobotany, ethnomedicinal uses, phytochemicals, and the available pharmacological evidence supporting its efficacy and safety in traditional medicine. **Method.** We collected data using a PROSPERO registered systematic review protocol on the ethnobotany, phytochemistry, and ethnopharmacology of *Erythrina abyssinica* from 132 reports that were retrieved from electronic databases. Documented local names, morphology, growth habit and habitat, ethnomedicinal and nonmedicinal uses, diseases treated, parts used, method of preparation and administration, extraction and chemical identity of isolated compounds, and efficacy and toxicity of extracts and isolated compounds were captured. Numerical data were summarized into means, percentages, and frequencies and presented as graphs and tables. **Results.** *Erythrina abyssinica* is harvested by traditional herbal medicine practitioners in East, Central, and South African communities to prepare herbal remedies for various human and livestock ailments. These include bacterial and fungal infections, tuberculosis, malaria, HIV/AIDS, diarrhea, cancer, meningitis, inflammatory diseases, urinary tract infections, wounds, diabetes mellitus, and skin and soft tissue injuries. Different extracts and phytochemicals from parts of *E. abyssinica* have been scientifically proven to possess anti-inflammatory, antibacterial, antioxidant, antiplasmodial, antiproliferative, antifungal, antimycobacterial, antidiarrheal, anti-HIV 1, antidiabetic, and antiobesity activities. This versatile pharmacological activity is due to the abundant flavonoids,

alkaloids, and terpenoids present in its different parts. *Conclusion.* *Erythrina abyssinica* is an important ethnomedicinal plant in Africa harboring useful pharmacologically active phytochemicals against various diseases with significant efficacies and minimal toxicity to mammalian cells. Therefore, this plant should be conserved and its potential to provide novel molecules against diseases be explored further. Clinical trials that evaluate the efficacy and safety of extracts and isolated compounds from *E. abyssinica* are recommended.

1. Introduction

Erythrina abyssinica Lam. ex DC. (Fabaceae) is an important medicinal plant as evidenced by the existence of its names in various local languages and high frequency of citation in ethnobotanical surveys [1–4]. The genus *Erythrina* derives from the Greek word “*erythros*,” translated to mean red (a reflection of the showy red flowers of its various species). The epithet “*abyssinica*” means “from Ethiopia” [5]. The *Erythrina* genus houses at least 120 species distributed mainly in tropical and subtropical zones [6]. Plants in this genus are usually referred to as “coral trees” due to their red flowers and branches that resemble the shape of sea coral [7]. *Erythrina abyssinica* is a deciduous leguminous tree native to East Africa but also found in Central and South Africa [8, 9]. Tropical Asia and Central America have *E. abyssinica* as an exotic species. The common English names of *E. abyssinica* are coral tree, Uganda coral, kaffir boom, erythrina, flame tree, red-hot-poker tree, and lucky-bean tree [10]. Some of the local names used across indigenous communities are summarized in Table 1.

Medicinal plants have been a veritable source of cure for a number of human and livestock diseases, and thus, they are widely used in many communities. This is because plants house abundant secondary metabolites (phytochemicals) with potential pharmacological activities. These include flavonoids, alkaloids, terpenoids, phenols, chalcones, quinones, aromatic hydrocarbons, chromones, and coumarins. It is these phytochemicals that are locally extracted in herbal preparations and used as remedies for the management of several diseases. The World Health Organization (WHO) estimated that 80% of the world’s population especially in low- and middle-income countries rely on herbal medicines for primary health care [30]. The use of herbal medicines in the management of several ailments among people continues to gain momentum due to their availability, affordability, perceived effectiveness, and cultural acceptability across ethnic backgrounds [31].

Globally, there has been an increase in natural product research in the last two decades [30, 32]. This has been partly in response to the increasing antimicrobial resistance, emergence of new diseases, and decrease in the chemical diversity of natural product libraries [30, 32–36]. It has also been so in an effort to continue the search for more effective, safer, and cheaper therapeutic agents for existing diseases, to substitute expensive prescription drugs [37–40]. *Erythrina abyssinica* is among those revered plants [40, 41] that has been widely researched [3]. However, the information on it is highly fragmented in different journals, books, university libraries, and other publication media platforms. This review was therefore undertaken to compile a comprehensive

document that describes the ethnobotany, phytochemistry, and ethnopharmacology of *E. abyssinica* so as to generate integrated and sufficient scientific evidence to support its medicinal use. The study further emphasizes the importance of conserving this medicinal plant amidst the growing destruction of natural resources for settlement, industrialization, construction, and energy production [27, 42–47].

2. Methods

2.1. Protocol Registration and Reporting. The protocol used in this systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO) and can be accessed from their website (https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020187081) with the registration number CRD42020187081. The Preferred Reporting Items for the Systematic Reviews and Meta-Analyses (PRISMA) guidelines [48] have been used in the reporting of this study (Figure 1).

2.2. Literature Search. Electronic data on ethnobotany, phytochemistry, efficacy, and toxicity of *E. abyssinica* were retrieved from electronic databases such as Scopus, Web of Science Core Collection, PubMed, American Chemical Society, ScienceDirect, Scientific Electronic Library Online (SciELO), Google Scholar, and NAPRALERT (a comprehensive natural products database with ethnomedical and pharmacological information of extracts and isolated compounds). Sets of keywords such as “ethnobotany,” “traditional medicine,” “ethnobotany,” “alternative medicine,” “ethnopharmacology,” “phytochemistry,” “extraction,” “isolation,” “efficacy,” “safety,” “toxicity,” “phytochemicals,” “structural elucidation,” and clinical study were combined with “*Erythrina abyssinica*.” The retrieved articles were downloaded and stored in EndNote X9 (Thomson Reuters, San Francisco, CA, USA) by three independent authors (SBO, TO, and YG). Duplicate articles were then removed from the file. Further, manual search from the reference lists of screened eligible articles and deposited electronic copies of dissertations and theses in University online libraries were done. The authors continuously received notifications of any new “similar reports” meeting the search criteria from ScienceDirect, Scopus, and Google Scholar.

2.3. Screening. Retrieved articles were first screened based on the titles and abstracts for relevance to the study by three independent reviewers (MPO, SM, and YG). Articles that reported on other species of *Erythrina* but not *abyssinica* and