



Phytochemical profiling of *Cassia sieberiana* parts utilized in indigenous Sierra Leonean malaria therapy

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ABSTRACT

Objective: To qualitatively analyse the phytochemical composition of the extracts of the different *Cassia sieberiana* (Gbangba) plant parts and to evaluate the anti-plasmodial activity of extracts of the different parts against *Plasmodium* parasites. To compare the anti-plasmodial activity of the different plant extracts against a control standard.

Methodology and Results: Phytochemical screening and thin-layer chromatography (TLC) were employed to identify and quantify the bioactive compounds present. A diverse range, including alkaloids, flavonoids, tannins, saponins, anthraquinones, and terpenoids, were observed, with varying concentrations across the different plant parts. However, only alkaloids and saponins were seen consistently across the roots, stems, and leaves. The stems were found to be particularly rich in almost all the phytochemicals, followed by the roots. Leaves, however, only showed trace amounts. An anti-plasmodial assay demonstrated concentration-dependent activity over 24, 48, and 72 hours, with roots showing the highest activity, followed by stems.

Conclusion and Application of findings: *Cassia sieberiana* demonstrates a rich phytochemical composition, with alkaloids, flavonoids, saponins, and anthraquinones contributing to its notable antimalarial efficacy. The stem and root extracts showed strong anti-plasmodial activity, eliminating parasites within 24 hours at 100% concentration, with the root extract being effective even at lower concentrations. In contrast, the leaf extract, with fewer metabolites, displayed minimal activity. These findings highlight the therapeutic potential of *C. sieberiana*, particularly its stem and root extracts, as promising sources of bioactive compounds for antimalarial drug development. To advance these results toward practical application, further work should focus on identifying and quantifying individual phytochemicals using high-performance liquid chromatography (HPLC), clarifying dose-response relationships through controlled experiments, and determining whether activity arises from synergistic interactions or single compounds. Clinical validation and mechanistic studies will be essential to translate laboratory findings into effective therapies, positioning *C. sieberiana* as a candidate for integration into malaria control programs.

Keywords: Malaria, *Cassia sieberiana*, Extract, Anti-plasmodial