



Anti-inflammatory, antibacterial and antioxidant activities of *Chenopodium ambrosioides* L. (*Chenopodiaceae*) extracts

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ABSTRACT

Objective: *Chenopodium ambrosioides* is an aromatic plant widely used in the Togolese traditional medicine. However, little is known about its pharmacological properties. The present study aimed to investigate the anti-inflammatory, antibacterial and antioxidant activities of its extracts.

Methodology and results: Thus, an ethnopharmacological survey was undertaken in Kara town in the northern part of Togo to assess the main uses in the traditional medicine and Gas Chromatography coupled with Mass Spectral Analysis (GC-MS) was used to identify several compounds in the extracts. Antioxidant activity was evaluated by FRAP, ABTS, DPPH methods. Anti-inflammatory and antimicrobial activities were assessed by soybean lipoxygenase inhibition and *in vitro* broth micro dilution techniques, respectively. Propidium iodide cell death was evaluated by flow cytometry and *in vivo* toxicity was assessed using wistar rats. The ethnopharmacological survey revealed that traditional healers use *C. ambrosioides* to treat malaria, intestinal worms and inflammation in addition to healing wounds. The hydroethanolic extract had high content of total phenols ($324.80 \pm 17.30 \mu\text{gEAG/mg}$) and flavonoids ($63.20 \pm 8.70 \mu\text{gEQ/mg}$), however the highest antioxidant, antimicrobial and antiinflammatory activities were obtained with the essential oil. GC-MS analysis leads to identification of hydrocarbon monoterpenes such as 2-carene, ortho-cymene and α -terpinene as the major components of the essential oil. All the tested extracts induced cell death ($14.60 \pm 9.23\%$ at $2 \mu\text{L/mL}$, $72.64 \pm 15.92\%$ at $200 \mu\text{L/mL}$ and 89.50 ± 7.16 at 100 mg/mL for essential oil, hydrosol and hydroethanolic extract, respectively).

Conclusion and application of results. The present study demonstrated various pharmacological activities of hydroethanolic extract, essential oil and hydrosol of leaves of *Chenopodium ambrosioides*. The essential oil had antioxidant, antimicrobial and antiinflammatory activities and could be the most active component of the leaves of *Chenopodium ambrosioides*. Our findings highlighted perspectives for the discovery of new medicinal molecules derived from plant extrats and confirmed certain practices of traditional healers.

Trial registration: NA

Keywords: *Chenopodium ambrosioides*, extract, pharmacological activities