

Current Bioactive Compounds

Antioxidant, Enzyme Inhibitory, Antifungal, and Cytotoxic Activities of *Ambrosia artemisiifolia* L. Extracts: Potential Applications as Natural Preservatives and Therapeutic Agents

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Introduction: The purpose of this research was to investigate the potential of *Ambrosia artemisiifolia* L. Methanolic (EMAA) and Chloroformic (ECAA) extracts as natural preservatives and therapeutic agents by analysing the biological activities of these extracts.

Methods: Total polyphenol content, antioxidant (DPPH, ABTS, and CUPRAC), enzyme inhibitory (butyrylcholinesterase, alpha-amylase), antifungal (against tomato infections), and cytotoxic (on *Artemia salina* and mealworm larvae) activities were analysed.

Results: According to the findings, the total polyphenol content of EMAA was found to be substantially greater (58.01 ± 5.19 $\mu\text{g GAE/mg}$) compared to that of ECAA (28.01 ± 0.67 $\mu\text{g GAE/mg}$). EMAA displayed higher antioxidant effectiveness in ABTS ($\text{IC}_{50} = 34.03 \pm 3.50$ $\mu\text{g/mL}$) and CUPRAC ($\text{A}_{0.5} = 71.24 \pm 2.14$ $\mu\text{g/mL}$) assays compared to ECAA (ABTS $\text{IC}_{50} = 76.07 \pm 3.31$ $\mu\text{g/mL}$; CUPRAC $\text{A}_{0.5} = 101.54 \pm 1.79$ $\mu\text{g/mL}$). In contrast, the IC_{50} of ECAA was shown to be lower in the DPPH assay (63.04 ± 0.20 $\mu\text{g/mL}$) compared to that of EMAA (83.64 ± 1.74 $\mu\text{g/mL}$ respectively). The enzyme inhibition of ECAA was shown to be more effective than that of the other compound (butyrylcholinesterase: $39.92 \pm 2.31\%$ versus $13.63 \pm 4.66\%$; alphaamylase $\text{IC}_{50} = 69.22 \pm 4.58$ $\mu\text{g/mL}$ versus 79.66 ± 3.23 $\mu\text{g/mL}$). Tomatoes were protected from fungal infections by both extracts (7.14 percent infection rate compared to 0 percent for copper sulphate infections). When administered at a concentration of 400 $\mu\text{g/mL}$, EMAA generated a mortality rate of 30% in *Artemia salina*, whereas ECAA induced a mortality rate of 62.5%. However, neither of these agents had any effect on mealworm larvae at a concentration of 4 mg/mL .

Discussion: It is important to note that the specific enzyme inhibition provided by ECAA and the powerful antioxidant capabilities of EMAA emphasise the complementing usage of these two compounds. Due to its low toxicity in mealworms and its antifungal activity, it appears to be suitable for use in agricultural factories.

Conclusion: Extracts of *A. artemisiifolia*, in particular EMAA and ECAA, have the potential to be used as natural preservatives and medicinal agents due to the bioactivity and safety profile of these extracts.

Keywords: *Ambrosia artemisiifolia*, polyphenols, antioxidant activity, phytotherapy, toxicity, bioactive compounds.



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