

EVALUATION OF ANTIMICROBIAL, ANTIOXIDANT PROPERTIES AND TOXICITY OF *Ocimum tenuiflorum* L. EXTRACTS

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Oral health is altered by pathogens and is a global health concern due to antimicrobial resistance. *Ocimum tenuiflorum* L. is widely recognized for its therapeutic potential in traditional medical systems. The objectives of the current study were to evaluate the antimicrobial, antioxidant properties and toxicity of crude ethanolic and aqueous extracts of the leaves of *O. tenuiflorum*. Ethanolic extracts of young, fresh leaves were prepared using ultrasonication (35 – 40 °C, 20 kHz, 15 min) and vacuum infiltration (25 – 30 °C, 1400 rpm, one h). Cold extraction was done by soaking paste in sterile distilled water at 27 ± 1 °C overnight and the filtrate was used as the aqueous extract. The antimicrobial activity was assessed using agar well diffusion bioassay in Mueller Hinton Agar against reference cultures of oral pathogens; *Staphylococcus aureus*, *Streptococcus pyogenes* and *Candida albicans*, *C. glabrata*, *C. krusei*, *C. tropicalis*, *C. parapsilosis* and 30 clinical isolates of *Candida* spp. The minimum inhibitory concentrations (MICs) were determined using the agar dilution method. Antioxidant capacity was analysed using 1,1-diphenyl-2-picryl-hydrazyl (DPPH) free-radical scavenging assay, while toxicity was assessed using the brine shrimp lethality assay. A significant antimicrobial activity was observed with ultrasonicated ethanolic extracts ($p < 0.05$) over vacuum infiltrated extracts. The ultrasonicated extracts showed a higher mean inhibition for *Candida* clinical isolates than vacuum infiltrated extracts ($p = 9.24 \times 10^{-5}$). The lowest MIC of 2.56 mg mL⁻¹ was observed against *S. aureus*. Aqueous extracts did not show antimicrobial activity. Antioxidant capacity was higher in ultrasonicated extracts (IC₅₀ = 45.53 mg L⁻¹) over vacuum infiltrated extracts (IC₅₀ = 60.96 mg L⁻¹), though the difference was not significant ($p = 0.40$). Ultrasonicated extracts showed significantly low toxicity (LC₅₀ of 9.20 × 10⁵ mg kg⁻¹), markedly lower than atropine, confirming its safe profile. Overall, ethanolic extracts of *O. tenuiflorum* possess antimicrobial and antioxidant properties, and ultrasonication is a more effective extraction method than vacuum infiltration for isolating bioactive compounds.

Keywords: Brine shrimp lethality, DPPH, Ethanolic extract, Fresh leaves, Minimum inhibitory concentration