Comprehensive in vitro and in vivo Evaluation of Antidiabetic, Antifungal, Antioxidant, Larvicidal, Bioelectricity and Anticancer Activity of Six Native Plant Species: Innovations for Novel Drug Discovery

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Plant-based natural products are utilized as active ingredients in herbal medicines, and studying their bioactivities leads to better understanding of their possible medicinal value. The present study aims to evaluate 6 bioactivities of Pseudophoenix sargentii, Byrsonima lucida, Glandularia maritima, Illicium parviflorum, Pinus elliottii, and Ulmus alata, preceded by phytochemical and antibacterial properties determined during my past study. Leaves were shade dried, powdered and underwent sonication extraction before rotary evaporation with two solvents, ethyl acetate (EA) and water, separately. Utilizing varied concentrations of leaf extracts, antifungal activity (disk-diffusion assay), larvicidal activity, antioxidant activity (DPPH radical scavenging assay), antidiabetic assays in vitro, anticancer activity (onion-root tip), and bioelectricity analysis (plant microbial fuel cell- 3 anodic configurations) were conducted. B. lucida plants demonstrated higher voltage production across stainless steel and activated carbon anodic configurations (0.153±0.056 V). The EA extracts of B. lucida showed statistically significantly greater antifungal activity against Candida glabrata (2.58±0.06 cm- 0.4 g/ml), the highest larval mortality in Aedes taeniorhynchus and Culex quinquefasciatus after 48-hour incubation (10.5±0.2 and 12.3±0.2, respectively), the highest antioxidant activity (42.46%) and the highest a-amylase and a-glucosidase inhibition (IC50, 1.10 mg/ml and 0.20 µg/ml respectively). The greatest mitotic activity inhibition (mitotic index, 0.40±0.02 at 0.2 mg/ml) was shown by the EA extract of I. parviflorum. Out of six tested native plant species, B. lucida demonstrates the highest potential for development of novel pharmaceutical drugs for noncommunicable diseases.

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