University of Venda

# Bioactivity and chromatographic profiles of the selected medicinal plants against *Candida albicans.*

By

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**Abstract**

Twelve medicinal plants were selected through ethnobotanical use and were screened for antifungal activity against candida albicans (ATCC 10231) and clinical isolates: *Aspegillus fumigatus*, *Candida albicans* and *Cryptococcus neoformans*. The dried leaves of *Breonadia microcephala, Colophospermum mopane, Commiphora pyracanthoides, Diplorrhynchus condylocarpon, Elaeodendron transvaalense, Elephantorrhiza elephantine, Eugenia natalitia, Leucaena leucocephala, Vernonia corymbosa, Zanthoxylum humile, Ziziphus mucronata* and *Ornithogalum ornithogaloides were* extracted with acetone and water. The antifungal activity was determined using the micro-dilution and bioautography methods.The minimum inhibition concentration (MIC) of the acetone plant extracts ranged from 0.04 to 1.25 mg/ml while those of aqueous extracts had very weak antifungal activity against the test microorgaanisms ranging from 0.63 to more than 2.25 mg/ml. Acetone extracts of *C. mopane* and *D. condylocarpon* were the most active against *C.albicans* (ATCC 10231), *A. fumigatus*, *C. neoformans* with the MIC value of 0.04mg/ml. *C. mopane* had the highest total activity of 13375 ml/g followed by *D. condylocarpon* with 7617 mg/l against *C. albicans* respectively. *L. leucocephala* had the lowest activity of 504 mg/l against clinical isolates *C. albicans*, *C. neoformans* and *A. fumigatus* respectively. This therefore means that acetone extract from 1 g of the plant material could be diluted 13375 times and still kill the microorganism.

Acetone extracted the highest amount of the plant material than water in all plant species. The highest amount was extracted from *O. ornithogaloides* with 81.2 % and the least extracted was *Z. humile* with 21 %, with regard to water, the highest amount was also extracted in *O. ornithogaloides*. Acetone was selected an extractant in this study because it dissolves both hydrophilic and lipophilic components, has low toxicity and is useful in bioassays. Water was selected as an extractant because it is used as the main medium of extraction in the traditional medicine.

With regard to bioautography the acetone plant extracts has some bands of *B. microcephala*, *C. pyaracanthoides* and *E. natalitia* had less zones of inhibition against *C. neoformans* with an $R_f$ value of 0.9. *C. mopane*, *E. elephantina* and *L. leucocephala* also had less zones of inhibition against *C. albicans* with the same $R_f$ value of 0.9. Aqueous plant extracts had poor activity against both *C. albicans* and *C. neoformans* since no inhibition were observed.

In Phytochemical analysis, a number of different bands were observed on TLC plates showing the diversity of compounds present in plant extracts. Some compounds showed same colour and $R_f$ values in the same solvent but different extracting solvents, this may suggest that compounds are of similar nature. BEA solvent system separated compounds acetone plant extracts more efficiently than CEF and EMW and more bands were observed in BEA than CEF and EMW solvent system. On the other hand water extracts separated poorly on the TLC plates.

Antioxidant activity of the twelve medicinal plants was investigated using qualitative assay 2, 2- diphenyl - picryl - hydrazyl (DPPH). TLC plates were developed in different mobile phases of varying polarities, namely, BEA (90:10:1), CEF (5:4:1), EMW (40:5:4:4) and FAWE 70: 20:3:2. The light yellow bands were observed on EMW, BEA and CEF solvent system of acetone plant extracts. The highest activity was observed in *E. transvaalense* with five bands present, followed by *B. microcephala*, *C. mopane* and *E. elephantina* with a total of four bands each, *O. ornithogaloides*, with only three bands and *D. condylocarpon* with only two bands. On the other hand, aqueous plant extracts hardly showed antioxidant activity.

In depth investigation was conducted using UPLC-MS in order to record the chemical profiling of the plant extracts and to identify some of the major compounds. UPLC-MS data indicated the prominent chromatograms representing different compounds. Flavonoids were identified as the major compounds in the leaves of all plant species. This study has shown that UPLC-MS is an excellent technique to evaluate the quality and content of pharmacologically important plant extracts.

**Conference Presentation**

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