

Antifungal activity of herbal extracts against *Candida albicans* and *Microsporum gypseum*

CPS Fernando¹, MKKD Sandaruwan², S Hettiarachi¹

Introduction and Objectives: Fungal infections are among the most challenging diseases to treat in humans and other animals. Eukaryotic fungal pathogens have many parallels with their host cells, making selective antifungal compound synthesis difficult. Multidrug resistance (MDR) phenotypes have been found in a number of pathogenic fungi, which may be a result of widely used medications having shared mechanisms of action. The objectives of the study were to investigate the activity of selected plant extracts and essential oils against *Candida albicans* and *Microsporum gypseum*.

Methods: *In vitro* antifungal activity of twenty-six plant extracts which were made using three methods, i.e., maceration, decoction, and Soxhlet hexane extraction, and five essential oils with volatile compounds were tested by the volatile method and the inhibition zone measured. Four herbal oils against the yeast *C. albicans* and the dermatophyte *M. gypseum* were examined in triplicate using the agar well diffusion method. The agar dilution method was used to determine the Minimum Inhibitory Concentrations (MICs) of the most active plant extracts and oils, and their combinational effect was investigated.

Results: Aqueous extracts obtained by maceration and decoction methods and essential oils gave higher activity against both organisms while Soxhlet hexane extracts gave the lowest activity against *C. albicans* and moderate activity against *M. gypseum*. *Allium sativum*, with MICs ranging from 21 to 25 g/l, and clove oil, with MICs ranging from 5 to 7.8 ml/l had greater antifungal potential against *C. albicans* and *M. gypsum*. The MIC value of the combined extracts of clove oil and *A. sativum* showed synergism in inhibiting the test fungi.


Conclusion: While selected aqueous extracts and essential oils exhibited antifungal activity against *C. albicans* and *M. gypsum*, *A. sativum* and clove oil exhibited a synergistic effect. Due to the different modes of action of different active ingredients in them, the chances of developing resistance against formulations of herbal origin may be very low and could be developed into cost-effective antifungal treatment.

Keywords: Essential oils, synergistic effect, medicinal plants, fungi, minimum inhibitory concentration

¹Department of Biological Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale

²Department of Physical Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale

Address for correspondence: Ms CPS Fernando. Department of Biological Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale. Telephone: +94 767829596; Email: csewwandi1997@gmail.com;

 <https://orcid.org/0009-0000-5992-6447>