ANTIFUNGAL EFFICACY OF FIVE NIGERIAN PLANT ESSENTIAL OILS

ID: SS_632

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Introduction

Due to the unpleasant side effects or ineffectiveness of many synthetic substitutes, the search for new substitutes of natural origin has gained momentum in recent years. In this regard, different species of plants in Africa have been in focus.

Parts of the plants such as leaves, stems, roots, flowers, and seeds have been found to be beneficial to humans and can be used as medicine /cosmetics preparation (1).

Antifungal agents in cosmetics is typically to enhance skin and hair beauty via cleansing and inhibition of the growth of fungal cells.

Essential oils have been widely reported to possess antifungal potentials, and are increasingly used in cosmetics to meet the consumer delight with reduced side effects and toxicity compared to synthetics (2,3).

The objective of the research was to evaluate the antifungal efficacy of essential oils (EOs) from the five Nigerian medicinal plants.

Abrus precatorius

Morinda lucida

Parkia biglobosa

Jatropha curcas

Jatropha gossypifolia

Materials & Methods

Based on the ethno-botanical studies and literature survey the plants were collected Forest Research Institute of Nigeria, Ibadan.

Their EOs were isolated by hydrodistillation and the antifungal potencies of each EO examined against *Candida albican, Candida krusei, Candida globerate, Aspergillus flavus, Aspergillus fumigatus* and *Cryptococcus neoformans.*

After investigating the zones of inhibition by disc diffusion protocol (4), the MIC of the EOs were determined using broth micro dilution plate method (5) by dispensing 95 µL of nutrient broth, 100 *µ*L of EO and 5 µL of the inoculums into consecutive wells in a 96 well plates. The EOs dissolved in 10 % dimethyl sulfoxide (DMSO), were first diluted to the highest concentration (500 µg/mL) and then serial 2-fold dilutions were made in order to obtain a concentration range of 0.45 to 500 µg/ mL. The content of each well was vortexed on a plate shaker at 300 rpm for 20s and the wells incubated at 37 ^{o}C temperatures for 48 h.

The microbial growth in the 96 well was determined by recording the respective absorbance at 620 nm using the universal micro titre plate reader (BioTek, Synergy Mx).

The MIC is defined as the lowest concentration (lowest absorbance) of the EOs or positive drug with no growth of the microorganisms

Results & Discussion

Table 1: Antifungal activities of the essential oils

Fungi	*P. biglobosa*		*M. lucida*		*J. curcas*		*J. gossy-pifolia*		DMSO	ApB
	Zones of inhibition (mm) diameter									
	L	S	L	R	L	S	L	S	-ve	+ve
C.albican	10	12	10	13	12	12	11	15	-	17
C. krusei	14	11	8	13	11	10	11	12	-	15
C. globerate	8	10	7	11	9	8	10	11	-	20
A. flavus	6	6	9	7	6	7	6	8	-	12
A. fumigatus	5	6	7	6	5	-	5	6	-	15
C. neoformans	10	11	10	14	10	10	11	13	-	17

[a] L: leave oil, S: stem oil. R: root oil DMSO: Dimethyl sulphoxide : -- control, ApB: Amphtericin B : + control, -- ≤ 4 mm or absence,

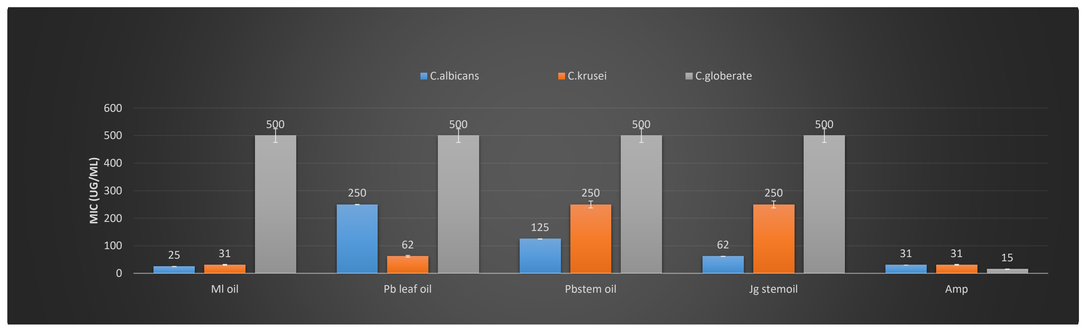
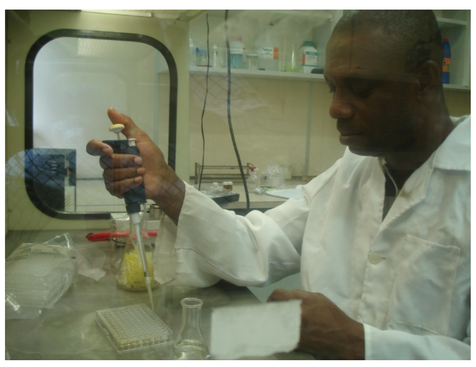


Fig 1: Summary of MIC essential oils on fungi

Conclusions

- *Jatropha gossypifolia* stem EO gave the best activity at 15 mm zone of inhibition against *Candida albican* followed by *M. lucida* root (13 mm), while *P. biglobosa* stem, *J. curcas* oils (12 mm) were next, while *J. Curcas* had the least activity.
- The MIC of *Morinda lucida* root oil (31.3 µg/mL) was similar to the reference compound (Amphtericin B) in *C. krusei,* while other EOs MIC were significantly different from the Amphtericin B.
- None of the oil exhibit significant effect on the *Aspergillus* species



Acknowledgments

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