THE ANTIFUNGAL EFFECTS OF EXTRACT OF EUPHORBIA HIRTA ON SELECTED PATHOGENIC FUNGI

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ABSTRACT: The antifungal effect of *Euphorbia hirta* has been known among people living rural and even urban communities for a long time now. The extracts from leaves have been used over time to clear off dermatophytic infections from the skin of young children. In this work, the root and leaf extract (aqueous) had minimal effect, while the alcohol (methanol) extract and leaf extract (aqueous) with 10% sodium chloride had virtually the same efficacy. The minimum inhibitory concentration (MIC) ranged between 200mg/ml to 800mg/ml. This work revealed the antifungal effect of a very common local plant with potentials for pharmaceutical and curative purposes.

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INTRODUCTION

The use of plants and plants extract for pharmaceutical purposes have been reported by various authors and researchers. However, a large array of plants is yet to be analyzed for their potential pharmaceutical effects. Various extracts from barks, leaves, stem, roots and even fruits have been formulated and tested against pathogenic organisms. In tropical Africa, particularly in Nigeria, the use of local herbs in the treatment of various ailment and wound infections is well known. Many plants are seen to produce antifungal metabolites which may be preformed compounds found in healthy plants or may actually had been synthesized in response to a pathogen's attack(Osbourn,1993).

In the later parts of the 19th century, awareness of systemic infections caused by species of fungi, such as *Histoplasma capsulatum* and *Coccidiodes immitis* led to a conscientious effort at finding effective treatment for these infections. This led to the development of drugs with less toxicity to the human cells and more efficacy against the fungi (human cells contain cholesterol while fungi contain ergosterol). The major breakthrough in antifungal drug development was Ketoconazoloe, in 1970s. This however did not remove absolutely the incidence of drug resistance among the aetiological agents of mycotic infections, especially in the wake of serious mycotic infections (Hitchcock, 1993; Rex *et al*., 1995).

There are claims and counter claims on the efficacy of various plants extracts in the treatment of fungi infections, particularly, dermatophytic infections. Following previous works, this study attempts to discover the therapeutic effect of the various extracts of *Euphorbia hirta* on selected pathogenic fungi.

METHODS

The methods used in this study, is as described in similar study by Ayanbimpe and Fagbemi, 2005.

The plant (*Euphorbia hirta*) used for this study, is a common plant found virtually in all towns in Edo state and was identified by Mr. Eseigbe Dan of the Department of Botany, Ambrose Alli University, Ekpoma, Edo state, Nigeria. The test organisms used were *Candida albicans, Trichophyton mentagrophytes, Trichophyton rubrum* and *Trichosporon beigelii* and *Epidermophyton floccusum* obtained from University of Benin Teaching Hospital Medical Microbiology laboratory (all distinct colonies). Extracts from roots, leaves, and stem were obtained using alcohol, water and water mixed wth 10% Nacl as described by Onah, *et al*., 1994 and Oloke, 2001. Agar plate method was the inoculation choice as described by Galgiani, *et al*., 1984 and modified by Onah, *et al*., 1994. This entails the incorporation of a known volume of the extract into molten Sabouraud Dextrose Agar (SDA) to make the desired concentrations of 5%, 10% and 15% of the extract in the medium. The medium was allowed to set at ambient temperature. The test fungi species were then inoculated on the media surface and incubated at room temperature (26-28^{o}C) for a period of 1-3 weeks. The culture plates were observed thrice daily for growth. Controls were run simultaneously by inoculating Sabouraud Dextrose Agar devoid of plant extracts and incubating under similar conditions. The lowest concentrations of the extract that inhibited growth of the fungi were taken as the minimum inhibitory

concentration. The method used here was the agar plate dilution method as described by Onah, *et al*., 1994 and three sets of trials were done for each test organism.

RESULTS

Of the various extracts used, the aqueous extracts of leaves and roots had the least efficacy. However, the alcohol extract and aqueous extract with 10% NaCl, had virtually the same potency. All these extracts had antifungal activities against the test organism though with varying minimal inhibitory concentrations. The aqueous extract has the highest concentrations of MIC while the aqueous 10% NaCl has the lowest MIC as shown in table 1.

TABLE 1: ESTIMATED MINIMUM INHIBITORY CONCENTRATIONS (MIC) OF AQUEOUS, AQUEOUS PLUS 10% NaCl AND ALCOHOL EXTRACTS OF *EUPHORBIA HIRTA*.

Fungi	**Minimum Inhibitory Concentrations (mg/ml)**		
	Aqueous Extract	Aqueous 10% NaCl	Alcohol
Candida albicans	800	500	500
Trichophyton metagrophytes	400	250	400
Trichophyton rubrum	400	250	250
Trichophyton beigelii	600	250	250
Epidermophyton floccosum	600	200	250

DISCUSSION

The tested organisms are the common aetiological agents of some common dermatophytic infections in our environment such as Tinea corporis, Tinea pedis, Tinea cruris, Tinea capitis, Tinea barbae and Tinea unguim (Ayanbimpe *et al*.,1995 ; Al-sogair *et al*., 1991; Marriot and Richardson,1987; Thomas,2004).

In this study, the aqueous plus 10% NaCl extracts as well as the alcohol extracts proved to be of better potency, compared to the aqueous extract alone. However, all extracts showed varying degree of fungal activity, thus collaborating similar works earlier done Ayanbimpe and Fagbemi (2005). However some forms of resistance to these extracts necessitated varying degree of MIC. Reasons for the resistance may be same, for the organisms' resistance to common antifungal agents (Galgiani *et al*., (1984).

The introduction of 10% NaCl to the extracts is novel, as it was observed that people using the plant for medicinal purposes do constantly used salt with the plant extracts. The result of the MIC was astonishing as the extracts containing 10% NaCl had lower MIC in virtually all the tests. This finding is expected to open up a new window for pharmaceutical studies.

The alcohol extracts also exhibited good antifungal activity against the test organisms. It actually had similar MIC with the extracts containing 10% NaCl. Possible reasons for increased antifungal activities of these two extracts may be attributed to the methanol or 10% NaCl, ability to pull the potent chemicals (chemicals that actually exhibit the antifungal activity) together in a higher concentration to exhibit the effect.

CONCLUSION

Conclusively, the potent extracts of *Euphorbia hirta* with some refinement, may be considered a better and cheaper alternative to the present antifungal agents in the market, for the management of dermatophytic infections.

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