

The Effect of Crude Methanolic Extracts of *Mitracarpus scaber* on *Dermatophilus congolensis*

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Abstract: *Mitracarpus scaber* is a local herb traditionally used for the treatment of eczema and other skin disorders. Methanolic extracts made from leaves, stem, fluorescence and roots were prepared and dried. Graded concentrations of the 4 separate plant parts were prepared in nutrient broth contained in universal bottles at 10, 7, 5, 3 and 2 $\mu\text{g mL}^{-1}$. Standard chloramphenicol (Norbrook Laboratories Ltd., London) was similarly prepared and used as known antibiotic. An isolate of *Dermatophilus congolensis* was obtained and inoculated in each of the graded broth media and incubated at 37°C, microaerophilically, for 24 h. Two replications were made with blank controls and growth of *Dermatophilus congolensis* was observed and recorded. The results obtained showed that leaves, fluorescence and root extracts were inhibitory at concentration of 3 $\mu\text{g mL}^{-1}$ while, stem extract was at 5 $\mu\text{g mL}^{-1}$. Chloramphenicol was inhibitory at 2 $\mu\text{g mL}^{-1}$. It is recommended that research be carried out on this plant to further elucidate its antimicrobial potentials.

Key words: Antimicrobial activity, crude methanolic extracts, *Mitracarpus scaber*, *Dermatophilus congolensis*

INTRODUCTION

Dermatophilosis is a disease of domestic animals and occasionally man, caused by the bacterium *Dermatophilus congolensis* (Shotts and Kishner, 1970). It leads to losses amounting to millions of US dollars arising from low productivity, decreased milk and meat production, as well as failure in reproduction (Oppong *et al.*, 1996). Deaths of young calves have been reported due to starvation because of the inability of dam, with infected udder, to feed them.

Hides and skins have been condemned because of the disease and this has resulted in colossal losses in Nigeria foreign exchange earnings (Lloyd, 1976).

Several medications have been tried to treat the disease but results have remained variable owing to factors of predisposition, ectoparasite control status and breed susceptibility (Abdullahi, 2001). Drugs used in the field in Nigeria are expensive because of high importation tariffs. Alternative means of treatment lie in trials of the natural herbal potentials that are readily available.

Such herb is the *Mitracarpus scaber* which is an annual plant found commonly on cultivated farms. This

has been used traditionally in treating human skin diseases such as crawl-crawl (scabies), itching, ringworms and lice.

MATERIALS AND METHODS

Preparation of plant materials: Fresh leaves, whole stem, roots and fluorescence of *Mitracarpus scaber* were air-dried separately and each portion was powdered using a mortar and pestle. Total 120 g of each portion of the powdered sample were macerated and extracted in methanol using a separating funnel. The mixture was allowed to stand for 48 h at room temperature before filtration. The filtrates were concentrated to dryness by evaporation of the methanol using a water bath. The extracts were placed in universal bottles, labeled and stored at 4°C in the refrigerator.

Preparation of media for the Isolation of *Dermatophilus congolensis*: About 3.7 g of blood agar (37 g L⁻¹) and 6.5 g of nutrient broth (13 g L⁻¹) were prepared using standard procedures. The blood agar in Petri-dishes were placed in a canister and stored in the refrigerator at 4°C.

Table 1: MIC ($\mu\text{g mL}^{-1}$) of the different parts of *Mitracarpus scaber* (methanolic extracts) on *D. congolensis* (replicated twice)

Concentration ($\mu\text{g mL}^{-1}$)	Chl.		Lf.		Stm.		Flr.		Rt.	
	1	2	1	2	1	2	1	2	1	2
10	-	-	-	-	-	-	-	-	+	-
7.0	-	-	-	-	-	-	-	-	-	-
5.0	-	-	-	-	+	+	-	-	-	-
3.0	-	-	+	+	+	+	+	+	+	+
2.0	+	+	+	+	+	+	+	+	+	+
Control 0.0	+	+	+	+	+	+	+	+	+	+

Chl. = Standard chloramphenicol (Norbrook Laboratories Ltd., London), Known control; Lf = Crude leave extract; Stm = Crude stem extract; Flr = Crude fluorescence extract; + = Growth of *D. congolensis* as jelly-white thread; - = No growth

Isolation of *Dermatophilus congolensis* from infected scabs:

Scabs from natural lesions of dermatophilosis were collected from slaughtered cattle at Zango abattoir in Zaria. Isolation of *Dermatophilus congolensis* was done according to methods described by Haalstra (1965). Colonies were observed as dirty brown patches stacked to the blood agar; β -hemolytic and rough in consistency.

Antibiotic: Standard chloramphenicol (Norbrook Laboratories Ltd., London) was obtained from Faculty of Pharmaceutical Science, Ahmadu Bello University, Zaria and used as control standard.

Determination of Minimum Inhibitory Concentration (MIC):

The MIC of chloramphenicol on *Dermatophilus congolensis* has been reported to be $5 \mu\text{g mL}^{-1}$ (Blancou, 1976). This was therefore, used at 5 different dilutions in nutrient broth medium ($10, 7, 5, 3$ and $2 \mu\text{g mL}^{-1}$) contained in sterilized universal bottles. Twenty-seven of such bottles contained 10 mL of nutrient broth prepared and autoclaved for 15 min at 15 lb sq^{-1} inch and 120°C . A stock solution of the standard chloramphenicol was reconstituted by dissolving 1 g of chloramphenicol in 10 mL of deionised distilled water. Similarly, stock solutions of the different extracts were prepared and labeled accordingly. Calculated portions of the stock solutions, including chloramphenicol, were removed and added to the 27 media bottles to achieve the 5 graded concentrations of $10, 7, 5, 3$ and $2 \mu\text{g mL}^{-1}$.

A loopful of previously isolated *D. congolensis* was inoculated into each of the 5 test groups. The dully labeled inoculated bottles were carefully arranged in a candle jar and incubated at 37°C for 24 h. The bottles were observed for growth of *D. congolensis* by checking for typical jelly appearance of the growing organism in broth medium. The observations were recorded as shown in Table 1.

RESULTS

Minimum Inhibitory Concentration (MIC): Figure 1 shows the minimum inhibitory concentration of

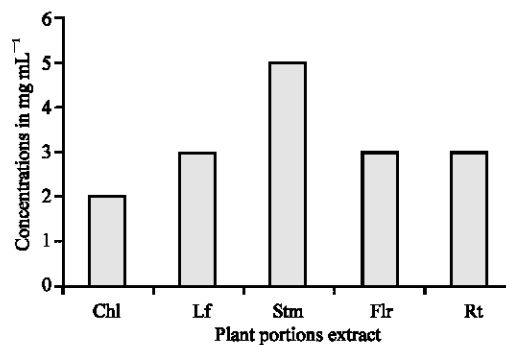


Fig. 1: Graph of bar-chart showing minimum inhibitory concentration of *Mitracarpus scaber* extract on *D. congolensis*

Mitracarpus scaber extracts on *Dermatophilus congolensis*. The MIC results shown above indicate that the crude extracts of leave inhibited the test organism at $3 \mu\text{g mL}^{-1}$. Hence, forth the crude extract of fluorescence and root also inhibited the test organism at $3 \mu\text{g mL}^{-1}$ while, the stem was at $5 \mu\text{g mL}^{-1}$. The standard chloramphenicol in this experiment inhibited the test organism at $2 \mu\text{g mL}^{-1}$. Therefore, the crude extracts of leaf, fluorescence and root are more efficacious than the crude extract of the stem against *D. congolensis*.

DISCUSSION

The crude extracts of leaves, fluorescence and roots inhibited *D. congolensis* at a concentration a little higher than the standard chloramphenicol, indicating that for topical efficacy, the crude extract is more likely to be available and cheaper for field use. The standard chloramphenicol used as known positive control showed a MIC of $2 \mu\text{g mL}^{-1}$ as opposed to the $3-5 \mu\text{g mL}^{-1}$ reported by Blancou (1976). This experiment showed that chloramphenicol is highly efficacious in the treatment of *D. congolensis*, but it must be borned in mind that *in-vitro* experimental results must be interpreted with caution because *in-vivo* methods are more often influenced by many factors that may include tissue absorption,

detoxification by body microsomal enzymes and availability of the test drug at the site of infection with the microorganism (Clark, 1978).

CONCLUSION

This study showed that all parts of *Mitrcarpus scaber* have antimicrobial activities against *D. congolensis*. However, crude extract of the stem appeared to be less efficacious. This also indicates that the antimicrobial activity of *Mitracarpus scaber* is as promising in efficacy as chloramphenicol. Furthermore, Dalziel (1937) reported that it is a common practice among the Yoruba community to administer a concoction, prepared from whole plant portion or mixed with food, as a remedy for crawl-crawl (scabies).

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