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ANTIMICROBIAL PROPERTIES OF THEVETIA PERUVIANA

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ABSTRACT

Thevetia peruviana seed oil was used to make a surface coating with antifungal, antibacterial and anti-termite properties. The paint exhibited inhibitory activity against Bacillus subtilis, Candida albicans, Staphylococcus aureus, and Escherichia coli in a concentration dependent manner. The antibacterial activities were statistically significant ($p = 0.05$). The repellent action of paint against subterranean termites (Microtermes spp.) was significant ($p = 0.03$). From these results, it was concluded that the *Thevetia peruviana* -based oil paint was self-preserving against microbes and substantially protected wood from subterranean termite attack.

Keywords: *Thevetia peruviana* , anti-termite, antifungal.

INTRODUCTION

Thevetia peruviana belongs to the family Apocynaceae and it commonly known as Yellow oleander and Lucky nut. It is an ornamental plant which grows in India, China, Australia. Decoction of the stembark of *Thevetia peruviana* is used as an antipyretic[1] agent. Seed extracts are also shows genotoxic assessment[2] . Flavonone and Flavonal glycosides from the leaves of *Thevetia peruviana* exhibit HIV-I reverse transcriptase and HIV-I intrase inhibitor activities[3]. It has also been regarded as potential source of biologically active compound, namely insecticides, rodenticides, fungicides and baectercides, that means *Thevetia Perruviana* plant extract have also been reported have Antimicrobial properties against Cladosporium cucumerinum[4,5].

Toxicity and repellent effects of medicinal plant extracts on subterranean termites (Isoptera: Rhinotermitidae) have also been demonstrated[6]. The presence of unsaturated linoleic acid in Yellow oleander oil[7], which has drying properties[8,] makes Yellow oleander oil suitable for making a surface coating such as paint. The aim of this study was to formulate an oil-based paint using crude Yellow oleander oil and to determine its insecticidal and antimicrobial properties.

EXPERIMENTAL

Collection of Yellow oleander kernel seeds and extraction of oil Yellow oleander kernel seeds were collected from College campus. After removing the kernel, seeds were macerated using a blender. Oil was extracted with methanol. Filtered crude oil was stored in a refrigerator at 4°C till used.

Paint formulation

Commercial grade long oil (alkyd resin), titanium dioxide, anti-skin agents, white spirit and paint dryers were purchased from a local chemical supplier. Five kilogrammes (5 kg) of paint was made by mixing appropriate ingredients. Yellow oleander oil extract was used to make paint batches whose oil concentration ranged from 0.0 to 80.0%.

Antibacterial and antifungal assays

The procedure followed was as described by Cheesbrough . Inhibition zone diameters for paints were determined against E. coli, S. aureus, B. subtilis and C. albicans. The results were presented in Figure-1.

Anti-termite activity

Labeled dry plywood plates (6 x 6 inches) were painted on both sides, (in triplicate) with the formulated paints. One set of control plates was painted with neat oleander oil, while the other was painted with a paint in which Yellow oleander oil was not added.

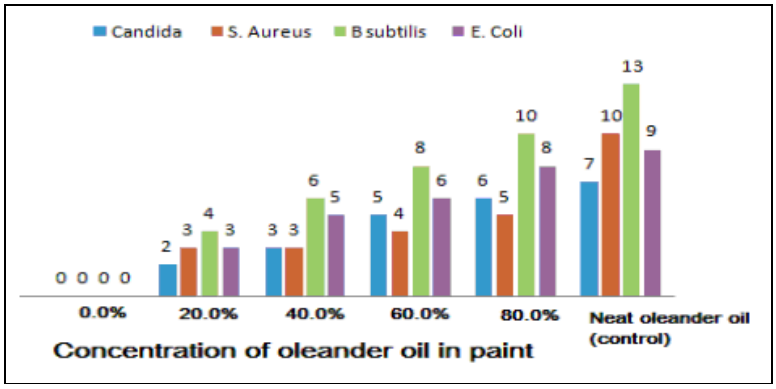

Fig.-1: Inhibition zone diameters (mm) of Oleander paint

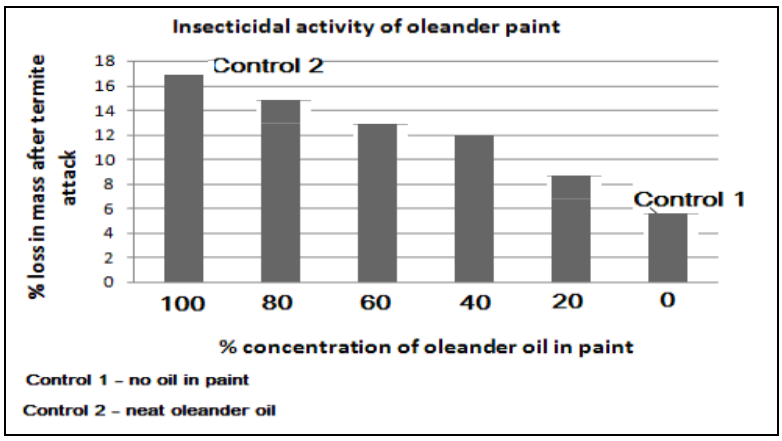

Fig.-2: Repellent activity of Oleander paint towards *Microtermes spp.*

After drying to constant weight in the laboratory environment, each plate weight was determined. The wooden plates were then placed side by side and covered with foliage under a termite (Microtermes spp) nest and left for a period of one month. Moisture was constantly maintained by pouring water on the foliage within the exposure period, so as to maintain appropriate environmental conditions favourable to termites. After the exposure period, the wooden plates were washed with clean water to remove soil and debris, and dried in the oven at 50°C to a constant weight. The mass of each plate was then determined and the average weight loss calculated.

RESULTS AND DISCUSSION

The Oleander paint inhibited the tested microbes in a concentration dependent manner. The control paint (containing 0.0% oil) did not inhibit the test bacteria and fungus. From these results, it was concluded that oleander paint was self-preserving against bacterial and fungal attack. Antibacterial and antifungal activity of *Thevetia peruviana* plant extracts had been earlier established[4,11] and collaborates with the present findings. From Figure 2 it was evident that the oleander paint repelled Microtermes spp. The repellent action was highest when pure oleander oil was used. However, no termite deaths were reported in this study. Insecticidal and toxicity of Yellow oleander oil has been reported.[10,12,13]Also anti-termite

activity of medicinal plant extracts has been documented[6]. The present findings demonstrate that paint made from *Thevetia peruviana* plant oil extract could substantially protect timber from termite attack.

CONCLUSION

Yellow oleander paint possesses antimicrobial and antitermite activities. *Thevetia peruviana* oil extract would serve as an environmentally friendly bactericide and fungicide for oil based paints.

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