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Short Communication

Anti-termite and antimicrobial properties of paint made from *Thevetia peruviana* (Pers.) Schum. oil extract

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Thevetia peruviana **(Pers.) K. Schum. seed oil was used to make a surface coating with antifungal, antibacterial and anti-termite properties. The paint exhibited inhibitory activity against *Escherichia coli, Staphylococcus aureus, Bacillus subtilis* and *Candida albicans* 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.**

Key words: *Thevetia peruviana*, anti-termite, antifungal.

INTRODUCTION

Thevetia peruviana (Pers.) K. Schum. (commonly known as Yellow oleander) is an ornamental plant which grows in Kenya and other parts of the World, such as tropical America, Western Asia, Southern Europe, India and tropical Africa. Extracts from *T. peruviana* plant species contain glycosides, whose toxicity against snails, slugs (Panigrahi and Raut, 1994), bacteria (Obasi and Igboechi, 1991), insects (McLaughlin et al., 1980) and humans (Langford and Boor, 1966) has been documen-ted. *T. peruviana* plant extracts have also been reported to have antifungal properties against *Cladosporium cucumerinum* (Gata et al., 2003).

Toxicity and repellent effects of medicinal plant extracts on subterranean termites (Isoptera: Rhinotermitidae) have also been demonstrated (Verena- Ulrike and Horst, 2001). The presence of unsaturated linoleic acid in Yellow oleander oil (Obasi et al., 1990), which has drying properties (Cecilia et al., 2005), 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.

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MATERIALS AND METHODS

Collection of Yellow oleander kernel seeds and extraction of oil

Yellow oleander kernel seeds were collected from Jomo Kenyatta University of Agriculture and Technology 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, Industrial area, Nairobi. 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 (1984). 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

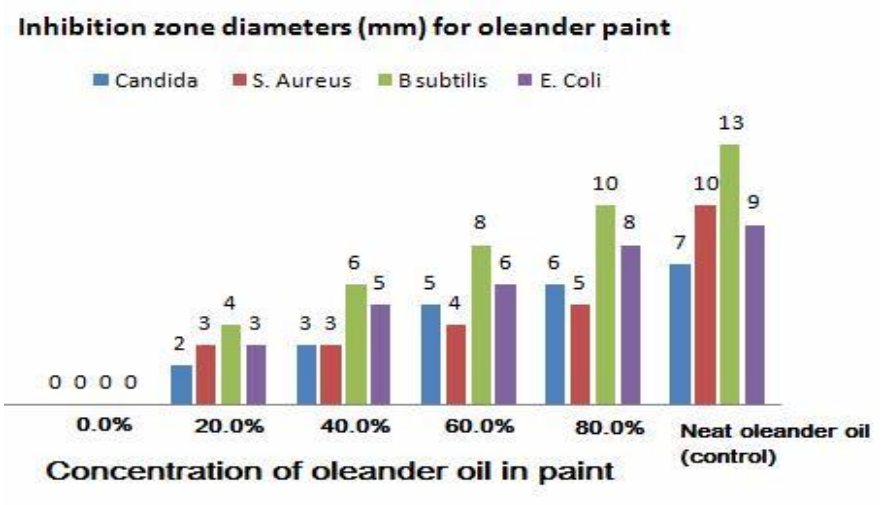

Figure 1. Inhibition zone diameters (mm) of oleander paint.

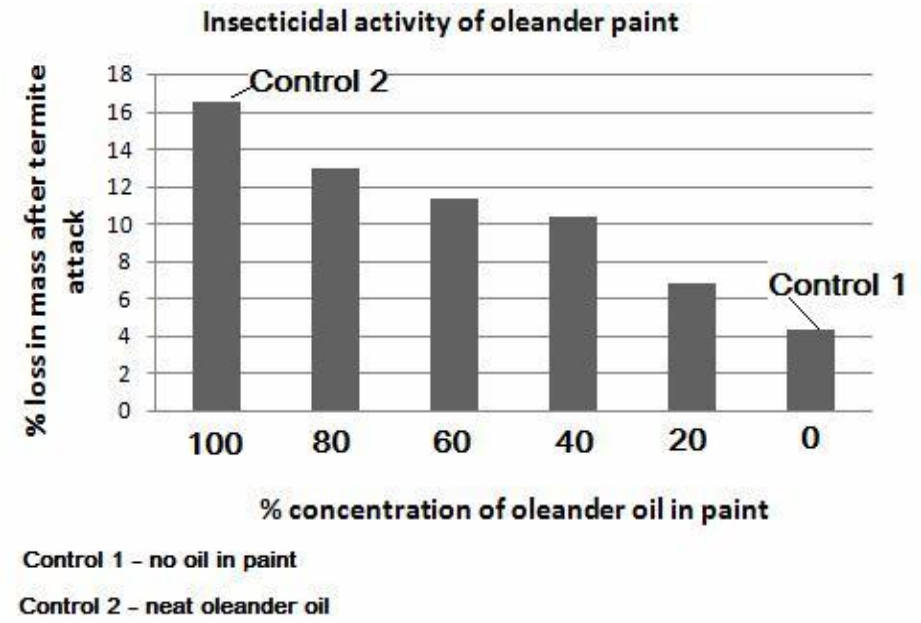

Figure 2. Repellent activity of Oleander paint towards *Microtermes* spp.

plates was painted with neat oleander oil, while the other was painted with a paint in which Yellow oleander oil was not added. 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 *T. peruviana* plant extracts had been earlier established (Obasi and Igboechi, 1991; Gata et al., 2003) 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 (McLaughlin et al., 1980; Panigrahi and Raut, 1994; Langford and Boor, 1966). Also anti-termite activity of medicinal plant extracts has been documented (Verena-Ulrike and Boor, 2001). The present findings demonstrate that paint made from *T. peruviana* plant oil extract could substantially protect timber from termite attack.

Conclusion

Yellow oleander paint possesses antimicrobial and anti-termite activities. *T. peruviana* oil extract would serve as an environmentally friendly bactericide and fungicide for oil based paints.

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