

**BIOACTIVITY TESTING OF SECONDARY METABOLITES FROM
SELECTED SPONGES ALONG THE KENYAN COAST**

Polycarp Lutta Kweyu

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ABSTRACT

This thesis describes investigations on *Axinella infundibuliformis*, *Haliclona oculata*, *Tethya citrina* and *Tethya sarai* sponges collected along the Kenyan Coast. Through various chromatographic and spectroscopic techniques, three triterpene compounds were isolated and identified from *A. infundibuliformis*. These were 3 β -hydroxylup-20(29)-ene (**23**), 3 β -hydroxylup-20(29)-en-28-oic acid (**24**) and 3-oxolup-20(29) - en-28-oic acid (**25**). One sterol compound (β) beta- sitosterol (**21**) was isolated from *H. oculata* and from *T. citrina*, one compound pentyl heptacosanoate (**22**), a wax ester, was isolated.

Hexane, dichloromethane and methanol crude extracts of *A. infundibuliformis* at 100 mg/ml showed the highest potential for antibacterial activity against methicilin resistant *Staphylococcus aureus* with inhibition zone diameters of 12.7 ± 0.1 , 11 ± 2 and 6.7 ± 0.2 mm, respectively. The MIC values for dichloromethane and hexane extracts were then evaluated as at 6.25 and 3.12 mg/ml, respectively. All the crude extracts from *H. oculata* were inactive against all the bacteria and fungi strains tested. The antifungal tests indicated that crude extracts from *A. infundibuliformis* had low activity while all the other extracts were inactive was against *Candida albicans* with inhibition zone diameters of 5.7 ± 0.3 , 6.0 and 6.7 ± 0.2 mm for methanol, dichloromethane and hexane extracts, respectively. In addition, the dichloromethane and hexane extracts conjured low activities against *Microsporium gypseum* (6.3 ± 0.1 mm) and *Cryptococcus neoformans* (6.3 ± 0.1 mm), respectively.

The isolated compounds β -sitosterol (**21**), pentyl heptacosanoate (**22**) and 3 β -hydroxylup-20(29)-en-28-oic acid (**24**) were tested against the same bacteria strains at 10 mg/ml. They all showed activity against *Pseudomonas aeruginosa* but were inactive against the other strains

except for β -sitosterol (**21**) which exhibited some activity against *Salmonella typhi* and *Escherichia coli*. The inhibition zone diameters against *P. aeruginosa* were; β -sitosterol (**21**); 24 ± 1 mm, pentyl heptacosanoate (**22**); 10.7 ± 0.1 mm and 3β -hydroxylup-20(29)-en-28-oic acid (**24**); 7.0 ± 0.1 mm, while gentamycin (Standard drug) had an inhibition zone diameter of 16.0 mm. The results indicate that whereas the crude extracts showed the potential to inhibit gram positive bacteria (methicilin resistant *S. aureus*), the isolated compounds showed the potential to inhibit gram negative bacteria (*P. aeruginosa*) which are known to be more difficult to inhibit (less susceptible to antibiotics) than gram positive bacteria.