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

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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 3β-hydroxylup-20(29)-ene **(23)**, 3β-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 *Microsporum gypseum* (6.3 ± 0.1mm) and *Cryptococcus neoformans* (6.3 ± 0.1 mm), respectively.

The isolated compounds β-sitosterol (**21)**, pentyl heptacosanoate (**22**) and 3β-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.