

## **Levels, distribution and fate of pollutants in the coastal waters off Zanzibar town**

**Frank Nyanda**

**Master of Science (Marine Science)**

**University of Dar es Salaam, Institute of Marine Sciences, 2015**

Biofiltration performances of native microorganisms concentrated on East African Doum Palm Fronds (EADPF), *Hyphaene compressa* (H. Windl. 1878) and Effective Microorganisms (EM) consortium were assessed. Triplicate polyculture tanks (1 m<sup>3</sup>) with *Oreochromis urolepis urolepis* (Norman, 1922) and *Mugil cephalus* (Linnaeus, 1758) were used. Seawater treated EADPF (EADPF-F), untreated EADPF (EADPF-U), EM on Polyvinyl Chloride sheets (PVC-EM), EM consortium without media (EM) and Polyvinyl Chloride without EM (PVC) were used except in the control (CONTROL) tanks. PVC-EM, PVC, EADPF-F and EM systems had better ammonia biofiltration efficiency of  $83.7 \pm 3.13\%$ ,  $80.9 \pm 3.13\%$ ,  $73.2 \pm 5.36\%$  and  $66.7 \pm 3.23\%$  respectively while EADPF-U had the least ( $38.4 \pm 7.09\%$ ). Total suspended solids levels were relatively little in PVC-EM, PVC and EM but high in EADPF-F and EADPF-U systems. Of the two finfish, *O. urolepis urolepis* had relatively higher specific growth rate (SGR) and survival rate (SR), with EM and EADPF-F systems providing the best SGR (3.41%) and SR ( $55.6 \pm 9.0\%$ ) while the CONTROL and EADPF-U provided the least SGR ( $2.45 \pm 0.03\%$ ) and SR ( $27.9 \pm 14.7\%$ ), respectively. The results showed that EM, PVC-EM and PVC were effective in enhancing both, the effluents biofiltration and growth of *O. urolepis urolepis*. Higher values in EM and PVC-EM were attributed to both the regenerative characteristics of EM consortium and ability to fix ammonia while excess heterotrophic activities explained the low values in EADPF-U. The EADPF-F, providing the best SR and run-up SGR of  $3.17 \pm 0.06$  similar to PVC-EM ( $3.17 \pm 0.04$ ) was revealed as a potential biofilter media and enhancer of periphyton or bioflocs in mariculture system.