

## **M.S. 37. IVY THOMAS – Studies on Chitinoclastic Bacteria of the Coastal zones of Cochin – 1984 – Dr. D. Chandramohan.**

For this study 28 sediment samples, 53 water samples, 8 species of prawns and 24 species of fishes were examined over a period of one year. The chitinoclastic bacterial population in these samples varied from undetectable levels to a maximum of 74.44% of the total population. Higher percentage of chitinoclast were recorded during May when the ambient temperature was comparatively high. Salinity, pH and dissolved oxygen seemed to have no influence on the distribution of chitinoclastic bacteria. Among the samples analysed digestive tract of prawns was found to harbour more chitinoclasts than the shell surface.

Chitinase activity could not be detected in sediment samples and in all the other samples it was in varying levels. No relationship could be observed between the chitinoclastic bacterial population and the chitinase activity in a sample.

Chitinoclastic genera isolated were *Vibrio*, *Aeromonas*, *Alcaligenes*, *Bseudomonas*, *Bacillus* and members of Enterobacteriaceae. Amongst this *Vibrio* was found to be the dominant genus.

Two strains belonging to *Aeromonas* and *Vibrio* were used for further studies. Both the cultures exhibited maximum growth at 30°C, and at 40°C growth was found to be very much affected, but survived an exposure to this temperature for 60 minutes. The range of pH tolerated by *Aeromonas* was 5.0 to 6.0 and by *Vibrio* 5.0 to 8.0, with their optimum at 5.6 and 7.00 respectively. Both species

grew well in media containing 1% NaCl.

The type and initial concentration of chitin were recognized as important cultural conditions for the chitinase production. The study reveals that the chitinase system in both the species are of constitutive ones. Maximum chitinase production was recorded at 37°C, pH 7.0 and 3.0% NaCl concentrations. The generation time of *Aeromonas* was  $1.5 \pm .10$  hrs. and of *Vibrio*  $1.00 \pm 0.17$  hrs. in chitin media. The maximum degradation rate of chitin for *Vibrio* ( $5.328 \text{ mg/day}/10^{10}$  cells) at 72 hrs. after inoculation. Whereas in the case of *Aeromonas* it was  $4.224 \text{ mg} (\text{day}/10^{10} \text{ cells})$ .

Properties of partially purified chitinase from both the species were studied using colloidal chitinase on substrates. In both the cases the end product formation was rapid and reached maximum at 40min. and 60min. for *Aeromonas* sp and *Vibrio* sp respectively. Optimum temperature for the enzyme activity was 37°C optimum pH was 5.6 and 7 for *Aeromonas* and *Vibrio* respectively. The maximum activity of the chitinase of *Vibrio* sp was recorded at a substrate concentration of 0.21 mg/ml and in *Aeromonas* sp at a concentration of 0.04 mg/ml. Enzymes from both the organisms were stable upto 40 C and they were almost completely inactivated at 70 C. Maximum stability of chitinase of these bacteria was noticed at pH 5.0. Mercury, Copper, Zinc, Calcium and Silver were found to affect the stability of chitinase produced by *Vibrio* compared to that *Aeromonas*.