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Improving the quality of marine foods by using bacterial pigments from an estuarine environment

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Naturally, an aquatic environment is rich in colours and pigment-producing microorganisms. Nowadays, there has been much interest in harmless biological colouring compounds in agro-food, marine food, pharmaceutical, cosmetic, aquaculture and ornamental fish culture industries. Fish, like other animals, do not synthesize carotenoids and depend on dietary carotenoid content for their colouration. Hence, there is a direct relationship between dietary carotenoids and pigmentation. Colour is one of the major factors which determine the price of aquarium fish as well as food fish in the world market. In this study, colouring compounds were obtained by identifying a new bacterial strain from an estuarine environment. This new strain was able to tolerate hypo- and hyper-environmental fluctuations. The colour enrichment ability of crustaceans was studied and the particular bacterial gene was sequenced. Sediment samples were collected from the Pantry Estuary and the pigmented colonies cultured and isolated. Parameters such as optimum salinity and temperature for growth of the isolates were noted. Biochemical analysis was performed, and antibiotic and anti-bacterial sensitivity of the strains was tested. Pigment feeding and enrichment of colour to crustaceans were studied. The G+C content of one of the strains was analysed and identified by using 16S rRNA sequencing. *Artemia*, which serve as live food for freshwater fish and crustaceans, were fed these bacterial isolates along with formulated feed. Then these isolate-fed *Artemia* were again fed to ornamental fishes and shrimps (Penaeus monodon). Four crimson red-pigmented, motile, rod-shaped, slightly halophilic bacteria were isolated. They grew optimally at salt concentrations between 1.5% and 5% and did not grow above 12% salinity. The temperature optimum was 15-42°C. One of the isolates, subjected to 16S rRNA gene sequencing, was found to be 96% identical to the sequences of Pseudomonas reactans. A single, yet-to-be-identified pigment was present, with an absorption maximum at 485 nm and a shoulder at 510–540 nm. The G+C content of the DNA was 52.7 mol.%. These pigmented strains exhibited a higher degree of sensitivity against some antibiotics and showed antibacterial property against some common aquatic pathogens. Our isolate was found to improve the colour of the *Artemia*; feeding of these *Artemia* to shrimps and ornamental fishes improved their colour and other properties. These are also amenable to enrichment and bio-encapsulation, making them ideal candidates for the delivery of valuable nutrients to shrimps and fishes.

Biography

Mr. A.V. Aji Kumar was an Indian graduate who had his Master Course and Master of Philosophy in the field of 'Microbiology' in Center For Marine Science And Technology (C.M.S.T) Manonmaniam Sundaranar University and now he was pursuing his Ph.D. at Scott Christian College (Autonomous), Nagercoil Which is affiliated to Manonmaniam Sundaranar University, Tirunelveli. He obtained distinction in PG at level. He completed Nanobiotechnology offered by Life Science Foundation of India (LSFI) Karnataka. His doctoral programme focuses on the invention of newer technology which amends the use of Gamma rays in the role to perform Bio-medical Waste treatment. His areas of research interest include searching the beneficial use of aquatic pigments. Currently he was working as SRF in BRNS funded project on Bio-medical waste treatment using low level Gamma radiation Studies. He is a member of Health physics Society, USA. He was born in 1984 in Tamil Nadu.

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