Short Paper

Effect of Bio-Luminescent Bacteria on Organoleptic Qualities of Fishes from Cochin Backwaters

The studies on the luminescent bacteria from Indian waters are scanty. RAMAMURTHY identified parasitic luminescent *Aeromonas* from porto Novo waters of Bay of Bengal.¹⁾ JAYABALAN, DHEVENDRAN & RAMAMURTHY isolated symbiotic bio-luminescent bacteria in the light organs of silver bellies.²⁾

KRISHNAMURTHY isolated free living luminescent bacteria of *Nisseria* in the head region of prawns from Cochin backwaters of Arabian Sea.³⁾

The present study deals with the presence of enteric luminescent bacteria—*Photobacterium* and *Lucibacterium* in two of the commercial backwater fishes viz. *Gerres* sp. and *Mugil* sp. The aim of the present study is to investigate whether the presence of luminescent bacteria in the backwater food fishes can effect the organoleptic qualities of fish products.

The investigation carried out for about four months in Munambam estuary situated about 20 km of Cochin (76°12'–13'E, 09°56'N). Two species of fishes viz. *Gerres setifer* and *Mugil cephalus* were caught from the estuary from Chinese dip nets.

The luminescent colonies were observed in the dark after 48 hours of incubation at room temperature 28 ± 2°C. Those colonies which emitted greenish bright luminescence were picked up and transferred to sea water and distilled water agar slants for culturing. These were again streaked and restreaked for pure culture. 24 cultures thus prepared were studied for their morphological and biochemical properties and their systematic position was determined with the aid of Bergy's Manual of Determinative Bacteriology.⁴⁾ Methods suggested by HENDRIE *et al.* were also followed.⁵⁾ 19 strains of *Photobacterium* and 5 strains of *Lucibacterium* were isolated (Table 1). All the 24 strains of luminescent bacteria were found to liquify gelatin. However, a differential variations of liquifaction of gelatin was observed. The strains of *Lucibacterium* liquified gelatin more rapidly than that

of *Photobacterium*. Indole production and hydrolisation of starch were also observed as in the case of *Lucibacterium*.

The percentage of luminescent bacterial strains in the gut of these fishes were high when compared to that of gills. The maximum population of luminescent bacteria occurred in *Mugil cephalus* when they were found in the gills and intestine. Whereas in the case of *Gerres setifer*, luminescent bacteria occurred only in the stomach and they were not reported in the surrounding environment. There was no sign of luminescent bacteria in the muscle of both fishes. In general, the occurrence of these luminescent bacteria in the intestinal content of fishes shows that these strains prefer an enteric habitat.

The occurrence of luminescent bacterial strains were more in the region of higher salinity and pH of the backwater environment. Temperature did not seem to have any effect on the occurrence of luminescent bacteria. The present investigation confirms the earlier studies of KRISHNAMURTHY³⁾ that the presence of luminescent bacteria in prawns do not affect the organoleptic qualities such as colour of the skin and flesh, flavour and texture of the meat. 14 frozen fillets of the above two species of fishes were smeared with 5% to 10% of luminescent bacteria in respect of total plate count and were preserved at a temp. of -17°C in the cold storage for about 24 to 48 hours. Observation on these fillets with above said levels of contamination of luminescent bacteria after 48 hours revealed that it did not show any variations from the fresh fillets in respect of organoleptic qualities. Total plate count before and after storing in the cold storage were noted as 24 × 10⁴ and 18 × 10⁴ respectively.

It was also observed that the fresh fish of the same species in the experimental tanks which harbour 10% to 15% luminescent bacteria in muscle, gill, stomach and intestine did not show any diseased symptoms even after 2 months and no change in the % of contamination during culture.

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Table 1. Total plate counts of bacterial colony and the corresponding luminescent bacterial count in the two selected species of fishes and its environment

	TPC/ gram/ ml × 10 ⁴	No. of <i>Photo-</i> <i>bacterium</i> colonies	No. of <i>Luci-</i> <i>bacterium</i> colonies
Mud	22	—	—
Water	184	—	—
Gerres Muscle	38	—	—
Gerres Gill	3	—	—
Gerres Stomach	24	7	—
Gerres Intestine	202	—	—
Mugil Muscle	47	—	—
Mugil Gill	32	3	5
Mugil Stomach	9	—	—
Mugil Intestine	31	9	—