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A STUDY ON LUMINISCENT BACTERIA IN SHRIMP POST LARVAE IN HATCHERIES & REARING TANKS IN EAST GODAVARI DISTRICT OF ANDHRA PRADESH, INDIA.

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ABSTRACT:-

Luminous Bacterial disease is one of the major problem in shrimp culture . A study is carried out on the species of Luminiscent Bacteria in shrimp post larvae of hatcheries in E.G.Dt were studied. Qualitatively species of Luminous bacteria viz *Photobacterium phosphorum, Photobacterium leiognathi*, *Vibrio fischeri, Vibrio harveyi, Vibrio splendius, Vibrio vulnificus* etc encountered in hatcheries. The study has indicated that the luminescent *V.harveyi* is dominant during the early larval stages of shrimp hatcheries lead to development of L.B diseases.

KEY WORDS:-

Luminescent bacteria, *V. harveyi*, luciferin,*Penaeus monodon*, shrimp hatcheries

INTRODUCTION:-

Aquaculture is the fastest growing food sector globally and is established itself as high protein resource to fulfill the food demand since the natural exhibits over exploitation. Bacterial diseases mainly due to *Vibrio* have been reported in penaeid shrimp culture system implicating at least 14 species and they are *V.harveyi, V. fishceri, V. splendidius, V. vulnificus* etc.

Luminescent bacteria emit light as the result of a chemical reaction during which chemical energy is converted to light energy. These microbes are easily found in sea water,

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marine sediments , in the guts of marine animals and on the surface of decomposing fish. The light is generated by an enzyme catalysed chemoluminiscence reaction, wherein the pigment luciferin is oxidized by the enzyme luciferase.

Luminescent bacterial disease is one of the major disease problem in shrimp , shell fish, & finfish aquaculture. Luminescent bacterial disease is responsible for mortality of cultured shrimp worldwide species from *Vibrio* are the most common bacterial pathogens causing some of the most serious diseases, growth and sporadic mortalities in Penaeid shrimp.

Early larval shrimp in hatcheries with luminescent *V. harveyi* occurrence even in low counts during early larval stages can lead to development of L.B disease in the larval rearing tanks.

MATERIAL & METHODS:-

60 Samples of post larvae of shrimp from hatcheries & rearing tanks in East Godavari District are collected.

On the 1st day seed collection & processing of the sample taken place i.e macerate /crush the sample and add 9ml of normal saline to dilute the sample . After that plating by pour plate method or spread

On the first day samples of larvae collected and processed the samples were crushed and added 9ml of normal saline to dilute the sample. After that plating by pour method /spread plate method used for the enumeration of microorganisms in the sample.

Plate method can be used for the enumeration of microorganisms in a sample. 0.1ml of sample is taken by using a micropipette and using a glass spreader which is sterilized by dipping in alcohol & flaming the material is well spread on the surface by rotary motion of the plate. After spreading , the plates are incubated at 350c for 24-48 hours.

On second day bacterial colonies are enumerated per ml of the sample.

Total bacterial count can be estimated by

$$\frac{\text{No. of colonies observed} \times 1}{\text{ml of the sample plated} \quad \text{dilute factor}}$$

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On third day Biochemical tests of Indole, Methyl Red,. Vogues-Proskaue, Glucose, Lactose, Citrate, Marine Oxidative Fermentation, Oxidase, Motility, Catalase tests for species identification can be done .

RESULTS:-

Out of 30 no of samples 23 are L.B positive & 7 are L.B NAGATIVE on L.B media . The species dominance on LB medium are *V. harveyi* is- 17 *, P. phosphorus* -10, *P. leiognathi* -10, *V. fisheri* -6,

V. splendius-4, *V. vulnificus*-3 occur.

Out of 60 samples analysis on TCBS medium L.B positive are -40, LB negative are-18 speices dominance on TCBS medium *V. harveyi* -14, V.fisheri-11, *V.splendid*-9,*V.vulnificus*-8.

Cumulating the results that were carried on L.B (LB specific) and TCBS (*Vibrio* specific) media for primary and later isolating for species based on the biochemical key the following luminescent bacteria were identified and found to be prevailing along the coast of Kakinada which are considered to be causative pathogenic bacteria for the outburst of LB in shrimp hatcheries in and around kakinada

Sl No	Sample	LB on L.B Media	L.B on TCBS Media
1	Total no of samples	60	60
2	L.B Positive	50	42
3	L.B Negative	10	18

DISCUSSION:-

During the work 60 samples have been analized and out of which 50 samples in LB Media & 42 samples in TCBS media were reported positive to luminescent bacteria.

During the isolation techniques that were carried out to identify the species it has been found that the following species were considered to be pathogenic causative bacteria that were responsible for the outbreak of LB in shrimp hatcheries. The occurrence of various

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vibrio species in water, sediment and shrimp samples from multiple shrimp environment from the east and west coast of India (Gopal S, Otta S K, Kumar S, Karunasagar I, Nishibuchi M, Karunasagar I). The distribution and species composition of luminous bacteria in commercial penaeid shrimp hatcheries were studied by Jawahar Abraham,T and R. Palaniappan (2004),and occurrence of Luminescent bacteria in sediment by (Jayabalan *et al,* 1982).,Occurrence of five types of diseases , tail necrosis, shell disease, red disease, loose shell syndrome(LSS) and white gut disease(WGD) by Vibrio species in *Penaeus monodon* from culture ponds of culture ponds of coastal Andhra Pradesh by (Jayasree L, Janakiram P, and Madhavi R (2006). Some of the species are *Photobacterium phosophorum, Photobacterium leiognathi, Vibrio harveyi, Vibrio splendidus, Vibrio fisheri, V. vunificus causative for vibriosis.*

The gross clinical signs of this disease in shrimp hatcheries was recognized widely by emission of faint light in the larval rearing tanks, followed by mass mortalities. Luminescent bacteria associated with shrimp mortality(Lila Ruangpan), and Vibriosis is bacterial disease responsible for mortality of cultured shrimp worldwide (Lightner & Lewis, 1975, Adams 1991, Lightner *et al*, 1992, Lavilla Pitogo etal 1996, Lavilla Pitogo *et al,* 1998) and Vibriosis caused by *V. harveyi, V. vulnificus, V. alginolyticus, V. Penaeicida* (Brock & Lightner, 1990,Ishimaru et al, 1995). Luminescent *V. harveyi* appears to release exotoxins (Liu et al, 1996) and may cause 80-100% mortality in *P. monodon* in hatcheries (Harris, 1995) and the primary source of *V. harveyi* in hatcheries appears to be the midgut contents of female brood stock, which are shed during spawning(Lavilla-Pitogo etal,1992).

From the above work it is evident that *V. harveyi* is the most dominant pathogenic *Vibrio* species that has got a greater effect on shrimp P.L during the rearing period.

It is evident *V. harveyi* is the most dominant pathogenic *vibrio* species that has got a greater effect on shrimp PL during the rearing period. According to (Lavilla-Pitogo et al,1990, 1998), Australia (Owens *et al* 1992) and India Karunasagar et al, 1994 Luminous bacteria particularly *V. harveyi* and occasionally other luminous species have become recognized as a devasting pathogen of Penaeid shrimp larvae and adults throughout South – east Asia.

Hatchery investigations revealed that the incidence and severity of luminous Vibriosis was higher in rearing tanks containing water with higher salinity. This environment proved congenial for harmful LB species like *Photo bacterium phosphorum, P. leiognathi, Vibrio harveyi, V. fisheri,* V. *splendidus* and *V. vulnificus* for their survival and multiplication. In preventing disease outburst in shrimp hatcheries especially the temperature of rearing water tanks need to be maintained at optimum levels, least fluctuations in temperature would lead to luminous vibriosis. Bio-film formed in the pipe source of pathogenic *Vibrio* as stated by Karunasagar *et al* (1995) which proved at during project observation and there is a evidence to

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suggest that V. harveyi can survive in pond sediment even after chlorination or treatment with lime (karunasagar *et al* 1996)

LB can be controlled in its early stage of infection when the typical symptoms of the disease are not apparent outwards. Treatment methods like resorting to sanitizer application inducing shrimp PL to moult reduces regular pathogenic load . Water exchange maintaining optimum levels of salinity & temperature . Adequate feeding may prove effective in controlling L.B to a large extent in shrimp hatcheries lowering water salinity serves as an effective measure against LB disease. However once mortality sets in it is very difficult to control the disease.

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