

ANTIBIOTIC RESISTANT *VIBRIO HARVEYI* ISOLATED FROM SWOLLEN HINDGUT SYNDROME (SHG) AFFECTED *PENAEUS MONODON* POST LARVAE FROM COMMERCIAL SHRIMP HATCHERIES

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ABSTRACT

Swollen Hindgut syndrome (SHG) of Penaeus monodon post larvae is an emerging problem in shrimp hatcheries. The bacterial isolates belonging to V.harveyi V.alginolyticus and V.campbellii were consistently isolated from SHG affected samples indicating their role in causing SHG in shrimp post larvae. An antibiotic-resistant V.harveyi was also isolated from SHG samples. The sensitivity of the various bacterial isolates to the commonly used antibiotics in the shrimp hatcheries was studied.

Keywords : *Penaeus monodon* – Shrimp – Swollen Hindgut Syndrome (SHG)– Antibiotic resistant *Vibrio harveyi*

INTRODUCTION

Culture of *Penaeus monodon*, tiger shrimp is one of the most profitable venture in aquacultures sector in India and in many countries of the world. The total export of processed shrimp from India is estimated to be 11,000 metric tones of which 48.96% is contributed by cultured shrimps. Commercial culture of shrimp involves stocking of shrimp seeds (post larvae) in the ponds rearing them to a marketable size and harvesting. Shrimp seeds for stocking are mostly procured from the commercial shrimp hatcheries as the availability and quality of wild seeds varies. There are about 226 hatcheries along the coastal region of the country with the production capacity of 1,05,828 lakhs post larvae. Tamilnadu has 72 hatcheries with capacity to produce 29,330 lakhs of post larvae per annum

(Anon, 2004) Swollen hindgut syndrome (SHG) is emerging as a major problem in the shrimp hatcheries along the east coast of India. Shrimp farmers avoid stocking seeds showing SHG which results in severe losses to shrimp hatchery operators. Shrimp seeds with SHG have a swollen hindgut with or without melanisation. This condition is also referred to as hindgut expansion. In the affected seeds, the rhythmic movements in the rectal region are affected resulting in difficulty in expelling the faecal pellets. In this study, we have attempted to isolate and identify the bacterial pathogen from post larvae with SHG

MATERIALS AND METHODS

Shrimp seed samples with SHG were collected from various commercial hatcheries located in the east coast of Tamilnadu. The samples were

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transported in live condition in aerated polythene bags and brought to shrimp disease diagnostic laboratory, Vaccine Research Centre – Viral Vaccines, Centre for Animal Health Studies, TANUVAS. The samples were observed microscopically to confirm the presence of SHG syndrome (Fig. 1&2). Shrimp seed samples showing typical changes specific to SHG were selected and subjected to bacteriological examination. The samples were washed in sterile saline and their gut were separated and transferred aseptically to sterile tubes with peptone water supplemented with 1.5% NaCl. Further isolation was done in tryptose soy agar with 1.5% NaCl and thiosulfate citrate bile salts sucrose (TCBS) agar, a specific media for *Vibrio* isolation. The isolates were characterized following biochemical scheme of Surendran and Gopakumar (1981). The sensitivity of the isolates to various antibiotics was tested following the method of Bauer *et al.* (1966).

RESULTS AND DISCUSSION

V.harveyi, *V.alginolyticus* and *V.campbellii* were the predominant species of bacteria isolated from most of the shrimp samples with swollen hindgut as confirmed by the standard biochemical tests (Table.1). The isolates belonging to *V.alginolyticus* and *V.campbellii* showed similar antibiogram results where as *V.harveyi* isolates varied in their sensitivity to the common antibiotics used in hatcheries. Hence two different isolates, *V.harveyi* I and *V.harveyi* II of *V.harveyi* were selected for the study. All the isolates were found to be highly sensitive to chlormaphenicol and gentamycin and resistant to furozolidone. *V.harveyi* I, *V.campbellii* & *V.alginolyticus* were also found to be sensitive to oxytetracycline, norfloxacin and ciprofloxacin where as, *V.harveyi* II was found to be resistant to most of the antibiotics tested except chlormaphenicol and gentamycin. The antibiogram results are presented in Table.2.

Vibrio species have been reported to cause serious diseases of larval and post larval stages of

Penaeus monodon (Lightner, 1988). Many shrimp hatcheries use antibiotics as prophylactic agents to prevent the bacterial infection in larvae (Baticados and Paclibare, 1992). Indiscriminate use of antibiotics results in the development of resistant strains of bacteria. Mass mortality in *Penaeus monodon* larvae due to antibiotic – resistant *V.harveyi* have been reported by various researchers (Lavilla – Pitogo *et al.*, 1990; Karunasagar *et al.*, 1994). The result of the study indicates that antibiotic – resistant *V.harveyi* could be involved in the development of SHG in the post larvae of *Penaeus monodon*. Hence there is a need to reduce the use of antibiotics and to use the appropriate antibiotics in their minimum effective levels in shrimp hatcheries.

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Table 1
Results of the biochemical tests with the bacterial isolates from shrimp samples with SHG

Organisms	<i>V.alginolyticus</i>	<i>V.campbellii</i>	<i>V.harveyi</i>
Vogues – prausker	+	+	+
Lysine decarboxylase	+	+	+
Arginine dihydroxylase	-	-	-
Ornithine decarboxylase	+	-	+
Sucrose fermentation	+	-	+
D-Mannitol fermentation	+	+	+
Maltose fermentation	+	+	+
D-Xylose fermentation	-	-	-
Cellobiose fermentation	+	+	+
Swarming	+	-	+
L-Arabinose	-	-	-
Lactose fermentation	-	-	-
Salicine fermentation	-	-	-
D-Mannose fermentation	+	+	+
0% NaCl	-	-	-
0.1% NaCl	-	-	-
0.3% NaCl	-	-	-
0.5% NaCl	+	+	+
1.0% NaCl	+	+	+
2.0% NaCl	+	+	+
3.0% NaCl	+	+	+
6.0% NaCl	+	+	+
8.0% NaCl	+	-	+
10.0% NaCl	+	-	-
12% NaCl	+	-	-

Table 2
Antibiogram results of bacterial isolates from SHG samples

Antibiotics	<i>V.harveyi I</i>	<i>V.harveyi II</i>	<i>V.campbellii</i>	<i>V.alginolyticus</i>
Chloramphenicol	HS	HS	HS	HS
Furozolidone	R	R	R	HS
Norfloxacine	HS	R	HS	HS
Ciprofloxacin	HS	R	HS	HS
Oxytetracycline	HS	R	HS	HS
Gentamycin	HS	HS	HS	HS
Erythromycin	R	R	R	R

HS – Highly sensitive; R – Resistant

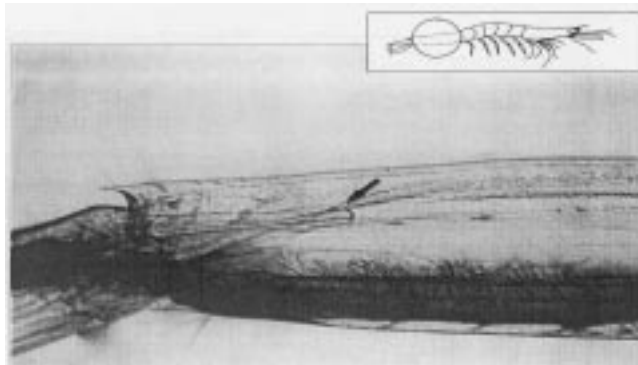


Fig.1
Normal hindgut of a healthy *Penaeus monodon* post larva

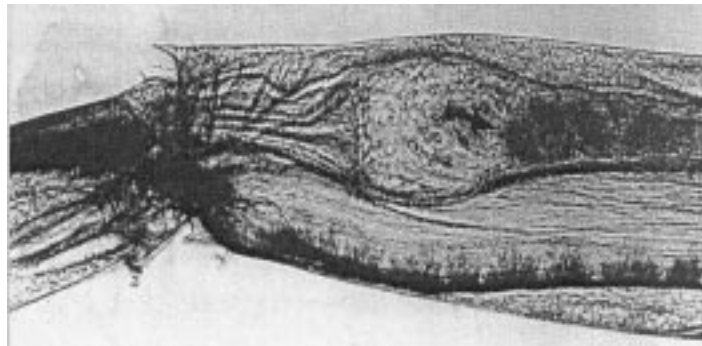


Fig.2
Swollen hindgut of an affected *Penaeus monodon* post larvae