

# Abstract of International Session

## Screening and Characterization of Photosynthetic Bacteria (PSB) for Hydrogen Sulfide Removal

Chirapongsatonkul, N.<sup>1\*</sup>, U-taynapun, K.<sup>1</sup>, Damayanti, A.F.<sup>1</sup> and Ratchapol, B.<sup>1</sup>

<sup>1</sup> Aquatic Animal Health Management Research Unit (AAHMRU), Faculty of Agriculture, Rajamangala University of Technology Srivijaya, Nakhon Si Thammarat 80110, Thailand

\* Corresponding author: [nion.c@rmutsv.ac.th](mailto:nion.c@rmutsv.ac.th), [nim\\_nion@hotmail.com](mailto:nim_nion@hotmail.com)

### Abstract

Hydrogen sulfide (H<sub>2</sub>S) is considered as a toxic substance produced under anaerobic conditions in aquaculture systems. Its accumulation can cause negative effects on aquatic organisms. This research focused on the screening and characterization of photosynthetic bacteria (PSB) that is capable to remove hydrogen sulfide in the laboratory experiment. Five isolates of PSB; G1-O, G1-OBRI, GNew3-BO, RG-YB, and RS13-Y, collected from sludges and sediments of shrimp pond, waste canal and public canal in shrimp culture areas in Nakhon Si Thammarat province were tested for its ability of hydrogen sulfide removal. Colony morphology on an agar plate and Gram stain was examined. The test bacteria were grown photoautotrophically in a modified Ormerod medium containing sulfide equivalent to 0.13 mg/L and determined for the amount of sulfide, sulfite and sulfate. The results showed that only 2 isolates, GNew3-BO and RS13-Y, could reduce sulfide while increased sulfite and sulfate were detected in the media during their growth. Moreover, the existence of sulfur functional genes (*sqr*, *pdo*, *sor*, and *sox*) was investigated. Comparable to the hydrogen sulfide removal activity, these genes were detected in GNew3-BO and RS13-Y with a pattern profile of *sqr*<sup>+</sup>/*pdo*<sup>+</sup>/*sor*<sup>+</sup>/*sox*<sup>+</sup> and *sqr*<sup>+</sup>/*pdo*<sup>+</sup>/*sor*<sup>+</sup>/*sox*<sup>-</sup>, respectively. Our findings provide a viable organism for environmentally friendly removal of hydrogen sulfide that can be applied to reduce the pollutant accumulation in aquaculture system.

**Keywords:** hydrogen sulfide, photosynthetic bacteria (PSB), aquaculture, waste treatment

# Isolation, Characterization, and Biomass Production of Thraustochytrids from Mangrove Leaves in Songkhla Province during the Summer Season

Tungse, W.<sup>1\*</sup>, Suanyuk, N.<sup>1</sup> and Nuntapong, N.<sup>1</sup>

<sup>1</sup> Aquatic Science and Innovative Management Division, Faculty of Natural Resources, Prince of Songkla University, Hat Yai, Songkhla, 90110

\* Corresponding author: [wijittra.tu@gmail.com](mailto:wijittra.tu@gmail.com)

## Abstract

Thraustochytrids are marine heterotrophic protists (Kingdom Chromista or Straminipila). They are the source of polyunsaturated fatty acids (PUFAs) suitable for application in the human health, aquaculture and nutraceutical sectors. These protists also play an important role in the food web through their degradative activities. In this study, thraustochytrids were collected and isolated from decaying mangrove leaves in two mangrove forests located in Songkhla Province. The sampling was conducted during the summer season. The results showed that *Hibiscus tiliaceus* and *Lumnitzera racemosa* were the most common mangrove leaf species, where thraustochytrids were isolated from, which the frequency of occurrence of 100% in station 1. Furthermore, 93 pure cultures were obtained from mangrove leaves. Of these, only 35 axenic cultures survived after three times of sub-culturing which they were 29 thraustochytrids isolates and 6 labyrinthulids isolates. Based on morphological characteristics, the 29 thraustochytrids isolates were classified into 2 genera i.e., *Thraustochytrium* sp. and *Japonochytrium* sp. Study on biomass production of the different thraustochytrid isolates indicated that *Thraustochytrium* sp. MURA 171 had the maximum biomass (14.20 g/L<sup>-1</sup> dry cell weight). This isolate will be selected for further study.

**Keywords:** thraustochytrid, *Thraustochytrium* sp., mangrove leave, Songkhla Province

# Effects of Ethanolic Vinasse Extract on Growth, Gene Expression, and Biofilm Formation of AHPND-Causing *Vibrio parahaemolyticus* ( $Vp_{\text{AHPND}}$ ) Strain

Damayanti, A.F.<sup>1</sup>, Chirapongsatonkul, N.<sup>1</sup> and U-taynapun, K<sup>1\*</sup>

<sup>1</sup> Aquatic Animal Health Management Research Unit (AAHMRU), Faculty of Agriculture, Rajamangala University of Technology Srivijaya, Nakhon Si Thammarat 80110, Thailand

\* Corresponding author: Kittichon U-taynapun, E-mail addresses: kittichon.u@rmutsv.ac.th, e\_aquatic1@hotmail.com

## Abstract

The outbreaks of acute hepatopancreatic necrosis disease (AHPND) causes devastating losses of shrimp farming and production. The causative agent of AHPND is the specific strain of *Vibrio parahaemolyticus* ( $Vp_{\text{AHPND}}$ ). Our previous study demonstrated that vinasse, a byproduct of bioethanol production, and vinasse extract using ethanol as a solvent are able to inhibit the growth of  $Vp_{\text{AHPND}}$  through anti-quorum sensing (QS) or quorum quenching (QQ) activity. Therefore, this study focused on the effects of ethanolic vinasse extract at various concentrations on growth, biofilm formation and expression of virulence-related genes of  $Vp_{\text{AHPND}}$ . The growth inhibitory effect was tested at 0.20%, 0.10%, 0.05% and 0.02% of the extract compared to that of the control (without the extract). The result showed that only 0.20% showed QQ activity while the lower amounts of the extract showed no effect. The concentrations of 0.20% and 0.02% were further evaluated for its effects on biofilm formation and the gene expression by using SEM and quantitative RT-PCR, respectively. Corresponding to the bacterial growth, 0.20% arrested the biofilm formation and significantly downregulated the Photobacterium insect-related (Pir) A toxin, Pir B toxin compared to the control ( $P < 0.05$ ). However, the expression level of membrane-associated transcriptional factor (ToxR) was induced in 0.20% vinasse extract. Time course expression of signal generator (LuxI) and signal receptor (LuxR) in QS were also measured. The expressions of QS-related genes in the treatments of vinasse extracts were lower than that detected in the control, however, it seemed not to be correlated to the result of bacterial growth. In conclusion, the inhibitory effects against  $Vp_{\text{AHPND}}$  depended on the amount or concentration of ethanolic vinasse extract. High enough concentration could play a role as quorum quencher while too low concentration exhibited no effect.

**Keywords:** Quorum quenching, Biofilm,  $Vp_{\text{AHPND}}$ , Vinasse

# Efficacy of Thai herbal Recipes to Accelerate Fin Regeneration in Siamese Fighting Fish (*Betta splendens*)

Malawa, S.<sup>1,2\*</sup>, Nuntapong, N.<sup>1</sup>, Waeowannajit, S.<sup>3</sup> and Thongprajukaew, K.<sup>2,3</sup>

<sup>1</sup> Kidchakan Supamattaya Aquatic Animal Health Research Center, Aquatic Science and Innovative Management Division, Faculty of Natural Resources, Prince of Songkla University, Songkhla 90110

<sup>2</sup> Center of Excellence in Agricultural and Natural Resources Biotechnology Phase 3, Faculty of Natural Resources, Prince of Songkla University, Songkhla 90110

<sup>3</sup> Division of Health and Applied Sciences, Faculty of Science, Prince of Songkla University, Songkhla 90110

\* Corresponding author: 6310630001@psu.ac.th

## Abstract

The courtship and reproductive behaviors or combating behavior encounter each other of Siamese fighting fish (*Betta splendens*) resulted in body damage and tear fins. In the current study, a half of the caudal fin of solid-red male Siamese fighting fish (1.11–1.44 g body weight) were amputated in the vertical plane. The amputated fish ( $n = 15$  per treatment) were divided to individually rear in fermented water containing eight combinations of Thai herbal recipes containing dried Indian almond (*Terminalia catappa*) leaf (IAL, 0.25 g L<sup>-1</sup>), dried banana (*Musa sapientum*) leaf (BL, 1.5 g L<sup>-1</sup>), and dried papaya (*Carica papaya*) leaf (PL, 2.5 g L<sup>-1</sup>) as major ingredients, while dried lemongrass (*Cymbopogon citratus*) leaf (LL, 1 g L<sup>-1</sup>), dried clay (50 g L<sup>-1</sup>), and salt (5 g L<sup>-1</sup>) were constant, in comparison to fish rear in non-fermented water for five weeks. The fin regeneration rate was monitored weekly, while growth performance was recorded at the end of the trial. The herbal treatments had no effect on growth (specific growth rate = 0.46% day<sup>-1</sup> on average) and feed utilization (feeding rate = 1.82% day<sup>-1</sup> on average) ( $P > 0.05$ ). The amputated fin completely regenerated fins within 35 days. However, the fin regeneration rate was statistically improved for the fish reared in combinations of IAL, BL, and PL (31–33 days) than for fish kept in non-fermented water (35.8 days) ( $P < 0.05$ ). Among these alternative treatments, red color intensity was fully redeveloped in fish reared in three herbal treatments ( $P < 0.05$ ) that all contained dried papaya leaf (BL + PL, IAL + PL, and IAL + BL + PL). Therefore, those three treatments could be applied effectively to enhance fin regeneration in betta fish.

**Keywords:** *B. splendens*, caudal fin, color development, fin amputation