

Investigation on *Vibrio harveyi* bacteria association in mortality of cultured Asian seabass (*Lates calcarifer*) in farm located in Iran Southern provinces with culture and PCR method

Ajdari, A.¹; Ghorbanpour, M.²; Peyghan, R.³; Ahangarzadeh, M.⁴ and Mirbakhsh, M.⁵

Received: 05.09.2018

Accepted: 22.12.2018

Abstract

Vibrio harveyi is of the bacterial flora of omnivorous fish intestine that is considered as one of the main causes of the Asian seabass (Barramundi) fish vibriosis disease in many cage farms in the world. The purpose of this study was to investigate the role of this bacterium in the mortality of Asian seabass fish in southern regions of the Iran. In this study, in 11 cases of Asian seabass mortality, a total of 110 Asian seabass fish (80 suspected vibriosis fishes and 30 healthy fish species) from southern provinces (Khuzestan, Bushehr and Hormozgan) were sampled and bacterial culture from the internal organs was done. Biochemical and molecular characteristics (with specific primers of genus and species) of isolates were investigated. Nine (81.81%) cases of vibrios (*Vibrio* sp). Were diagnosed as causative of mortality. The results showed that in fish with symptoms of vibriosis, 70.76% of the isolates were *V. harveyi*. Also, in the seasonal study, the prevalence of *V.harveyi*, the losses due to vibriosis and the highest prevalence of infection with this bacterium were observed in spring. The antimicrobial susceptibility test of 46 isolates of *V. harveyi* isolates was also investigated. The results of this study indicate the significant role of *Vibrio harveyi* in the mortality caused by vibriosis in Asian seabass fish farms in Iran. The results are important for prevention perspective (health management and vaccination) and the effective treatment of Vibriosis disease in Asian seabass fish, these results are important.

Key words: *Vibrio harveyi*, Asian seabass, Cage culture, Vibriosis, PCR

1- PhD Graduated of Aquatic Animal Health, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran and Expert of Iranian Shrimp Research Center, Agricultural Research, Education and Extension Organization (AREEO), Iranian Fisheries Science Research Institute, Bushehr, Iran

2- Professor, Department of Pathobiology, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran

3- Professor, Department of Clinical Sciences. Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran

4- Assistant Professor, South of Iran Aquaculture Research Center, Agricultural Research, Education and Extension Organization (AREEO). Iranian Fisheries Science Research Institute, Ahvaz, Iran

5- Assistant Professor, Iranian Fisheries Science Research Institute, Agricultural Research Education and Extension Organization (AREEO), Tehran, Iran

Corresponding Author: Ajdari, A., E-mail: a_arzhan@yahoo.com

References

- Ahangarzadeh, M.; Ghorbanpour, M.; Peyghan, R.; Sharif rohani, M. and Soltani, M. (2015). Role of *Aeromonas hydrophila* in bacterial septicemia of cultured carps in khouzeestan province. Iranian Veterinary Journal, 11(3): 5-16.
- Albert, V. and Ransangan, J. (2013). Effect of water temperature on susceptibility of culture marine fish species to Vibriosis. International Journal of Research in Pure and Applied Microbiology, 3(3): 48-52.
- Austin, B. and Austin, D.A. (2016). Bacterial fish pathogens. Disease of Farmed and Wild Fish Heidelberg: Springer, P: 652.
- Bellos, G.; Angelidis, P. and Miliou, H. (2015). Effect of Temperature and Seasonality Principal Epizootiological Risk Factor on Vibriosis and Photobacteriosis Outbreaks for European Sea Bass in Greece (1998-2013). Journal of Aquaculture Research and Development, 6(5): 338.
- Buller, N.B. (2014). Bacteria and fungi from fish and other aquatic animals: a practical identification manual. 2nd ed. CABI Publishing, Pp: 1-37.
- Chatterjee, S. and Haldar, S. (2012). Vibrio Related Diseases in Aquaculture and Development of Rapid and Accurate Identification Methods. Journal of Marine Science: Research and Development S1:002. doi:10.4172/2155-9910.S1-002
- Conejero, M.J.U. and Hedreyda, C.T. (2004). PCR Detection of Hemolysine (*vhh*) Gene in *Vibrio harveyi* Journal of General and Applied Microbiology, 50 (2004), Pp: 137-142.
- Dong, H.T.; Taengphu, S.; Sangsuriya, P.; Charoensapsri, W.; Phiwsaiya, K.; Sornwatana, T. et al. (2017). Recovery of *Vibrio harveyi* from scale drop and muscle necrosis disease in farmed barramundi, *Lates calcarifer* in Vietnam. Aquaculture, 473, 89-96.
- Gibson-Kueh, S.; Chee, D.; Chen, J.; Wang, Y.H.; Tay, S.; Leong, L.N. et al. (2012). The pathology of 'scale drop syndrome' in Asian seabass, *Lates calcarifer* Bloch, a first description. Journal of Fish Diseases, 35 (1): 19-27.
- Gomez-Gil, B.; Soto-Rodríguez, S.; Garcí'a-Gasca, A.; Roque, A.; Vazquez-Juarez, R.; Thompson, F.L. et al. (2004). Molecular identification of *Vibrio harveyi* related isolates associated with diseased aquatic organisms. Microbiology 150, 1769-1777.
- Harris, L.; Owens, L. and Smith S.A. (1996). Selective and Differential Medium for *Vibrio harveyi*. Applied and Environmental Microbiology, 62: 3548-3550.
- Humphrey, J.D.; Benedict, S. and Small, L. (2010). Streptococcosis, trypanosomiasis, vibriosis and bacterial gill disease in sea-caged barramundi at Port Hurd, Bathurst Island, July-August 2005. Industry, Fisheries and Mines, Northern Territory Government, 98.
- Lal, M.T. and Ransangan, J. (2013). Taxonomic classification of *Vibrio harveyi* using 16S rDNA and atpAgene sequencing method, International Journal of Research in Pure and Applied Microbiology, 3(1): 17-24.
- Mirbakhsh, M., Afsharnasab, M., Khanafari, A., & Razavi, M. R. (2014). Molecular identification of *Vibrio harveyi* from larval stage of Pacific white shrimp (*Litopenaeus vannamei*) Boone (Crustacea: Decapoda) by polymerase chain reaction and 16S rDNA sequencing. Iranian Journal of Fisheries Sciences, 13(2): 384-393.
- Narouie, A.; Mirdar, J.; Gharai, A. and Sanchooli, N. (2016). In vitro antibacterial effects of several plant essential oils on *Vibrio parahaemolyticus*, *Vibrio harveyi* and *Vibrio damsela*. Iranian Veterinary Journal. 12(3), Autumn, 2016.
- Noga, E.J. (2010). Fish Disease: Diagnosis and Treatment. Second ed. Wiley-Blackwell.
- Pang, L.; Zhang, X.H.; Zhong, Y.; Chen, J.; Li, Y. and Austin, B. (2006). Identification of *Vibrio harveyi* using PCR amplification of the *toxR* gene. Letters in applied microbiology, 43(3), 249-255.
- Peyghan, R. and Eftekhari manavi, Sh. (2010). Finfish and shellfish bacteriology manual: techniques and procedures, Shahid Chamran University of Ahvaz. 284 Pages. (In Persian).
- Raissy, M.; Rahimi, E.; Azargun, R.; Moumeni, M.; Rashedi, M. and Sohrabi, H.R. (2015). Molecular Detection of *Vibrio* spp. in Fish and Shrimp from the Persian Gulf. Journal of Food Biosciences and Technology, Islamic Azad University, Science and Research Branch, 5(2): 49-52.

- Ransangan, J. and Mustafa, S. (2009). Identification of *Vibrio harveyi* isolated from diseased Asian seabass *Lates calcarifer* by use of 16S ribosomal DNA sequencing. *Journal of Aquatic Animal Health*, 21(3), 150-155.
- Ransangan, J.; Lal, M.T. and Al-Harbi, H.A. (2012). Characterization and experimental infection of *Vibrio harveyi* isolated from diseased Asian seabass (*Lates calcarifer*). *Malaysian Journal of Microbiology*. 8, 104-115.
- Sharma, S.R.K.; Rathore, G.; Verma, D.K.; Sadhu, N. and Philipose, K. (2012). *Vibrio alginolyticus* infection in Asian seabass (*Lates calcarifer*) reared in open sea floating cages in India. *Aquaculture Research*. 44: 86-92.
- Tarr, Cl.; Patel, J.; Puher, Nd.; Sowers, Eg.; Bopp, Ca and Strockbine, Na. (2007). Identification of *Vibrio* isolates by a multiplex PCR assay and *rpoB* sequence determination. *Journal of Clinical Microbiology*, 45(1): 134-140.
- Tendencia, E.A. (2002). *Vibrio harveyi* isolated from cage-cultured Asian seabass *Lates calcarifer* Bloch in the Philippines. *Aquaculture Research*, 33(6): 455-458.