ACTA SCIENTIFIC MICROBIOLOGY (ISSN: 2581-3226)

Volume 2 Issue 1 January 2019

Short Communication

Vibrio Anguillarum, the Causative Agent of Vibriosis

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Received: November 20, 2018; **Published:** December 12, 2018

Vibrio anguillarum, one of the most dangerous vibrio species that causes huge loss in aquaculture industry, is a heterotrophic bacterium and a member *Gammaproteo bacteria* class under the family of *Vibrionaceae* [1-3]. *Vibrio anguillarum* is the causative agent of Vibriosis, the fatal hemorrhagic septicemia, a major disease of marine and freshwater fishes which can result in large-scale economic loss in fish farming industry [4-9]. It is dominant in the freshwater, estuarine and environments which is transmitted from fish to fish via the oral route. So, the fish species in these habitats are highly exposed to be infected by *Vibrio anguillarum* because it is highly able to infect aquatic animals [3-7]. It was first isolated by Canestrini from an eel *Anguilla anguilla* in 1893 and named it as *Bacillus anguillarum*. In 1909, Bergman named the causative agent as *Vibrio anguillarum*. It was also known as *Vibrio piscium, Achromobacter ichthyodermis, Pseudomonas ichthyodermis,* and later officially named as *Vibrio anguillarum* in 1974 [6].

It is a ubiquitous, Gram-negative, oxidase and catalase positive, and rod shaped motile bacteria, cells are typically 1-2 microns in length and 0.5 microns in width [6-7,15]. *Vibrio anguillarum* grows well in the laboratory media in the presence of 1.5-3.5% salt at an optimum temperature of 18-30°C, also grows rarely at 5 and 37°C. It produces cream-colored and yellow-colored circular, and convex colonies and grows rapidly on Tryptic Soy Agar [6,9,10]. *Vibrio anguillarum*, the causative agent of vibriosis enters into the host fish via the gastrointestinal tract to grow in the nutrient rich environment [12,13]. It was reported by Barcia., *et al*. that the *Vibrio anguillarum* grows well in the intestinal mucus of salmon where mucus cells express a number of different proteins such as outer membrane proteins and the extracellular metalloprotease [14].

A study on the complete genome sequence of *Vibrio anguillarum* reveals that the genome of *Vibrio anguillarum* consists of two circular chromosomes and one plasmid which contains 3,783 protein-coding genes and 129 RNA genes totaling 4,307,037 bp [15]. *Vibrio anguillarum* NB10 is highly virulent for *Oncorhynchus mykiss* (rainbow trout) and *Salmo salar* (Atlantic salmon) [4,20]. Some of the extracellular proteins secreted by *Vibrio anguillarum* including *vah1-plp* and *rtxACHBDE* have been found effective to contribute to virulence [11].

Vibrio anguillarum the aetiological agent of vibriosis for a number of warm- and cold-water finfish and crustacean species including *Oncorhynchus* spp., *Salmo salar*, *Oncorhynchus mykiss*, *Scophthalmus maximus*, *Dicenthrarchus labrax*, *Sparus aurata*, *Morone saxatilis*, *Gadus morhua*, *Anguilla japonica, Anguilla anguilla*, and *Plecoglosus altivelis* [16-18]. Vibriosis is still a devastating threat to the larviculture and aquaculture industry over the world in spite of having commercial vaccine *Vibrio anguillarum*-Ordalii, *Vibrio anguillarum-salmonicida* Bacterin, against *Vibrio anguillarum* and other preventive measures due to bacterial resistance to antibiotics and inefficient vaccination at the larval stage [15,17]. In this context, Rørbo., *et al*. proved that phage therapy can be an effective measure to prevent and reduce morality rate in cod and turbot larvae and concluded that the phage therapy is a promising alternative to the traditional treatment and vaccination of vibriosis in marine aquaculture [5]. At the end, we remark that additional researches should be conducted to develop more effective vaccines for the prevention and optimization of vibriosis in aquacultures for each respective fish species [19].

Beside the vaccines, application of probiotics is another way in reducing the disease occurrence caused by *Vibrio anguillarum* [21-23], such as *Vibrio alginolyticus, Pseudomonas fluorescens* and many other probiotics have been proved effective in reducing disease caused by *Vibrio anguillarum* [24-25].

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