

THE OCCURRENCE OF *AEROMONAS HYDROPHILA* IN VARIOUS MARINE ENVIRONMENTS IN TURKEY

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Abstract

In this study, the occurrence and distribution of *Aeromonas* species in sea water and sediment samples were reported regarding the studies conducted in various marine areas (the Sea of Marmara, Aegean Sea and Mediterranean Sea) of Turkey at different time periods between 2002 and 2014. The marine areas isolated *Aeromonas* spp. were evaluated with respect to the environmental conditionals, human and ecosystem health.

Keywords: *Aegean Sea, Bacteria, Marmara Sea, Mediterranean Sea, Pollution*

Introduction

Aeromonas hydrophila is found in diverse habitats, including soil, water, and is pathogenic to warm and cold-blooded animals. Aquatic environment along with seafood is thus important potential source for the transmission of *Aeromonas hydrophila* resulting in human infections. *Aeromonas* infections are one of the most common bacterial diseases diagnosed in marine and cultured freshwater fish. Virulence in *Aeromonas hydrophila* is multifactorial which consists of aerolysins, hemolysins, enterotoxins, and proteolytic enzymes which play significant role in pathogenesis. EPS, (exopolysaccharides) also play very important role in the interaction between bacteria and their environment. Despite their importance, very few studies have been done on chemical characterization of EPS produced by *Aeromonas hydrophila*. It was also used to construct a semi-specific biosensor to estimate biochemical oxygen demand (BOD) in high fat and grease content wastewaters. *A. hydrophila* cells were grown in fat containing medium to induce necessary enzymes for transport and degradation of fatty substances.

Materials and Methods:

In this study, the occurrence and distribution of *Aeromonas hydrophila* was investigated in the coastal areas of the Eastern Mediterranean the Sea of Marmara, Straits of Çanakkale and Istanbul, the northern part of the Aegean Sea and also the southern parts of Gokceada and Thasos Island, Güllük Bay, Gulf of Antalya as well as the Mediterranean (Figure 1). The samples used in the analysis were collected in a Nansen bottle that had been cleaned with acid (10% HCl in distilled water), sterilized with alcohol (50:50, v/v), and rinsed with sterile water. The sea water samples were taken in sterilized glass bottles, serial dilutions of 10⁻⁵ were prepared in 9-mL amounts of sterile seawater (artificial seawater, Sigma) and inoculated (0.2 mL) in duplicate on marine agar (Difco), and the plates were incubated for 5 days at 22 ± 0.1°C. The identification of the isolates were carried out using VITEK 2 Compact 30 (bioMérieux, France).

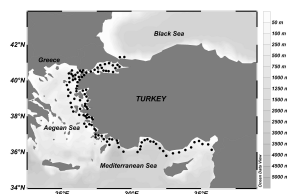


Fig. 1. Location of sampling sites in various marine areas of Turkey.

Results and Discussion

The presence of *A. hydrophila* in the 80 units of seawater samples, which were taken from 22 stations in the Southern part of the Sea of Marmara, was analyzed in 2006-2007 [1]. The occurrence of *A. hydrophila* in the 22 units of seawater samples from coastal areas in the Aegean Sea and 14 units of seawater samples from the Eastern Mediterranean, Turkey were investigated during the months of August in 2007 and 2008 [2]. The occurrence of *A. hydrophila* was investigated in the 83 units of seawater samples which were taken from various depths ranging from 0-30 cm to 500 m in the northern

part of the Aegean Sea in 2006 and 2007. Seven unit samples were taken from the offshore areas extending from the eastern part of Andros Island to the southern part of Gokceada and Thasos Island in 2007 and 2008 [3]. The occurrence of *A. hydrophila* was investigated in the 175 units of seawater and 86 sediments samples which were taken from various depths ranging from 0-30 cm to 50 m Güllük Bay and coastal areas part of the Aegean Sea in 2012 and 2013 [4]. The presence of *A. hydrophila* in the 304 units of seawater samples which were taken from 82 stations in the Sea of Marmara, Turkey were investigated in 2008 and 2014 [5,6]. The occurrence of *A. hydrophila* was investigated in the 144 units of seawater samples which were taken from various depths ranging from 0-30 cm to 200 m Gulf of Antalya part of the Mediterranean in 2009 and 2010 [7]. Occurrences of pathogenic bacteria have potential negative effects on the ecosystem and also on human health. Terrestrial sourced pollution, over-use of living aquatic resources and habitat destruction have been considered as the three greatest menaces to the world's oceans. The occurrence and distribution rate of the *A. hydrophila* showed that the areas sampled under the influences of sewage-contaminated waters. *Aeromonas* is predominant in waters with high levels of fecal pollution and it has therefore been claimed that the presence of *Aeromonads* can assist in assessments and predictions of aquatic system deterioration or recovery.

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