

Prevention of marine environment pollution at the tourism regions by the application of a simple method for the domestic wastewater

Günay Kocasoy*, Hatice İmer Mutlu, B. Aylin Zeren Alagöz

*Boğaziçi University, Institute of Environmental Sciences, Hisar Campus, 34342 Bebek, Istanbul, Turkey
Tel. +90 212 359 44 76; Fax +90 212 257 50 33; email: kocasoy@boun.edu.tr*

Received 18 January 2007; revised accepted 20 March 2007

Abstract

Diffuse pollution generated from the coastal tourism areas is one of the significant threats for the marine environment. Besides the accommodation facilities discharging the generated wastewater into the sea without any treatment, the summer resorts of the coastal areas also deteriorate the coastal waters. Since most of the summer resorts do not have any sewage system, it is difficult to control these non-point sources.

The research was conducted in two phases at selected two beaches and a coastal village having summer resorts in Çeşme, Turkey. In the first phase, seawater quality was monitored while the wastewater was discharged/seeped into the marine environment without any treatment. In the second phase, besides the construction of the treatment plants for the wastewater of the facilities, willow trees were planted in the soil near the septic tanks of the summer resorts. During the study, the sea quality was monitored by samples collected during the peak seasons as well as during the low seasons to determine the effect of the population increase on the seawater quality. Growth rates of the foliage and trees were also followed up.

During both phases of the research, a questionnaire was distributed to the tourists and the local people to determine the types and the number of incidences of the waterborne diseases they faced. The waterborne disease incidence is actually increasing worldwide, promoted by both natural phenomena and human activities including sewage disposal. This study verified that even small increases in the degree of microbial pollution in seawater results to a considerable increase in the number of waterborne disease incidences. This is a very important observation especially for developing countries which depend economically mainly on tourism.

In this study, the results indicated that by the operation of the treatment plants and the application of the willows, the seawater quality was improved and the seaborne disease incidences caused by the sewage disposal were reduced significantly.

Keywords: Domestic wastewater treatment; Marine pollution; Non-point source; Public health; Septic tank; Tourism; Willow

*Corresponding author.

Presented at the 10th IWA International Specialized Conference on Diffuse Pollution and Sustainable Basin Management, Istanbul, Turkey, 18–22 September 2006.

1. Introduction

Marine environment is one of the significant media that should be protected from the pollution. It has been considered as a proper media for the discharge of the wastewater as well as the disposal of the solid wastes for a long time. Beside these, other major sources of the marine environment are rural and coastal tourism areas which discharge their sewages into the environmental without any treatment and deteriorate the seawater quality significantly. This affects the aquatic life negatively and threatens the public health severely [1].

Tourism, especially coastal tourism, is an important industry for many countries. It is a prospective investment for governments that have many expectations such as the development of the new sites, creation of new job opportunities for the local people and increasing the income of foreign currents into the country. They, in order to fulfill these expectations, encourage both public and private sectors for the establishments of facilities such as hotels, motels, etc. Most of the time, these facilities discharge their wastewater into the sea directly without any treatment. While the majority of the tourists prefer to spend their holidays at the coastal areas, 60 percent of the large cities are located by the sea and two thirds of the world population is living along the coasts. Most of these houses/residents have septic tanks for the disposal of wastewater which seeps into the soil and reaches the marine environment in an uncontrolled way [2,3].

Turkey being a Mediterranean country surrounded by seas — the Aegean Sea, the Mediterranean Sea and the Black Sea — has a great tourism potential because the coastal zones have many recreational amenities for both local and foreign tourists [4].

In order to find the effects of the increased population, and thus increased amount of wastewater on the seawater quality and the health of tourists, a research was conducted at the two beaches and a village of summer resort in Çeşme

located on the Aegean Coast of Turkey to compare the quality of the seawater and the health problems faced before and after the necessary wastewater treatment methods were applied.

2. Materials and methods

2.1. Site selection

In the present study, the tourist resort of Çeşme, Turkey is selected as the experimental site. Çeşme is located on the coast of the Aegean Sea. It is one of the most popular and important tourist resort. While the permanent population of the town is 10,124, it is estimated that during the summer season (between May and October which is the peak season) the population reaches to approximately 150,000 [5]. Two beaches having many hotels, motels for the tourists visiting the area and a village named Gülbahçe having summer resorts/houses were selected as the survey areas. Three stations close to each other and approximately 10–15 m from the shore were selected for sampling seawater at each of these areas. The depth of the sea at the selected stations were approximately 1.5–2.0 m. Samples were collected from a depth of approximately 15 cm — a significant depth from the public health point of view — because people usually swallow water which is within the upper 15 cm layer [6]. Location of the sampling points of the beaches and the village is presented in Fig. 1.

2.2. Determination of seawater quality

In order to determine the quality of the seawater, equal amount of samples were collected monthly at all three stations selected at each survey area and were mixed to obtain a typical sample of that particular survey area. In this survey the recommendations and the criteria described in “Health Criteria and Epidemiological Studies Related to Coastal Water Pollution” are followed [6]. Five hundred milliliter glass bottles with

Download English Version:

<https://daneshyari.com/en/article/627684>

Download Persian Version:

<https://daneshyari.com/article/627684>

[Daneshyari.com](https://daneshyari.com)