

# THE LEVELS OF INDICATOR AND PATHOGEN BACTERIA IN MOLLUSK *UNIO PICTORUM* (LINNAEUS 1758) AND SURFACE WATER

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## Abstract

Indicator and some pathogen bacteria were investigated in both freshwater mussel, *Unio pictorum* (Linnaeus 1758) and water from five stations in the Buyukcekmece Lake, Turkey. *Helicobacter pylori*, *Staphylococcus aureus* and *Salmonella* spp. were isolated in three samples of 36 *Unio pictorum* samples over a one year period. The highest *Enterobacteriaceae* numbers were found in August and September in both *Unio pictorum* and water samples.

**Keywords :** *Bacteria, Bio-indicators, Mollusca.*

## Introduction

*Unio pictorum* (Common name: Painter's mussel) is relatively tolerant to polluted waters and can be the sole unionoid present in waters immediately downstream of sewage outfalls [1]. The Buyukcekmece Lake has been isolated via a coastal barrier from the Marmara Sea in 1985 for the purpose of providing water supply and drinking water. In this study, the level of bacteriological pollution was evaluated in this specific indicator organism (*Unio pictorum*) and surface water collected from the Buyukcekmece Lake.

## Material and Methods

*Unio pictorum* samples were collected at approximately 5-10 meters depth at selected stations and transported to the laboratory between January to December 2005. Water samples were taken [2] from the surface (0-20 cm). Analyses were carried out according to previously described methods [3-5].

## Results and Discussion

The highest bacterial abundance was  $24 \times 10^3$  cfu/100 mL in *Unio pictorum* samples in August and September.

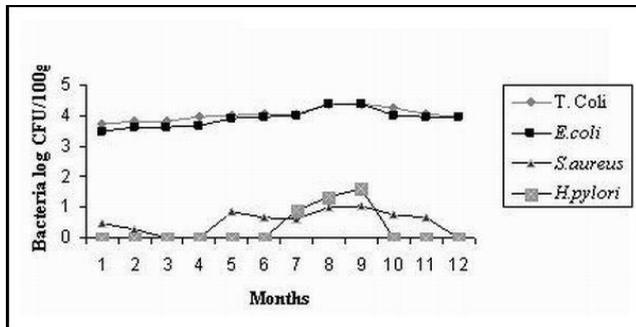


Fig. 1. Levels of total coliforms, *Escherichia coli* and *H. pylori* in samples of *Unio pictorum* collected in the Buyukcekmece Lake, Turkey during one year (2005).

The highest total coliform was found in water samples amounting to  $18 \times 10^2$  MPN/100 mL in September.

There were no significant differences in the values among the sampling stations. However, mussel samples contained more coliform, *E. coli* and pathogen bacteria than the surrounding water during the sampling period. This situation has led to the thought that there is more accumulation in organisms with respect to their environment, due to the sensitiveness of organisms to environmental contamination and their accumulation feature [6, 7].

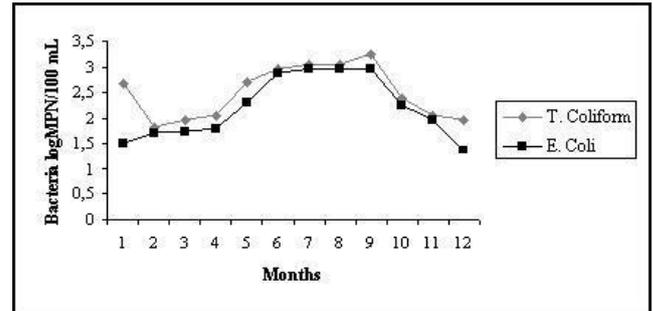


Fig. 2. Levels of Total Coliforms, *E. coli*, in water samples collected in the Buyukcekmece Lake, Turkey. MPN/100 mL (2005).

It is also related to the probability that when the bacterial number in aquatic environment decreases, the number of CFU/ml in the medium also decreases because of the high substrate concentration [8]. There are no preliminary studies with which we can compare and discuss our determinations in this area. Monitoring microbial qualities of these areas is important in terms of saving natural resources and usage of the products which have economical importance.

## References

- 1 - Killeen I., Aldridge D., and Oliver G., 2004. Freshwater bivalves of Britain and Ireland. Cambridge University, pp 44-46.
- 2 - Anon, 1996. Manuel of aquatic products quality control. Ministry of Agriculture and Rural Affairs, Ankara, Turkey.
- 3 - FAO 1992. Manuel of Food Quality Control 4, Rev 1, Microbiological Analyses. Food and Agricultural Organization of the United Nations, Rome.
- 4 - FDA, 1998. Bacterial Analytical Manual 8<sup>th</sup> ed. Revision A. AOAC International, Washington, D.C.
- 5 - Harrigan W.F., 1998. Laboratory Methods in Food Microbiology, Academic Press, San Diego.
- 6 - Altug G. Bayrak Y., 2002. Determination of the levels of indicator bacteria and *Salmonella* spp. in *Chamelea gallina*, L. and seawater on the coastline of Sile, Turkey, Journal of the Marine Biology United Kingdom Association (JMBA), 82:4, 673-674.
- 7 - Straskrabova V., 1993. Function of bacteria and bacterial activity in lakes. ILEC / UNEP International training course limnological bases of lake management, Tihany, Hungary, pp. 80-83.
- 8 - Martinez, M.E., Egea, F., Castro, D., Morinigo, M.A., Romeo, P., and Borrego, J.J., 1991. Accumulation and depuration of pathogenic and indicator microorganisms by the bivalve mollusc *Chamelea gallina* L. under laboratory conditions *Journal of Food Protection USA* 54: 612-618.