

# SEASONAL DISTRIBUTION OF COPPER IN *MYTILUS GALLOPROVINCIALIS* IN BAYS OF NORTHERN AEGEAN SEA

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## Abstract

In the current study, samples of *Mytilus galloprovincialis* ( *Mollusca* ) were taken periodically in each season from 11 stations on bays of Northern Aegean Sea (Çandarlı, Dikili and Edremit Bays ) between August 2002 and November 2003. ANOVA - Analysis of variance was done for analyzing copper in mussels. Results of ANOVA showed that there was no significant difference in Cu levels in mussels among the stations and seasons (  $p < 0.05$  ). Cu level in the mussels was found as 0.43 - 0.84  $\mu\text{g/g}$  wet weight.

**Keywords :** Aegean Sea, *Mollusca*, Bio-indicators, Pollution.

## Introduction

Izmir Bay has been the only region where marine pollution is being studied well for the reason that it is focus of rapid population increase, developed industry and tourism activities. Aliaga Seaport which is located on one of the counties of Izmir hasn't draw attention although there are intensive industrial activities, petrol refinery, and similar facilities in it. Similarly, other ports and bays on Aegean Sea has not been studied enough so far. The current study aimed to investigate copper pollution in the region.

## Study area

11 sampling stations were established in order to detect Cu levels deposited in *M. galloprovincialis* distributing in Northern Aegean Sea. Sampling stations were chosen considering the distribution of mussels and pollution sources. The stations are located between the coordinates of N 38° 44.404/E 026° 46.760 (Sazlıca Beach in Yeni Foça) and N 39° 34.990/E 026° 55.395 (Akçay Port).

## Material and Methods

Individuals of *M. galloprovincialis* ( Mediterranean mussel ) which is an indicator species served as material in investigating copper pollution in Northern Aegean Sea between August 2002 and November 2003. Crusts of the mussel samples harvested from the field by hand were cleaned in the laboratory with a stainless steel lancet so that any organism or other remnants would not remain on them. Then, they were washed in tap water and pure water and they were dried out filter paper and weighted. They were stored in sealed bags in deep-freeze at -21 °C prior to the analyses. Modified EPA - 3051 method was used in preparing the mussel samples to measurements in AAS [1]. Before starting analyses, the mussels were taken from the deep-freeze and warmed to ambient temperature. Then, they were dissected in order to investigate the amount of copper distributed in total soft tissues of the mussels. 0.5 gram of homogenized mussel samples was placed in cups of microwave device and decomposed by adding 10 ml of nitric acid of 65% purity. Decomposed mussel samples were stored in polyethylene bottles at +4 °C prior to the measurement procedure. They were measured using Varian SpectrAA 300/400 Plus Atomic Absorption Flame Spectrometer.

## Results

Cu concentration in mussel soft tissues was measured for 11 stations in several bays on Northern Aegean Sea ( Çandarlı, Dikili and Edremit Bays). The lowest concentration of Cu in the mussel samples was detected in Sazlıca Beach in November 2002 with a value of 0.43  $\mu\text{gCu/g}$  wet weight and the highest one in Dikili Harbor in February 2003 with a value of 8.4  $\mu\text{gCu/g}$  wet weight. Results of ANOVA showed that there was no significant difference in Cu levels in mussels among the stations and seasons (  $p < 0.05$  ). It has been observed that Cu concentration in mussel soft tissues varies depending on developmental stage of the organism and the region in which pollution is dense.

## Discussion

It has been reported that Aegean Sea is subjected to heavy metal pollution and other kinds of pollution arising from numberless settlement and industrial constructions around it [2, 3]. The main sources of pollution contributing to pollution load in Aegean Sea are industrial constructions in Izmir and Aliaga. Other sources are regarded as minor pollution sources [4]. *M. galloprovincialis* can grow easily in clean and semi-clean waters as well as in the regions with dense pollution. It is very important for

us in that it can provide information on pollution in communities in hard substrata. As mussel is an organism feeding by filtering their food, it is a very good indicator species in studying marine pollution. It is a very important benthic organism in determining hem structure and composition of the pollution [5]. The lowest concentration of Cu in the mussel samples was detected in Sazlıca Beach in November 2002 with a value of 0.43  $\mu\text{gCu/g}$  wet weight and the highest one in Dikili Harbor in February 2003 with a value of 8.4  $\mu\text{gCu/g}$  wet weight. Acceptable amount of Cu in marine products in several countries ranges between 10 and 30  $\mu\text{gCu/g}$ . In the current study, amount of Cu in of *M. galloprovincialis* was found to be between 0.53 and 8.4  $\mu\text{gCu/g}$  wet weight. Amount of Cu in samples collected from all stations was found to be lower than acceptable limits. Additionally, one can argue that these amounts are lower than those found in other studies although the region is under risk due to industrial activities and intensive and uncontrolled urbanization.

## References

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