^{210}PO AND HEAVY METAL (ZN, CU, FE, CD, MN, NI, PB, CR) CONCENTRATIONS IN MUSSELS (*MYTILUS GALLOPROVINCIALIS*) AND SEDIMENTS IN DIDIM

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Abstract
The trend of marine pollution levels to increase worldwide requires control strategies and routine monitoring of radionuclides and heavy metals in the marine environment. Estimation of marine pollution levels is based on measurements of the abundance and bioaccumulation of metals and radionuclides in water, sediment and selected marine organisms.In this study, concentrations of ^{210}Po and heavy metal (Zn, Cu, Fe, Cd, Mn, Ni, Pb, Cr) have been measured in mussels (*Mytilus galloprovincialis*) and sediments collected from Didim (Aegean Sea) monthly. Our obtained results were higher than the literature.
Keywords : Aegean Sea, Bio-indicators, Pollution, Radionuclides, Sediments.

In the marine environment ^{210}Po ($t_{1/2}$= 138.4 d) is mainly resulted in the decay of ^{210}Pb deposited from the atmosphere. These radionuclides are daughter products of ^{222}Rn, which is released from the earth's crust to the atmosphere. ^{210}Po can be also introduced by radioactive decay of ^{226}Ra and ^{222}Rn that diffuse from the sediment. Part of it is scavenged from the water by particles and removed to the sediment (1, 2).
Most of the particle-reactive radionuclides released into the aqueous phase eventually reach the sediments. The accumulation, retention and transport of particle reactive radionuclides is strongly associated with sediment and sedimenting particles (3).
^{210}Po becomes highly concentrated in marine organisms and can contribute significantly to human radioactivity exposure through seafood consumption.
It is well known that, many organisms have the potential to bioaccumulate heavy metals from ambient waters to extremely high levels. In previous studies with mussels, mainly the soft tissue of *Mytilus* spp has been considered as a potential *biomonitor* for monitoring metallic contamination in marine ecosystems (4, 5, 6, 7).

Fig. 1. The map of sampling location.

In our project supported by IAEA, ^{210}Po concentrations of mussel and sea water samples obtained from Didim station, on the coast of Aegean Sea, were found higher than the other stations. Therefore, our research has been emphasized on Didim station and ^{210}Po concentrations of marine samples are measured monthly to determine the sources of marine pollution in this area.
Sampling for mussels (*Mytilus galloprovincialis*) and bottom sediments has continued at Didim in Aegean Sea indicated in Figure 1.
For mussel (*Mytilus galloprovincialis*) samples, in order to minimize the effect that size (age) exerts on the radionuclide concentrations; specimens of standard size in groups were selected.
Sediment samples were taken by bottom-grap. Each sample is oven-dried to constant weight and was sieved before analysis.
Concentrations of ^{210}Po and heavy metal were determined monthly in sediments and the edible muscle tissue of mussel samples. After applying chemical procedure with some acids, polonium was spontaneously plated onto a copper discs. Measurements of ^{210}Po were realized through its 5.30 MeV alpha particle emission, using ^{209}Po (4.88 MeV alpha emission, $t_{1/2}$= 109 a) as the internal tracer. ^{210}Po was measured by alpha spectrometry using a Passivated Implanted Planar Silicon detector (PIPS). Heavy metal concentrations (Zn, Cu, Fe, Cd, Mn, Ni, Pb, Cr) were measured by ICP-OES.
According to obtained results until now, the concentrations of ^{210}Po in mussels *(Mytilus galloprovincialis)* and sediments were come up to 2002 $\pm$ 60 Bq kg^{-1} and 79 $\pm$ 8 Bq kg^{-1}.

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