

CS-137 AND CS-134 CONTENT IN THE FISH OF THE NEUM-KLEK BAY

SADRŽAJ CS-137 I CS-134 U RIBI
IZ ZALJEVA NEUM-KLEK

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This paper gives the survey of the content of the fission radionuclides Cs-137 and Cs-134 in the sea fish of the Neum-Klek Bay. Fish samples equaled 5 kg. Gammasspectrometric measurement was performed with high resolution (1.95 KeV) and 25% efficiency HPG detector connected to the 4096-channel analyzer and computer.

Analysis of results shows the presence of both fission radionuclides (Cs-137 and Cs-134) in all tested samples. The Cs-137 concentration ranges from 0.16 to 1.90 Bq/kg and the Cs-134 concentration from 0.08 to 0.28 Bq/kg.

INTRODUCTION

Marine organisms are directly dependent on the content of certain substances present in the surrounding water. The radioactive matter content in the sea water has a direct influence on the concentration of radioactivity in marine fish. All fish accumulate radionuclides in the concentrations much higher than those in the ambient water around them (C o h e n , 1985; W o o d h e a d , 1973). The accumulation of the fission radionuclides in the Klek-Neum Bay fish indicates an additional radiocontamination of that bay.

In spite of the considerable dilution in the sea water, along with the natural radioactive elements, the fish contain the fission radioactive elements which may reach

human organisms through ingestion of thus contaminated fish (H o r š i ć , 1977).

RESULTS AND DISCUSSION

Specific conditions of the Klek-Neum Bay are the reason for the presence of different marine organisms.

Radionuclides reached the sea water and accumulated in fish in concentrations much higher than those in the water. Generally speaking, radionuclides come into the fish by two pathways. The first pathway is passive filtration of the sea water, and second one is including of radionuclides on the fish skin and gills (P o s t o n and K l o p f e r, 1988).

The Cs-137 and Cs-134 contents are given in Table 1.

Table 1. Cs-137 and Cs-134 activity (Bq/kg) in some sea fishes

Species	Cs-137	Cs-134
<i>Sardina pilchardus</i>	1.15 ± 0.09	0.27 ± 0.13
<i>Trachurus trachurus</i>	0.54 ± 0.09	< 0.15
<i>Mulus surmuletus</i>	0.25 ± 0.08	0.08 ± 0.02
<i>Trisopterus minutus capelanus</i>	0.49 ± 0.09	0.13 ± 0.06
<i>Merluccius merluccius</i>	1.90 ± 0.11	0.25 ± 0.07
<i>Spicara maena flexuosa</i>	0.16 ± 0.08	< 0.15
<i>Lophius budegassa</i>	0.33 ± 0.13	0.17 ± 0.08
<i>Mugil cephalus cephalus</i>	0.57 ± 0.24	0.22 ± 0.15
<i>Diplodus annularis</i>	< 0.48	< 0.28

The results indicate that the both of these fission radionuclides are present in all tested samples. The lowest radioactivity of Cs-137 (0.16 Bq/kg) was found in *Spicara maena flexuosa*, and the highest activity (1.90 Bq/kg) in *Merluccius merluccius*.

The highest content of Cs-134 was found in *Sardina pilchardus* (0.27 Bq/kg) and the lowest in *Mulus surmuletus* (0.08 Bq/kg).

CONCLUSION

1. The both radionuclides, Cs-137 and Cs-134, were present in all tested fish samples, that indicate, in spite of dilution in large amount of sea water, the possibility of their accumulation in hydrobiota.
2. Presence of Cs-134 indicates that the radioactive contamination originated from the Chernobyl incident.

REFERENCES

- C o h e n , B.L. 1985. Bioaccumulation factors in marine organisms. *Health Phys.*, 49: 1290-1294.
- H o r š i ć , E. 1977. Kontaminacija riba Sr-90 i Cs-137. *Veterinaria*, 26: 574-581.
- P o s t o n , M.T. and D.C. K l o p f e r. 1988. Concentration factors used in the assessment of radiation dose to consumers of fish: A review of 27 radionuclides, *Health Phys.*, 55: 751-766.
- W o o d h e a d , D.S. 1973. Levels of radioactivity in the marine environment and the dose commitment to marine organisms. IAEA-SM-159/31.

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SADRŽAJ CS-37 I CS-134 U RIBI IZ ZALJEVA NEUM-KLEK

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KRATKI SADRŽAJ

Morski organizmi su direktno ovisni o sadržaju određenih supstanci prisutnih u morskoj vodi koja ih okružuje. Radioaktivne materije sadržane u morskoj vodi imaju direktni utjecaj na koncentraciju radioaktivnosti u morskim ribama. Sve ribe akumuliraju radionuklide u koncentraciji mnogo većoj nego što je ona u ambijentalnoj vodi oko

njih. Akumulacija fisijonih radionuklida u ribama zaljeva Klek-Neum ukazuje na dodatnu radiokontaminaciju tog zaljeva. Usprkos određenom razrijeđenju u morskoj vodi, usporedno sa prirodnim radioaktivnim elementima, ribe sadrže i fisijone radioaktivne elemente koji mogu dospjeti u humani organizam preko ingestije tako kontaminirane ribe. Ovaj rad daje pregled sadržaja fisijonih radionuklida Cs-137 i Cs-134 u morskim ribama zaljeva Klek-Neum. Uzorci ribe su bili težine 5 kg. Gamasppektrometrijska mjerenja su obavljena sa HPG detektorom visoke rezolucije (1.95 KeV) i 25% efikasnosti, povezanog sa 4096-kanalnim analizatorom i kompjuterom.