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ENVIRONMENTAL FACTORS AND LIVING ORGANISMS

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- The Biosphere is exposed on the influences of different impacts.
- In a study of global atmospheric changes one of the main tasks is the evaluation of their complex effect on the biota.
- The prolonged influence of one or several harmful factors (even with low intensity) on the organisms reduce their compensatory adaptive possibility.
- Among the main environmental factors are the radiation and chemical influences –both can cause genetic damages.

Some Results up to now

Radiation influence

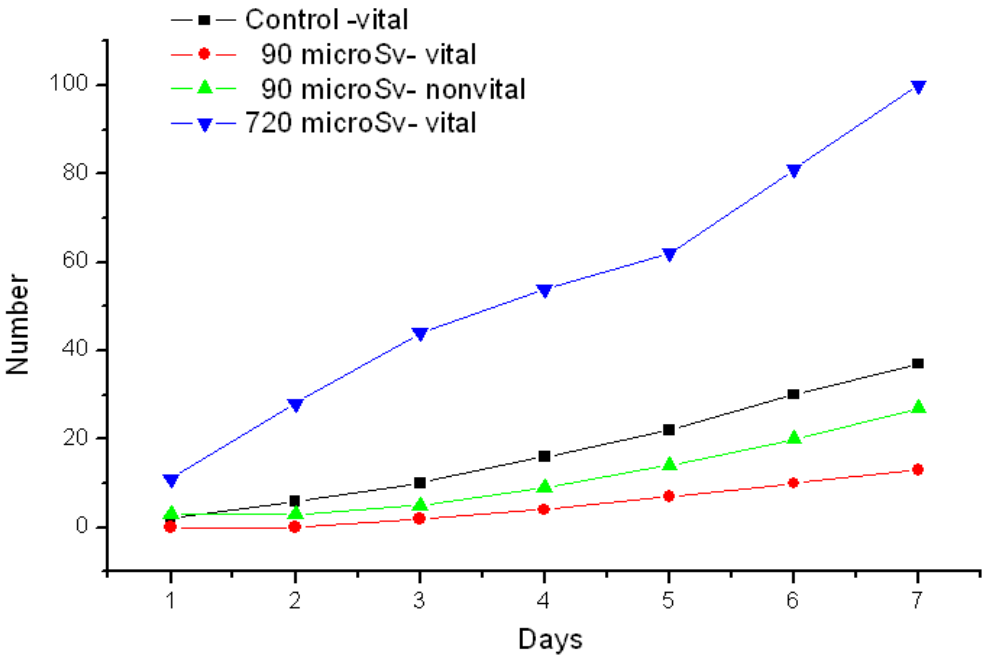

Fig.1 Influence of different increasing doses of gamma-radiation on the development of M.arenaria

- The use of gamma-radiation sources aimed the investigation of low doses gamma radiation (corresponding to 100 times higher background) on the organisms.
- The gamma radiation dose of 90 μSv retains the development of the organisms.
- The complete inhibition of the process has been observed at 1800 μSv doses.

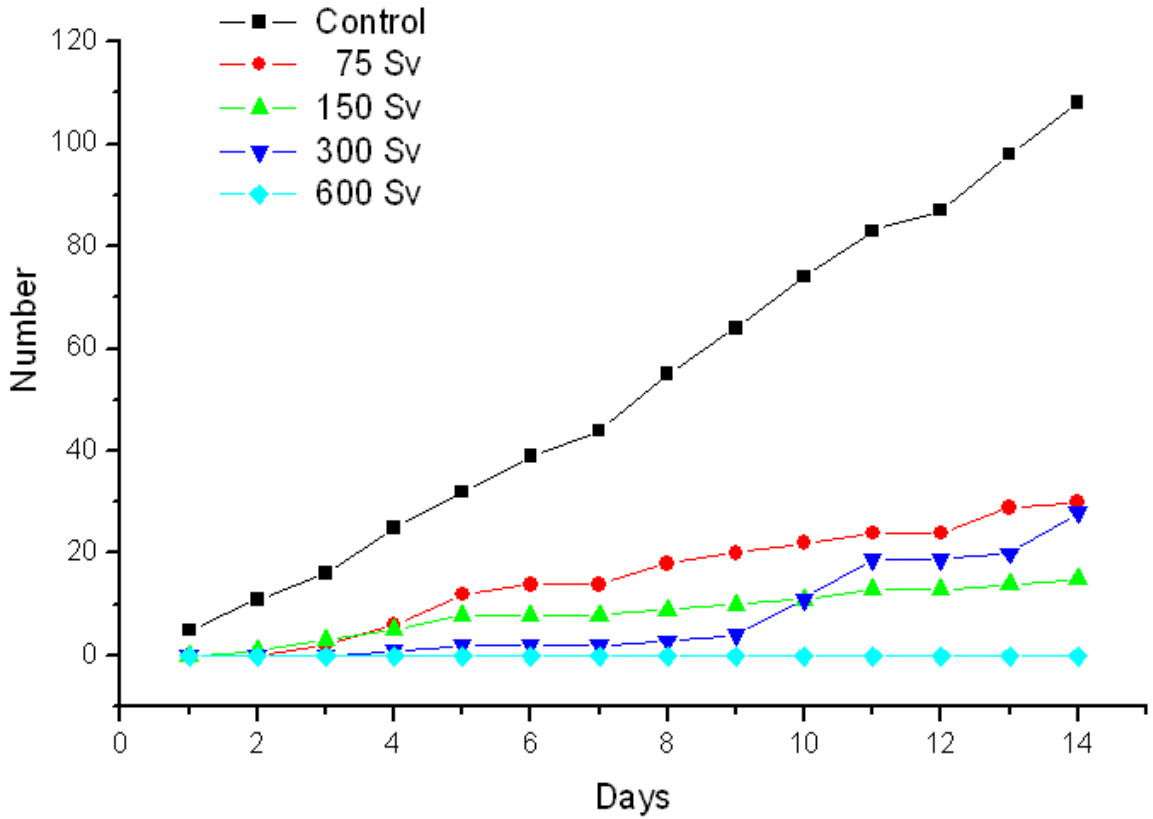

Fig.2 Influence of increasing doses of alfa-radiation on the development of M.arenaria

- The impact of the increasing doses of α – radiation gradually reduce the number of the organisms.
- The dose higher than 150 Sv has a stronger effect and the dose of 600 Sv stop their development.

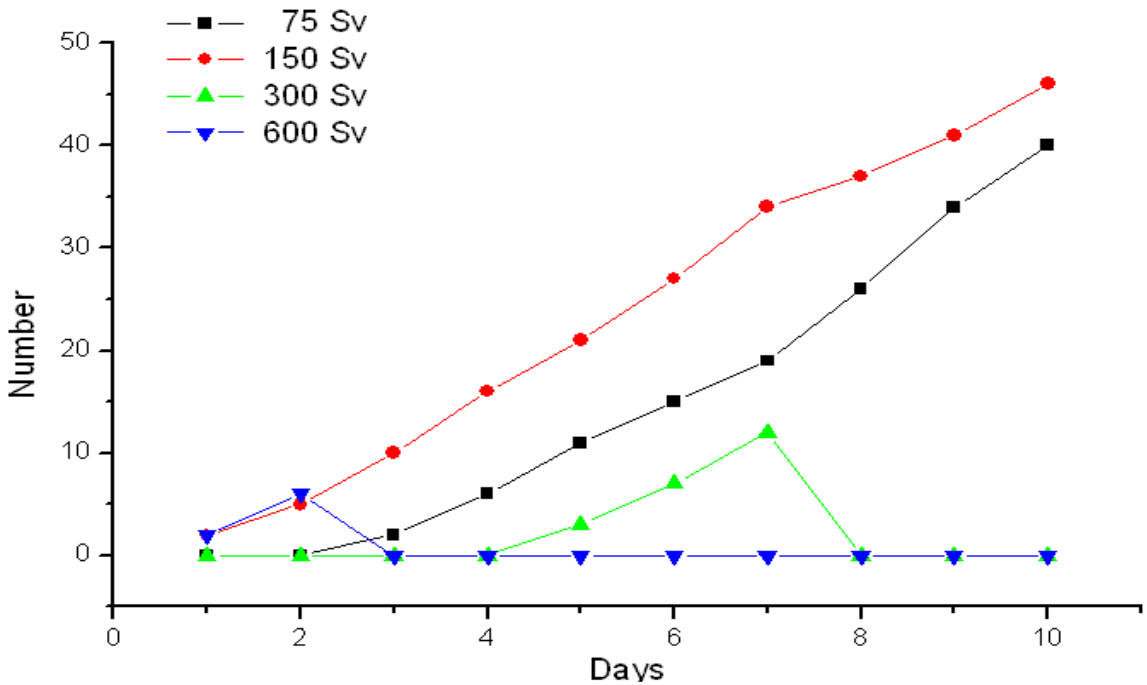

Fig.3 Influence of increasing doses of alfa-radiation on the development of M.arenaria protected by glycoproteid membrane

- In the process of investigations a presence of protective mechanism has been observed in the organisms- glycoproteid membrane is active till the dose of 400 Sv.
- Part of the effects observed probably are due to the development in the process of evolution of a protective mechanism in order to adapt the organisms to the modifying of the radiation background.

Influence of chemical elements

- Chemical elements are transferred on the Biosphere from the original sources to the ecosystems until they reach an equilibrium.
- Accumulation of chemical elements from anthropogenic origin have the potential to disturb the delicate balance attained within the organisms.
- Some of the elements with high accumulative capacity (Pb,Hg,Cu,V etc.) in high doses disturb the balance within the organisms.


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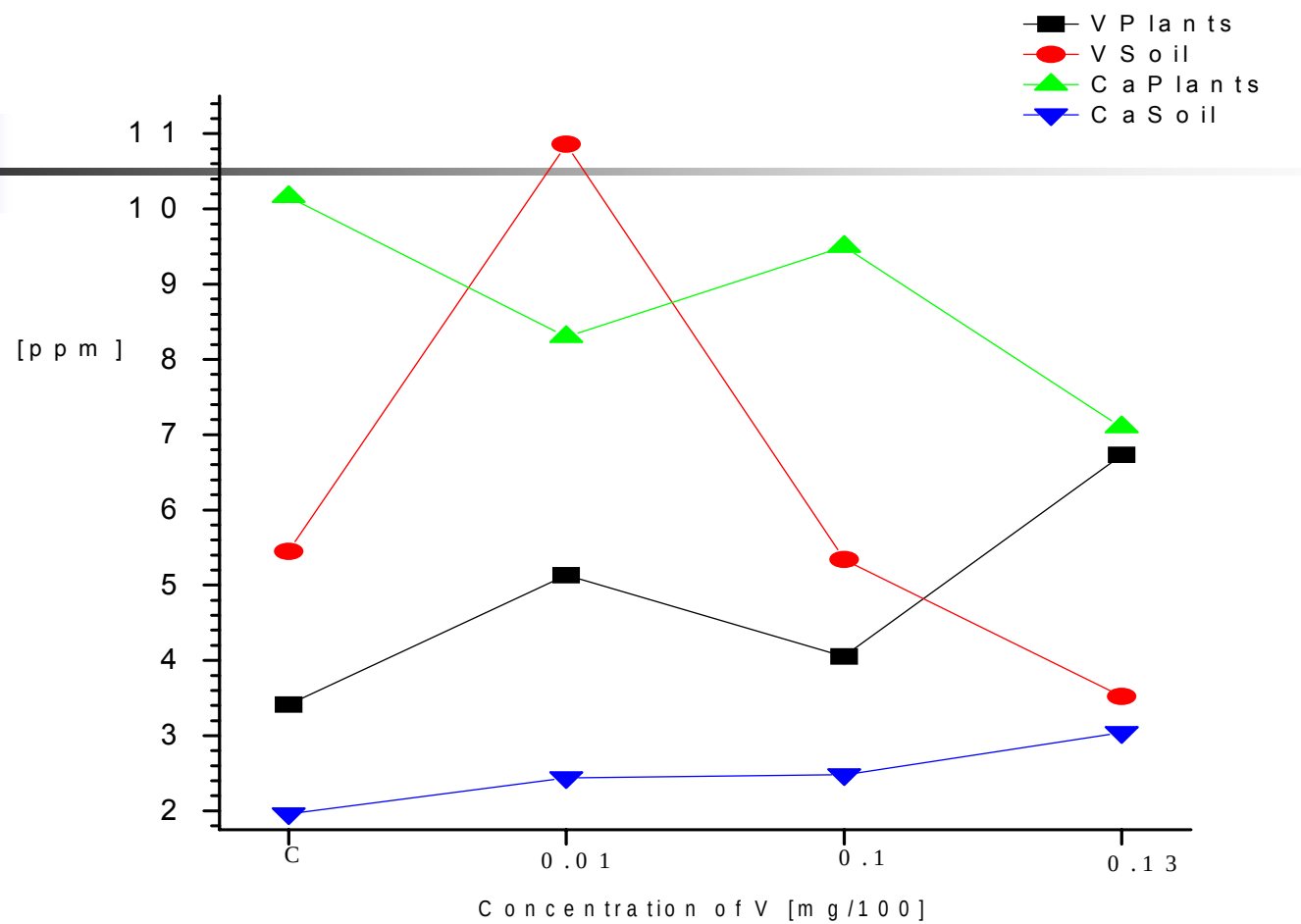

Fig.4 Content of V and Ca in Tiny Tim whole plants and soil (ppm dw)

Additional input of Vanadium to the soil causes a high accumulation of the element in the plants.

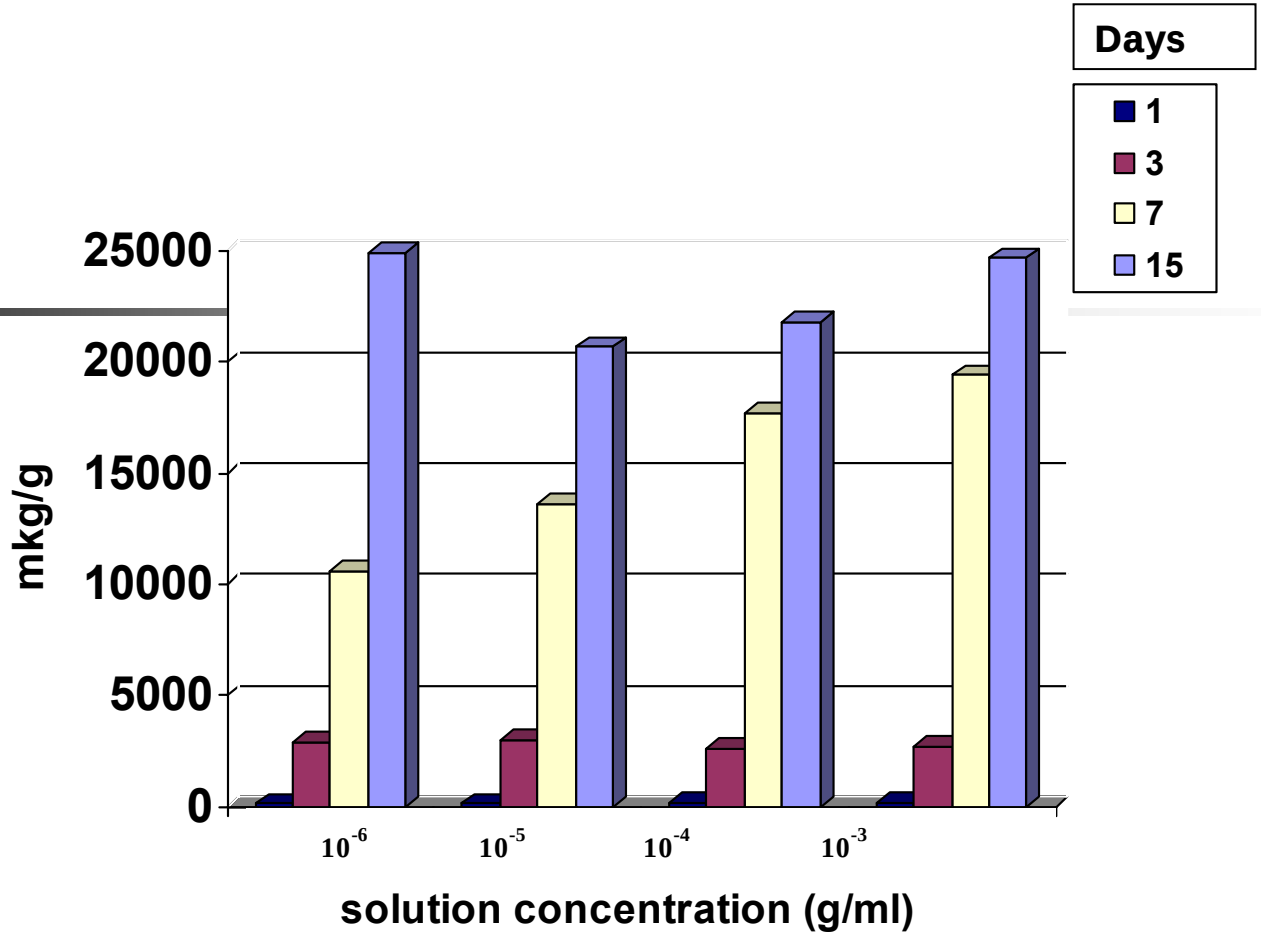

Fig. 5 Dynamic of the accumulation of different concentration of Cu in F.antipyretica

The accumulation of Cu reach constant high level in two weeks time independently of the concentrations used

The Cu accumulation gives rise to a disbalance in the microelement content

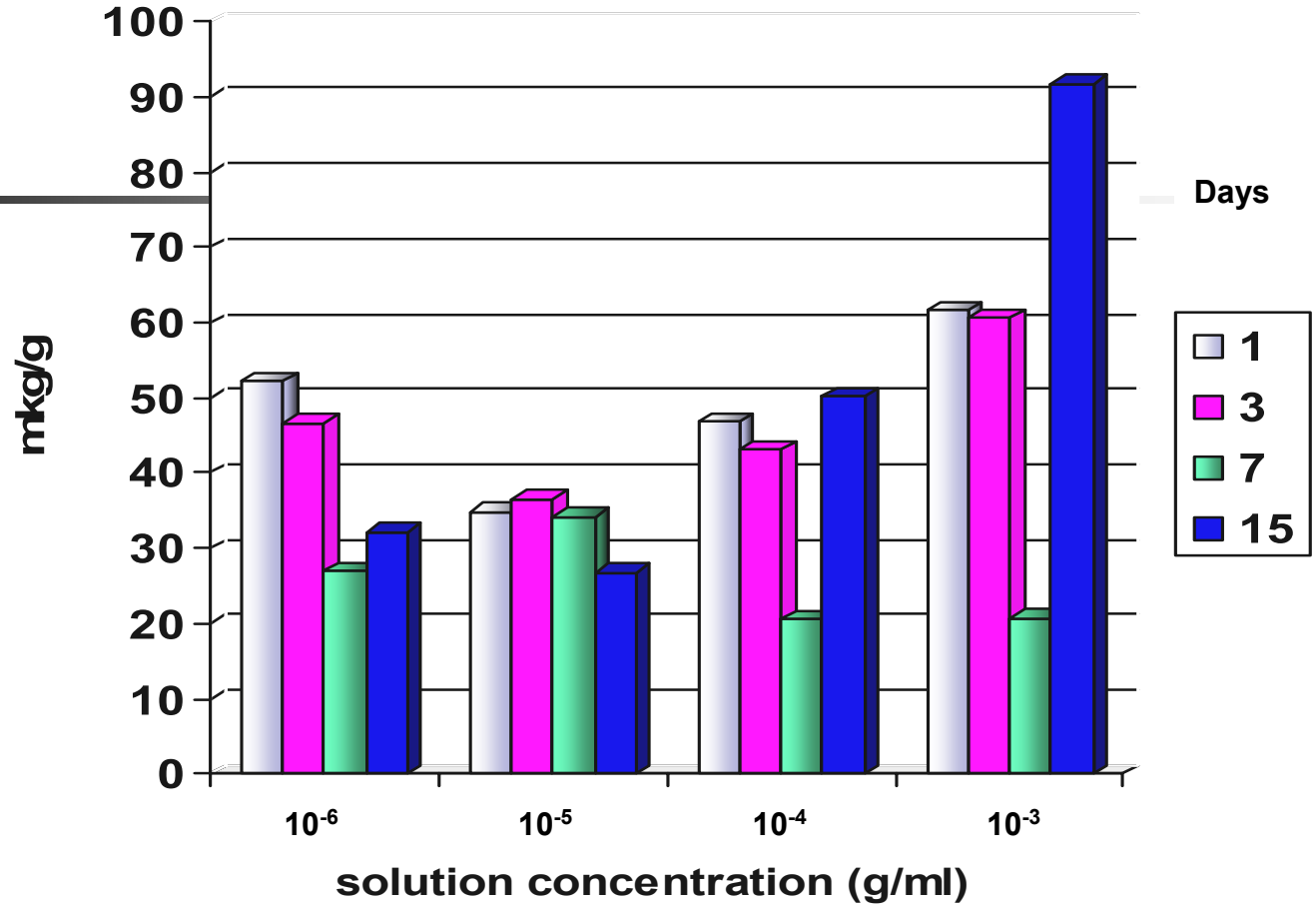

Fig.6 Influence of Cu accumulation on Zn content in F.antipyretica

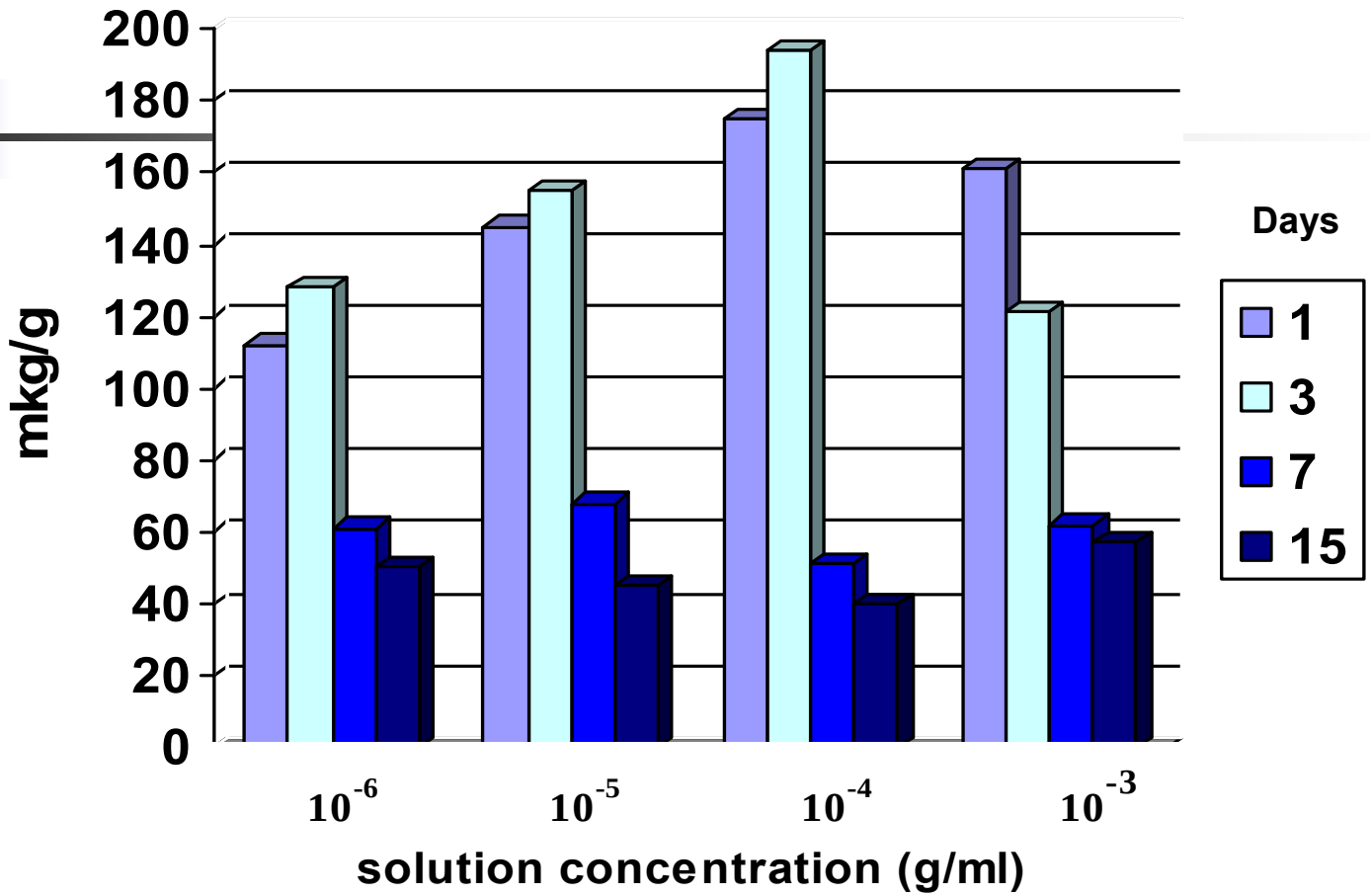

Fig. 7 Influence of Cu accumulation on Mn content in F.antipyretica

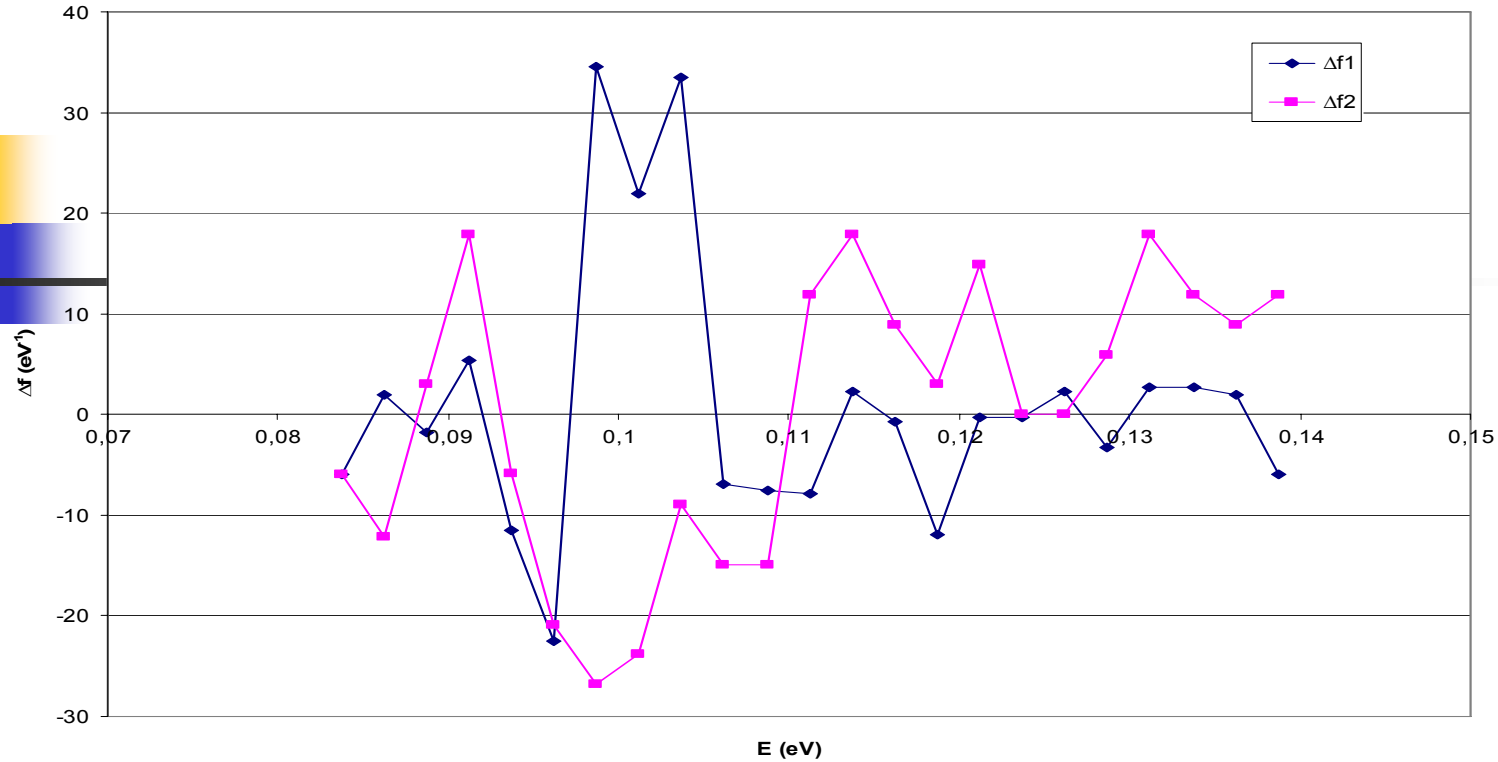

Fig.8 Influence of Cu^{2+} (curve 1) and bryophytes F.antipyretica (curve 2) on the energy spectrum of water

A special attention is given to the pollution influence on the energy spectra and the structure of water as the most wide spread part and center of the biological systems.
The variations of the environmental parameters influence on the living organisms also via the changes in the water intramolecular energy spectrum.
The presence of the plants (bryophytes) in the water stabilizes the energy of water H-bounds and increases the water activity.

The application of techniques (zeolite adsorption) shows an opportunity for Cu reduction and restoration of the normal status quo of the medium.

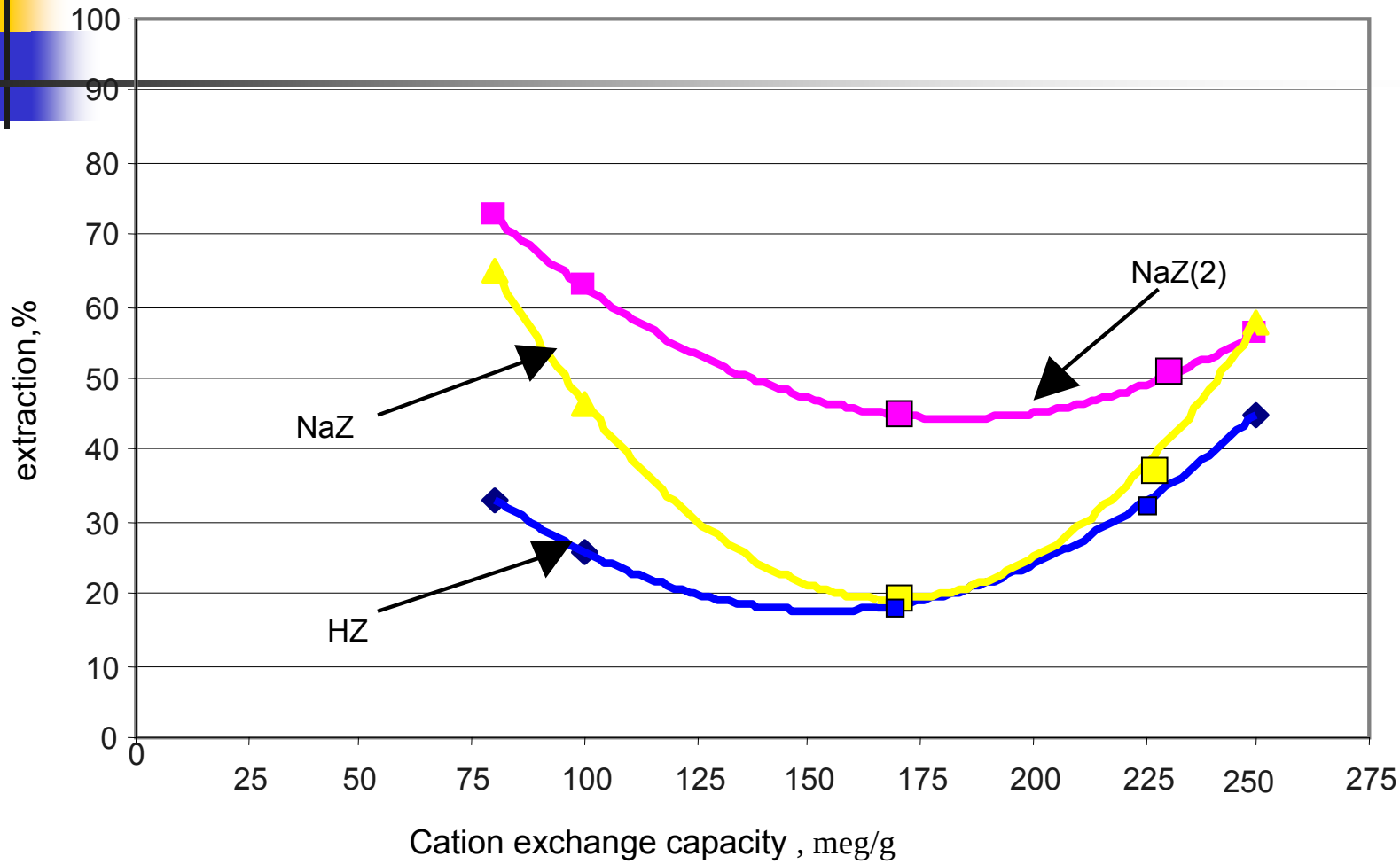

Fig. 9 The capacity of modified zeolite and the adsorption of low concentration of Cu $(NO_3)_2$ in water solution

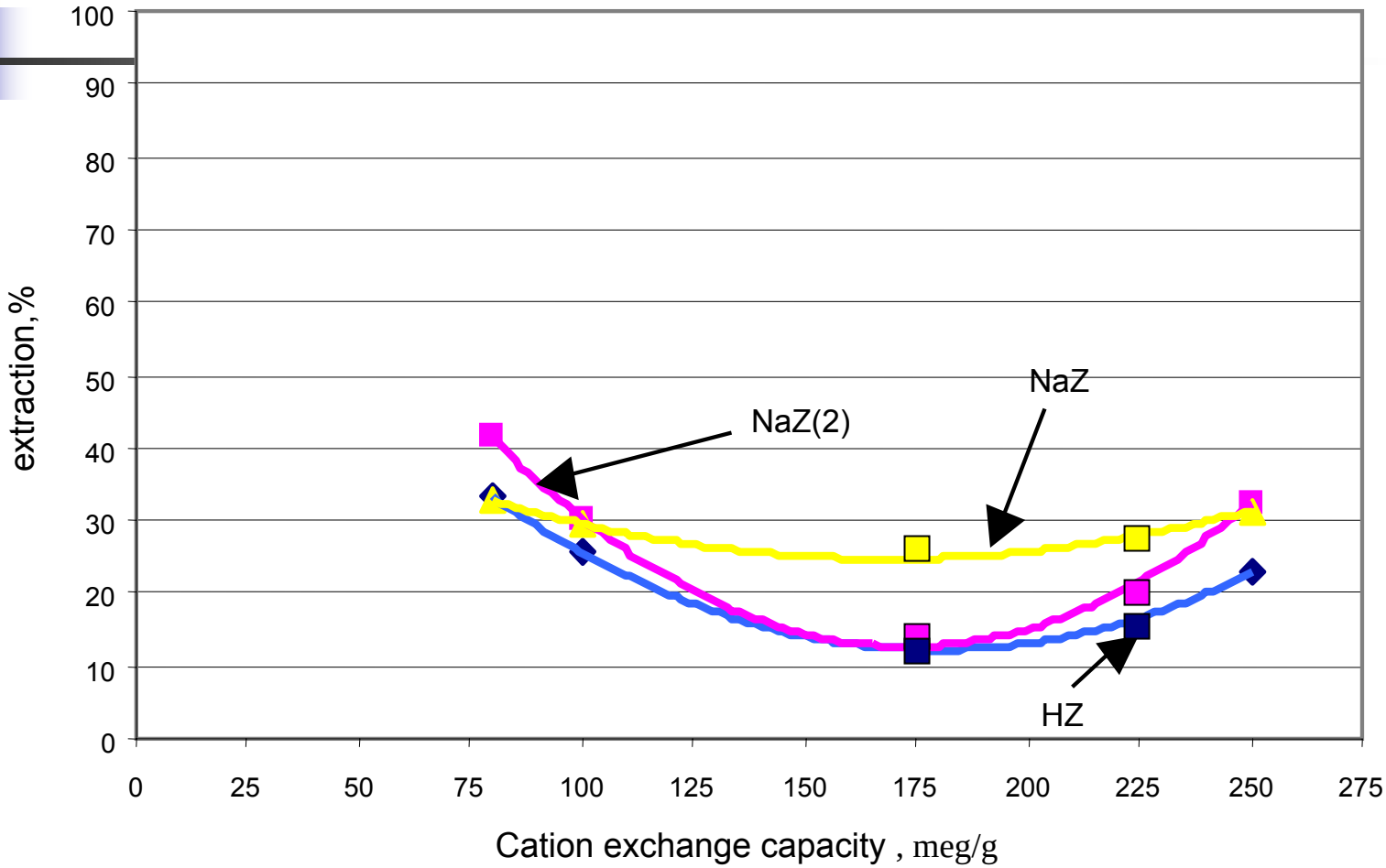

Fig. 10 The capacity of modified zeolite and the adsorption of high concentration of $Cu(NO_3)_2$ in water solution

A1. Diversification, broadening and enhancement of International collaboration and cooperation **in the field of:**

- **evaluation and study of process of exposure to complex environmental factors (toxic elements, radioactivity) of the living organisms**
- **investigation of the correlations between the harmful influence and the organisms response**
- **investigation of the influence of some toxic elements on the microelement balance and biological parameters of the organisms**
- **estimation of the pollution influence on the energy spectra of the water in biological systems**

We look forward for future active collaboration in the area of radioecotoxicology and beneficial to the environmental results in order to protect the life on our planet

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