

BIOMONITORING ON THE URANIUM MILL TAILINGS

T. Čechák, J. Dostál*, J. Dostálek*,
V. Spěváček, J. Losinská

ČTU, Fac. of Nucl. Sci. & Phys. Eng., Dept. of Dosimetry & Appl. of Ionizing Rad.
Břehová 7, 115 19 Praha 1

*Research Institute of Ornamental Gardening,
Průhonice, Czech Republic

Key words: uranium mill tailings, bioaccumulation, specific activity of biomaterials, genetic risk, environmental pollution

Management and confinement of uranium mill tailings, problem of radon releases from mill tailings and hydrological problems connected with the tailings are complicated and generalization of knowledge is still not reliable. Therefore it is desirable to broaden the number of observations and field measurements.

This research project was started this year with the aim of mapping the influence of higher radiation background and higher contents of radioactive elements in the soil on the vegetation and on the genetic load of the vegetation.

The pilot study was carried out on the mill tailings Straz in Northern Bohemia. The Straz and Hamr deposits are located in the Cretaceous basin of Northern Bohemia. The uranium mineralization consists of uranite, uraniferous hydrozircon and ningyoite. The ore grade varies between 0.08 and 0.15 % U. The Straz and Hamr deposits have different characteristics including thickness, continuity and tectonic disturbances. Straz, which exhibits limited thickness and less continuous mineralization, is mined by in situ leach methods using an acid lixiviant. The northern part of the Hamr deposit consists of a 2 – 3 m thick continuous ore body, and was being mined using the conventional room and pillar method with backfill.

The rest of in situ leach mining in Straz are artificial lakes with variable level of water. The main part of vegetation on the beaches consists of following plants: *Betula pendula*, *chemopodium glaucum*, *chemopodium rubrum*, *polygonum lapathifolium*, *tussilago farfara*, *calamagrostis epigejos*, *alopecurum aequalis*, *phragmites communis* and *sisymbrium altissimum*.

The results of specific activity measurement of the particular plants are given in Tab. 1.

Different specific activity of above-ground parts of particular plants tribe can influence the genetic load of this plants. This genetic load and quantity of the mutations will be investigated in the next period.

Investigation and field measurement are continued and should lead to recognition of the convenient and environmentally acceptable types of vegetative structure on the uranium mill tailings.

Undergraduate students are involved in this research project.

No		Specific activity [Bq/kg]		
		Ra-226	Th-232	K-40
1	Betula pendula	19	< 10	204
2	Chenopodium glaucum	54	< 10	1165
3	Chenopodium rubrum	155	< 10	1690
4	Polygonum lapathifolium	130	< 10	399
5	Tussilago farfara	53	< 10	1350
6	Calamagrostis epigejos	38	< 10	269
7	Alopecurus aequalis	67	< 10	557
8	Phragmites communis	25	< 10	377
9	Sisymbrium altissimum	14	< 10	306

Tab. 1.: Specific activity of above-ground parts of plants

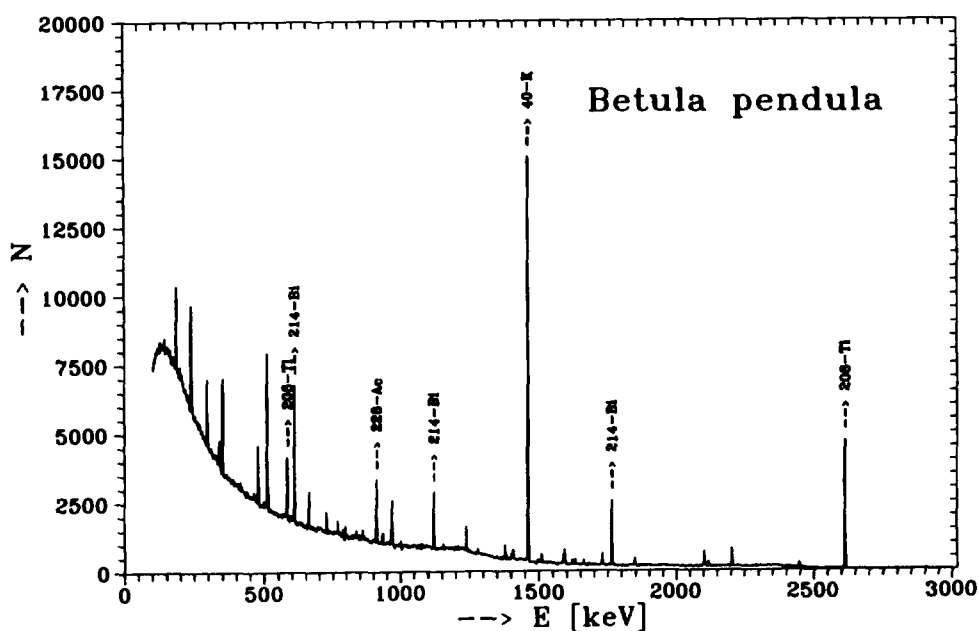


Fig. 1: Typical gamma ray spectrum of above-ground parts of plants measured by HP Ge detector

References:

- [1] *URANIUM - Resources Production and Demand*. OECD and IAEA, Paris, 1993
- [2] ČECHÁK, T. – KLUSOŇ, J.: *Snížení dávkového příkonu gama záření a úniku radonu z odkališť Rožná*. FJFI, Praha, 1995

This research has been conducted at the Research Institute of Ornamental Gardening and at the Department of Dosimetry and Application of Ionizing Radiation as part of the research project "Influence of radioactive background on the genetic risc" and has been supported by Ministry of Environment, grant No. PPŽP/640/2/96