

Biological monitoring

Biological monitoring includes monitoring the presence of foreign substances in the environment using a biological indicator (plants or animals, including humans).

Plants

The disappearance of lichens from the forests and **sphagnum**, which, thanks to its specific anatomical arrangement of leaves, accumulates toxic metals present in the air in the form of aerosols is used as a representative of plants for monitoring undesirable substances in the environment. If the forest dies, it is mainly conifers, with the exception of larch, because they, like deciduous trees, grow "new lungs" every year.



Peat as a bioindicator of the presence of toxic metals in the air.

Animals

- **Bees** – they are sensitive to the concentration of As and F in the environment (they were used in the past by Svoboda to determine the so-called Těšín disease of bees when As escapes into the environment).
- **Raindrops** – are a suitable monitor for the presence of xenobiotics (pesticides, fertilizers, toxic metals) in the soil. They are collected after the rain, left to starve for three days, dried, and then the powder from them is analyzed.
- **Hares** – the same toxic metals (Hg, Pb, etc.) were found in their fur as in the hair of children in the infested area
- **Voles** – their habitat is a circle with an approximate radius of 30 m. Modern analytical methods make it possible to qualitatively determine the presence of xenobiotics of interest in a few drops of blood or in individual organs or tissues of voles.
- **Domestic rabbit.**
- **Rats.**
- **Human material.**



(In the past, canaries and mice were used to detect carbon oxides in mines.) **Breast milk fat** is a material suitable for biological monitoring of exposure to lipophilic xenobiotics and represents a bloodless (i.e. ideal) route to subcutaneous fat. The ideal material is naturally the blood lipid fraction, in which we determine dioxins, dibenzofurans and PCBs: polyhalogenated hydrocarbons in general.

Examples from the world

- Chloracne in children and the death of small animals drew attention to the leakage of dioxins during the accident in Seves.
- The loss of methyl isocyanate in Bhopal was also highlighted by the death of livestock and domestic animals.
- The loss of alkylmercury in Minamata Bay in Japan was highlighted by the death of cats in fishing families as a result of eating fish, especially predatory fish (sea pike) caught from the bay.

Biological exposure testing

Biological exposure tests are a specific example of biological monitoring in the event that a biological limit is established for the relevant pollutant or its metabolite.

 For more information see *Biological exposure tests*.

Links

Related articles

- Emission
- Immissions

References

- BENCKO, Vladimír, et al. *Hygiena : Učební texty k seminářům a praktickým cvičením*. 2. přepracované a doplněné vydání edition. Praha : Karolinum, 2002. 205 pp. pp. 35 – 44. ISBN 80-7184-551-5.

