# POLYCYCLIC AROMATIC HYDROCARBON LEVELS IN WATERS AND SPONGES OF THE NORTHERN ADRIATIC

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Summary:
Polycyclic aromatic hydrocarbons (PAH) were estimated in seawater samples collected at two clean sites and compared with the PAH present in samples of harbour water as an example for a chronically polluted area. Several sponge species were analyzed on their natural or bioaccumulated PAH - contents.

Resumé :
On a déterminé les teneurs en hydrocarbons aromatiques polycycliques dans des échantillons tirés à deux locations avec de l'eau nette. Ceux-ci sont comparés aux HAP dans des échantillons venant des eaux du port avec sa pollution élevée chronique. On a analysé plusieurs éspèces d'éponges pour leur teneur en HAP naturelles ou bio-accumulées.

The concentrations of PAH were estimated using a coffeine complexation method for purification. Separation of different PAHs was on precoated TLC plates CEL 300-100/AC (Machery-Nagel, Düren, F.R.Germany) with 0.1 mm acetylated cellulose. Quantitation of separated spots was done with a Shimadzu Dual-Wavelength TLC Scanner CS-910 (Shimadzu Corporation, Kyoto, Japan). The PAHs from 25-50l of seawater were concentrated on XAD-2 columns. PAHs from tissue homogenates of sponges Tethya lyncurium and Tethya limski were extracted with 3x10 ml portions of cyclohexane.

Water samples were collected at two "clean" sites: surface water in the Limski kanal and bottom water (30m depth) 5 miles offshore from Rovinj, and one polluted site: surface water from the Rovinj harbour. Sponges were collected by diving or dredging at the two clean sites.

Results are given in Table 1. All water samples contain Benzo(a)pyrene (BaP) in the picogram range, which is two orders of magnitude lower than the content of Fluoranthene (Fl.). Harbour water is known to contain a microflora that at the ambient temperature of 24 C becomes the decisive factor in the control of the level of men-made PAHs from domestic and traffic loads, a fact that explains the very low

TABLE 1. Level of polycyclic aromatic hydrocarbons in water samples (ng/l) and sponges (ng/g) collected on different days in August 1982

| Locale | Water | | T. lyncurium | | T. limski | |
|---|---|---|---|---|---|---|
| | BaP | Fl. | BaP | Fl. | BaP | Fl. |
| 5 miles offshore | 0.01<br>0.03 | 1.81<br>2.53 | 0.41<br>2.47<br>0.39<br>0.53 | 0.26<br>1.60<br>0.33<br>0.43 | | |
| Limski kanal | <0.01<br><0.01 | 0.89<br>0.95 | | | 0.01<br>0.02<br>0.03<br><0.01<br><0.01<br>0.02<br>0.25<br>0.32 | 1.32<br>2.87<br>2.07<br>1.05<br>2.79<br>2.11<br>1.84<br>2.30 |
| Harbour | 0.07 | 4.41 | | | | |

concentrations of BaP found in harbour water. The BaP values present in 50l samples from all locations are much lower than the lowest amount of BaP that can cause significant increase of TA 100 revertants in Ames-microsomal test (Zahn et al.,1981). Tethya limski and Tethya lyncurium accumulate BaP by a factor of one thousand and ten thousand respectively. Interestingly enough, the accumulation factors for Fluoranthene were just the reverse, although the water concentrations of Fl. were higher in offshore bottom water.

The sponges lack a mixed function oxydase system for the metabolism of BaP which makes them useful in monitoring the pollution of water and sediments. The concentrations found in sponges represent balance values between accumulation and degradation facilitated by light-mediated formation of BaP-derivatives (Zahn et al.,1981). These derivatives couple to the macromolecular fractions and cause damage of protein, RNA and DNA. In spite of such measurable damage the concentrations of BaP accumulated in our sponges are within the levels of their evolutionary experience, and therefore maybe harmless to them.

Literature:

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