

Quantitative estimation of the levels of polychlorinated compounds in natural environments of the Pribaikal

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Among the variety of harmful chemical substances special consideration should be given to the following polychlorinated organic compounds (PCC):

polychlorinated biphenyls (PCBs), chlororganic pesticides (COP), polychlordibenzodioxins (PCDD) and polychlordibenzofurans (PCDF).

Compared to well-known COP, PCDD, PCDF, PCBs are the most toxic and this represents the potential danger both for the environment and human health.

The results of preliminary research in different areas of our planet as well as in Russia carried out by Dr A. Schecter showed rather high levels of food contamination by PCBs, PCDD and PCDF in the Pribaikal region. That was the reason for elaborating a complex programme, the aim of which is to determine the degree of PCDD influence on human organisms with consideration of local peculiarities.

The first stage of research showed the real levels of PCC in drinking water. The results of Baikal water and its tributaries research are given in table 1.

Water body	Average levels of PCBs contents $\mu\text{g/l}$
Baikal (South)	0.04 – 0.10
Tributaries:	
Utulik	0.12
Selenga	0.13
Goloustnju	0.02
Discharge waters of BCPC	0.28
Phytoplankton	0.80
Zooplankton	1.15
Seal fat	38.00

Tab. 1.: The levels of PCBs contents in waters of lake Baikal and its tributaries

As it is shown in table 1, discharge waters of BCPC contain a considerable amount of PCBs (0.28 $\mu\text{g/l}$). The concentrations of these substances change in Baikal water at a range from 0.04 to 0.10 $\mu\text{g/l}$. At the same time one can see the accumulation of PCBs in lake biota: phytoplankton 0.80 $\mu\text{g/l}$; then in zooplankton – 1.15 $\mu\text{g/l}$. Maximum PCBs concentrations (38.0 $\mu\text{g/l}$) have been found in seal fat, which confirms the possibility of their accumulation in the food chain.

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Alongside with PCBs the presence of HCDD in discharged waters of BCPC was established (7.5 pg/l) as well as in fish of lake Baikal (1 – 2 pg/l). In the river Angara, which is the only river going out of lake Baikal, total PCDD contents (8.0 pg/l) were determined.

As it is known the Angara River is the main source of drinking water where the following levels of HCCH were found:

Water body	Average values of levels of contents of HCCH $\mu\text{g/l}$
Angara	0.06
Tributaries:	
Kuda	2.75
Angara (beneath)	0.04
Irkut	0.02
Angara (beneath)	0.04
Kitoji	0.02
Angara (beneath)	0.05
Belaya	0.05
Angara (beneath)	0.07

Tab. 2.: Levels of contents of COP (HCCH) in the River Angara and its tributaries

The analysis of these data confirms the slightest increase of HCCH concentration in Angara River in the investigated area (0.07) compared to 0.06 $\mu\text{g/l}$. In conditions of stable HCCH concentrations in water due to its confluence with tributaries there is always the possibility of COP accumulation in organisms living in the water.

The further investigation of COP, PCBs, PCOD, PCDF contents in lake Baikal waters and Angara with consideration of available industrial sources and agriculture will allow to estimate the level of contamination of water sources, their possibility of toxic substances accumulation and to establish the total load of PCC in human organisms as taken up with drinking water.