# Protection of the Population of the Khabarovsk Territory, the Amur River from Dioxins and Dioxin-Like Toxicants

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The purpose of this article is to focus the problem on ecological crisis situation because of dioxin-like toxicants and dioxins in the biggest river in the world - the Amur in order to include it into the list of potentially - dangerous water objects subjected to research. The Amur river being the main water artery of the Far East with the length of 4400 km and the square basin about 1885 thousand km2 flows into the Okhotsk sea - the zone of industrial fishing . On the territory of Amur basin there are three states: Russian Federation ( 1002,8 thousand km2 ), Chinese People Republic ( 820 thousand km2 ), and Mongolian Republic ( 32 thousand km2 ) .

Due to the water regime the rivers of the Amur basin are the ones of the far eastern type characterized by pronounced prevailing rain flowing . The main water features are determined by monsoon - type climate . In annual volume flowing in to the Amur the rain feeding comprises 75-80%, snow melting - 15-20% and only 5-8% of subsoil feeding. Considerable part of the territory is situated in the zone of permafrost. Bogs and marshy grounds occupy great conifer and deciduous conifer woods. It is widely known that crisis ecological situations are closely connected with demographic, industrial and agricultural factors. In the Russian part of the Amur basin there live about 5 million people, in the Chinese - about 41-45 ml people, where is the tendency to further increase of the population. Antropogenic press on the Amur basin is various and considerable enough. Among them petrochemical, oil processing, biochemical, pulp and paper, chemical-fire, plastic, synthetic rubber works as well as coal, mining oil tin extractions.

In Russia in resent years there is decrease in industry and agriculture but it could not be said be about the same in China. There is great increase of industry in Chinese Republic. But in spite of the consequences of the Chinese industrial activity the Lower Amur running over the Russian territory the control over all pollution coming to the Amur is made only on the part of Russian through laboratories .

In our report the general attention in paid to such organic components which are present at the classification and are attributed to dioxines and dioxin-like substances

predecessors. In most cases these are phenol compounds . The sources of phenol compound ways to water objects are various .

Their genesis can be divided into antropogenic and natural . The main technogenic polluters are the enterprises of woodworking , oil-processing and pharmacentical industry . In the Khabarovsk territory there are 90% of industrial flowings and containing phenol compounds as well , being purified , but only 2% of them become normally clear .

The enterprises of housing and communal services are throwing more than 70% of organic components treated with chlorine into water objects . This is one of the factors of dioxin predecessors formation .

By experiments it was proved that in the process of active silt destruction , after its usage in biological purification a great number of phenol compounds enter the water environment . Active chlorine coming into oxidation reaction with volatile phenol compounds form the most toxical chlorine-phenol compounds which then enter the water objects .

Downpour flows without corresponding purification in to the period of monsoon rains have none controlled of organics .

In nature conditions phenols are formed in the process of metabolism of water organisms , taking place in water and in bottom sediments .

Sanitary-ecological condition of the Amur river become critical in the winter season . Decrease of self-purifying ability of the river in conditions of small dilution of flowing waters and winter deficiency of diluted oxygen , slow rate of decomposition of toxic substance due to low temperature of the water under ice cause accumulation of organic substances and heavy metal compounds . In such conditions Septomitus lacteus and Aniasosira islandika are developing . In the process of active propagating and dying off of the algae , fungi , protozoa there appears entrance of incomplete decay of toxic compounds , phenols as well . Some research of the laboratory of hydrobiology Khab. S. R. I. ( IVEP FEO RAS ) proved that 2/3 organic substances in the Amur river are oxidated after falling out and they can store considerable amount of phenols which afterwards enter the water .

However the most dangerous are stable toxins : chlorine and metalorganic compounds , able to be stored in water organisms due to the principle of bioconcentration .

Considering official examination protocol of the Laboratory of physico-chemical research methods in ITG FEO RAS phenols concentration in algae suspension equals was 0.4 mg/l . At the same time the phenol content in the river water was 0.005 mg/l .

Chlorphenoles , organic acids , mercaptans were determined qualitatively .

In some examined river fishes were found neutral polychlorine compounds among them - DDT , DDA , and others. If was stated that fish living in such places possess strange smell , change its taste quality , becoming not suitable for fishery .

This was supported by the events of the year 1996 when in the winter -spring season the extreme out-break of high phenol contain 0.9 mg/l in the Lower Amur in paralyzed fishing company , where fish is the main feeding products and it undermined economics of some administrative territories . The situation was worsened by the fact that the Amur is the main source of water using .The water in its open places while preparing for using is treated by chlorine as obligatory measure .

Thus the constant presence of organic pollutants , phenol compounds of nature and technogenic origin , some other dioxin-like compounds in the conditions of chloridation of

potable water in open water sources especially in the Amur cause dioxin-generating of the potable water and make threat to health of the population of the Far-Eastern territory .

The present system of monitoring could not cover the whole specter of natural and antropogenic pollution of the Amur and could not evaluate the water condition , could not prognose it in the future which is fraught with serious consequences not only for Russia .

To solve the problem in question it is necessary to unite all scientists of the countries being interested in this problem . For this purpose it is expedient to create scientific methodical center in Khabarovsk on the problem of observation and research of super ecotoxicants in water environment and the population health in the Amur basin . This center must be organized on the base of scientific research establishments of Khabarovsk .