

EDUCATION AND RESEARCH PROBLEMS IN AZERBAIJAN REPUBLIC RELATED TO GLOBAL ENVIRONMENTAL CONTROL OF DIOXIN POLLUTION

Aliyeva G R¹, Ashurova N D¹, Salakhov M S¹

¹Institute of Polymeric Materials of the National Academy of Sciences of Azerbaijan
Zargarpalan St d7 ev3 Baku AZ1009 Azerbaijan Republic

Abstract

It is known that many years different industries such as chemical, metallurgical and machinery had been developed in Azerbaijan with application of technological processes involving heavy usage of chlorine and chloro-organic products. This lead to significant contamination of marine and terrestrial ecosystems of Apsheron peninsula by chlorine-containing compounds preceding formation of dioxins^{1,2}.

In 1989 the Scientific-Production Unit "Typhoon" of the Institute of Experimental Metrology analyzed soil sample taken on the territory of Sumgait Production Unit "KhimProm", producing chlorine and chloro-organic pesticides such as hexochloran, pentachlorophenol, 2,4,5-threochlorphenoxyacetic acid. The analysis of sample showed amount of 0.1-0.15µg /kg⁶ of 2,3,7,8 – tetrachlordibenzo-para-dioxin. Dioxin pollution was also proved by skin disease chlorachne affected personnel of the Production Unit. Therefore in 1989 the production of γ-hexachlorane (lindane) had been shut down².

In this relation the following systematical precautonal and fundamental scientific works have been conducted in the region:

- 1) Liquidation of some non-effective chloro-organic productions
- 2) Preparation of high-quality personnel and increase of environmental awareness of population
- 3) Determination of possible dioxin contamination sources and geography of contaminated territories
- 4) Correlation analysis and determination of interrelation between chemical structure and toxicity of PCDD/Fs.

Introduction

The large-scale measures on liquidation and limitation of pollution by dioxin ecotoxicants included the followings:

- Upgrade of technological processes of productions which were followed by formation of dioxins and related compounds
- Prevention of environmental pollution caused by dumping and incineration of wastes from chemical, petrochemical and metallurgical industrial enterprises
- Cleaning and melioration of dioxin-contaminated lands
- Replacement of chlorine method of water purification by other methods excluding formation of dioxin and related compounds
- Strict control of sewage water falling into the Caspian Sea from industrial enterprises of Sumgait city

In 1991 a group of scientists of the Institute of Polymeric Materials of the National Academy of Sciences of Azerbaijan took initiative to implement the range of actions for prevention of dioxin pollution and inclusion of Azerbaijan Republic into a global chemical and environmental control of dioxin pollution, establishment of environmental public antidioxin society, dissemination of information on dioxin danger, provision of consultancy and other support to the interested parties as well as implementation of chemical, biological and toxicological monitoring in the regions of Azerbaijan^{1,4}.

As a result the following organizational works had been implemented:

- Application has been sent to the Parliament of the Republic requesting to accept National Program on dioxin problem⁵;
- Prepared map showing inventory of industrial sources of dioxins and other POPs in the industrial city of Sumgait⁶;

- The strategy of the concept “Dynamic thinking in education” has been developed and submitted to the Ministry of Education of Azerbaijan Republic. On the modern stage of the scientific-technical progress the concept requires to find corresponding forms and methods of practical approach to objective reality in the process of teaching of environmental science. According to this concept environmental understanding and environmental thinking should be based on perception of spatial structures of environmental objects, in this instance, determination of interrelation between toxicological activity of chlorinated dioxins and their spatial structure⁷;
- Conducting research on quantum chemical calculations of effective atomic charge in the molecules of dioxin and its chlorinated derivatives in different isomeric forms for determination of correlation between structure and toxicity depending on the quantity and location of chlorine atoms in the molecules of chlorinated derivatives of dioxin^{4,7,8,9};
- Established section of “Stereo-chemical aspects of chlorinated dioxin xenobiotics” at the Azerbaijan branch of International Academy of Sciences;
- Systematical preparation of students of higher education at Sumgait State University, Caucasus State University and Baku State University where providing cycle of lectures on special course “Haloido-organic compounds and dioxin problem” based on elaborated educational program^{10,11}.
- Increasing of environmental awareness of population about global dioxin problem, ways of its prevention, health issues through mass media regularly since 1992;
- Agreed and signed Memorandum of Understanding between Institute of Polymeric Materials of the National Academy of Sciences of Azerbaijan Republic and Environmental Research and Protection Centre of Bashkir Republic as a document prepared for scientific collaboration within Intergovernmental agreement on economical cooperation of Russian Federation and Azerbaijan Republic till 2010.
- Jointly prepared “Program of PCDD/PCDF research in Sumgait industrial city” which have been submitted to Azerbaijan National Research Fund for financing
- The results of implemented activity on global environmental problem of dioxin have been presented and published in various international conference and symposiums held in Istanbul, Ankara (Turkey), Ufa (Bashkir Republic, Russia), Gyengju (Korea), Alexandria (Egypt), Monterey (USA), Baku and Sumgait (Azerbaijan).

Results and Discussions

Presently research group of the Institute of Polymeric Materials of the National Academy of Sciences of Azerbaijan is working on Regional Pollution Control Program to prevent environmental pollution by dioxins and related compounds in Azerbaijan.

References:

- 1) Salakhov M, *UNDP, Environmental Rehabilitation of Sumgait*, Azerbaijan 1999 (1, 10)
- 2) Salakhov M, Aliyeva G, Islam-zadeh A, Efendiyev A. *Organohalogen Compounds*, 2000; 46:510
- 3) Salakhov M, Efendiyev M, Islamzadeh A. *Air Quality Management on Urban, Regional and Global Scales*. Proceedings of 10th Regional IUAPPA Conference, Istanbul, Turkey, 1997
- 4) Salakhov M, Pashayev F, Hasanov A, Ashurova N. “*News*” Baku State University, 2006, 3: 167
- 5) Salakhov M, Aliyeva G. *Dioxin and related compounds: environmental problems and methods of control*, RISLA RB, 2001 Ufa, Russia, p.100-102.
- 6) Aliyeva G, Salakhov M, Geychaylou Sh, Efendiyev A, Islam-zadeh A. *Organohalogen Compounds, Formation and Sources I*, 2001
- 7) “*Elm (Science)*” newspaper of the National Academy of Sciences of Azerbaijan, 20th March 2007
- 8) Salakhov M, Ashurova N, Mursalov T, Pashayev F. *AXK*. 2005, 4:116
- 9) Mursalov T, Pashayev F, Salakhov M, Ashurova N, Gasanov A. *Proceeding of the eighth VIII Baku International Congress “Energy, Ecology, Economy”*, 2005, P.89
- 10) M.S.Salakhov, T.M. Murselov, F.H.Paşayev, A.K.Hasanov, N.D.Aşurova. *Erzurum fizik günleri-II sempoziumu, Atatürk Üniversitesi, Erzurum-Türkiye*. 2005. P.39.
- 11) Salakhov M, Aliyeva G. *Scientific Methodological Conference at Baku State University “The problems of applied ecology”*, Baku, Azerbaijan, December 3-5, 2002, P.26.