

Dioxins and human health: competences for ecological safety management

V.S. Roumak^{1,2}, N.V. Umnova¹

¹A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow, Russia, e-mail: roumak@mail.ru

²M.V. Lomonosov Moscow State University, Moscow, Russia

Sources of emissions and discharges of polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) are encountered in numerous places on the territory of Russian large and small cities where the majority of the population lives. The necessity to monitor and minimize the impact of these emissions on human health is evidenced by the toxic levels of these substances in human breast milk [1]. Experts consider landfills with municipal/industrial wastes as the most threatening sources of PCDD/Fs [2]. The problem of toxicometry* of PCDD/Fs low doses contaminating the environment in the vicinity of landfills and other sources has not yet been resolved and is under development for minimization (reduction) of the health hazard of PCDD/Fs.

Scientific and methodological foundations of activities on the risk minimization. The following requirements were accepted for a new approach to evaluate the environment contamination by PCDD/Fs discharged by the landfills and waste incineration plants: a) the harmful effects of environmental PCDD/Fs mixtures are determined by the toxicity of congeners absorbed by the organism, their doses (concentration) and exposure conditions; b) the key points in the chain of chemicals' transfer from the environmental matrices to the organism are the content of contaminated biotic products included in the diet; c) environment is obviously an active element responsible for the behavior of toxicants in natural systems, as well as their interactions within biotic components, and the extent of damage to living organisms and the population overall; d) The use of PCDD/Fs maximum permissible concentrations is limited by their extreme conditionality and sanitary safety regulations [3, 4].

The appropriate experimental design involves all these requirements and reflects an organism's interactions with PCDD/Fs by studying toxic effects in association with the characteristics of the environmental fate of these substances and the exposure conditions. The most objective assessment of such interactions is provided by the epidemiological methods. Their use in the risk management is limited by the high probability of individual toxic effects. Screening of PCDD/Fs' concentrations in wild animal tissues allows to control general (for humans and animals) patterns of these substances' accumulation in the real exposure conditions [5–7]. Small mammals follow this pattern and can be used as an available model for biomonitoring the ecotoxicological situation and consequences of exposure.

*Toxicometry – system (summary) of principles, methods and techniques for chemical substances' toxicity and hazard evaluation [Kasparov A.A., Sanotsky I.V. (Eds.). Moscow, 1986. 428 p.]