Quater of century has passed away after the chernobyl disaster

Andras S. Szabo

Food Physics Public Utility Foundation,
Budapest
andras.szabo@uni-corvinus.hu

ABSTRACT. The disaster has happened in 1986 in the former Soviet Union, on the territory of northern Ukraine. In consequence of the nuclear plant accident a huge territory of Europe has been contaminated, including also Hungary. The contamination level of foodstuffs in Hungary within a few weeks after the disaster (dominantly 131-I) was significantly higher than the natural radioactivity (e.g. 40-K). Later the pollution level decreased and from 1990 the results of radiometric measurements have been proved that there is no significant difference in contamination (e.g. 137-Cs) of food and agricultural products before and after the nuclear disaster. The total radiation burden (partly from foodstuffs) of hungarian population (living appr. 1000 kilometres from the place of the accident) has been much less than the natural radiation load, so no increase of health risk has been determined in the 25 years period after the disaster.

Keywords:
disaster,
natural radioactivity,
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contamination of food and agricultural products,

INTRODUCTION

From the beginning of the publication of Journal of Food Physics (1988) a lot of papers were published concerning the radioactivity (natural and man-made one) of the food chain and contamination level, radiation burden, measurement techniques of radionuclides. A special attention was paid to the questions of the Chernobyl disaster, giving detailed information about the radiocontamination level of foodstuffs in Hungary (Tarjan, Kis-Benedek, 1991) (Szabo, 1991, 1996, 2000-2003).

The disaster at Chernobyl is often called the worst nuclear accident of the XX. century. This accident is the most serious one of the nuclear industry, partly through consuming contaminated food and drinking water or breathing with radionuclides contaminated air. Huge territory of the earth was contaminated by rainfall and the radioactive isotopes entered into the food chain through plants and animals. The impact of the Chernobyl disaster on health of population, living in the affected regions of Ukraine and Belorussia was significant because of radiation exposure (UN report, 2006).

A total of up to 4000 people could eventually die of radiation exposure from the Chernobyl nuclear power plant (NPP) accident in 1986, an international team of more than 100 scientists has concluded. However, fewer than 50 deaths had been directly attributed to radiation from the disaster, almost all being highly exposed rescue workers, many who died within weeks or months of the accident but others who died much later.

The report, "Chernobyl's Legacy: Health, Environmental and Socio-Economic Impacts," was released by the Chernobyl Forum. The three-volume, 600-page report, incorporating the work of hundreds of scientists, economists and

health experts, assesses the impact of the largest nuclear accident in history. The Forum is made up of 8 UN specialized agencies, including the International Atomic Energy Agency (IAEA), World Health Organization (WHO), United Nations Development Programme (UNDP), Food and Agriculture Organization (FAO), United Nations Environment Programme (UNEP), United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA), United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), and the World Bank, as well as the governments of Belarus, the Russian Federation and Ukraine.

This compilation (report) of the latest research can help to settle the outstanding questions about how much death, disease and economic fallout really resulted from the Chernobyl accident. The governments of the three most-affected countries have realized that they need to find a clear way forward, and that progress must be based on a consensus about environmental, health and economic consequences and some good advice and support from the international community. Unfortunately this was a very serious accident with major health consequences, especially for thousands of workers exposed in the early days after the disaster.

Let us see shortly the situation today (2011) in Hungary, after 25 years of the Chernobyl NPP accident. Of course it seems to be necessary to mention that 25 years later the Chernobyl accident the nuclear industry had another serious disaster in Japan at the Fukushima NPP in 2011, contaminating with radionuclides the environment. But – because of the huge distance between Hungary and Japan – the effect of the japanese accident is perfectly negligible in Hungary, the food chain was absolutely not contaminated (Szabo, 2011).

RADIOACTIVE CONTAMINATION OF THE FOODSTUFFS

In Hungary during a few weeks after the disaster the contamination of milk and fresh vegetables was rather high (mainly 131-I, 137-Cs, 134-Cs) in comparison with the natural radioactivity level, but the contamination decreased fast. In 1987 the pollution was based dominantly on the 137-Cs activity (physical half-life 30 years). In 1990 the contamination level of foodstuffs of plant and animal origin was similar to the level before the accident. And in the following 20 years after this 1990 year the contamination level (man-made radioactivity) of the foodstuffs and agricultural products, produced in Hungary was practically negligible in comparison with the natural radioactivity (e.g. 40-K). Till today a lot of measurements were carried out to get data about the contamination level of different foodstuffs, but no case about high level of radioactivity in the food samples.

RADIATION BURDEN AND HEALTH RISK

Because of the accident a huge amount of radioactive materials (e.g. volatile noble gases, cesium, iodine isotopes) were emitted into the atmosphere and later into the food chain (soil, surface water, plants, animals, men), contaminating mainly many countries of the continent, but also some other countries (e.g. Turkey). Hungary is appr. 1000 kilometres from the place of the Chernobyl NPP, so the indirect contamination – depending mainly on meteorological conditions – was a few orders of magnitude less, than the pollution level in the surrounding territories of the NPP in Chernobyl. Even there were some areas in Hungary – Great Plain – where the contamination level was really very low. But even in case of people, living on

territories of the country with higher contamination (e.g. Budapest region) the total dose burden from the accident should be less than 1.0 mSv. The natural radiation load per year is appr. 2.4 mSv. This is the reason that we do not have to expect or calculate the increase of the irregular growth of babies and cancer cases of the hungarian population.

We know that the probability of occurrence of leucemia and disease of thyroid gland for children increased significantly on the territories of high radioactive contamination (mainly southern part of Belorussia). But in Hungary there was no indication of increase of disorders of new-born children, or cancer illness, tumour mortality and leucemia for adult and young population. With other words: no increase of health risk has been evaluated.

CONCLUSION

Today in Hungary the impact of the Chernobyl NPP accident in 1986 is not significant, concerning the contamination level of foodstuffs or health risk of the population. But we have to take into account that the Chernobyl NPP accident was not the first and not the last one of the history of nuclear industry. Therefore – to my mind – it would be necessary to have a significant change in the energy program development of the world, paying more attention to the renewable energy sources and the construction of fusion reactors. The fusion reactor – this is the energy source of the Sun – produces no fission products, so there is no harmful risk on the environment. No carbon-dioxide, no radioactive waste materials, no global warm-up, but sustainable environment.

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