§5. Research on Oxidation Factors of Tritium Gas and Fluctuation Factors of Tritium Level in the Environment

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Tritium gas will be used on a massive scale in the future nuclear fusion reactors as fuel. Although tritium gas itself is much less radiotoxic than tritiated water, it is easily converted to tritiated water by microbial action in surface soil when it is released into the environment. We have conducted several heavy water (D_2O) vapor release field experiments using deuterium as a substitute for tritium to obtain parameters as for tritium transfer from air to the crops and tritium retention during their growth phase and at harvest.

The meeting on the environmental behavior of tritium and its biological effects was held at NIFS on February 8, gathering with tritium researchers. The titles and contents of the meeting were as follows and some of research details were described in the following references..

1. LHD and the research programs in Safety Research Center. T. Uda (NIFS)
2. Dose tritium dose of 1mSv cause DNA damage? Y. Ichimasa (Ibaraki Univ.)
3. Mechanism of D_2O transfer into rice and soybean and some distinctions on their translocation parameters among plants. M. Ichimasa (Ibaraki Univ.)
4. Detritiation system using microorganisms. N. Momoshima (Kumamoto Univ.)
5. Transfer of tritium from HTO contaminated surface soils into plants. H. Amano (JAERI)
6. Tritium transfer in the environment similated by ETDOSE. M. Andoh (JAERI)
7. Behavior and dose assessment of tritium after oral intake in animal body. M. Saito (Kyoto Univ.)
8. Estimation of internal dose by blood analyses for exposure to tritium in various chemical forms. H. Takeda (NIRS)
9. Development of a simplified method for determination of low-level tritium concentration. T. Kimura (Osaka Pharmaceutical College)
10. Effect of dehumidification on tritium concentration in exhaust gas from an attenuator tank of power plant. M. Fukui (Kyoto Univ.)
11. Effect of condensing rates on determination of tritium concentration in environmental samples. Y. Sakuma (NIFS)
12. ERMA and a computer code for calculating atmospheric tritium diffusion. K. Miyamoto (NIRS)
13. Application of a dynamic compartment model to tritium transfer from the atmosphere to plants. T. Takahashi (Kyoto Univ.)
14. DNA damage by irradiation and its repair mechanism. K. Komatsu (Kyoto Univ.)
15. Estimation of biological effects of tritium on reproductive cells. A. Watanabe (Hiroshima Univ.)
16. Development of a hyper-sensitive detection system for risk assessment of low dose rate of tritium exposure. H. Tauchi (Ibaraki Univ.)

References

1) M. Ichimasa, C. Weng, T.Ara, Y. Ichimasa, Fusion Sci. Technol., 41(2002), 393-398.
2) M. Komuro, M. Ichimasa, Y. Ichimasa, , Fusion Sci. Technol., 41(2002), 422-426.
3) N. Momoshima, H.Kakiuchi,, Fusion Sci. Technol., 41(2002), 404-408.
4) M. Atarashi-Andoh, H. Amano, M. Ichimasa, Y. Ichimasa, Fusion Sci. Technol., 41(2002), 427-431.
5) M. Atarashi-Andoh, H. Amano, M. Ichimasa, Y. Ichimasa,, Health Physics, 82 (2002) in press.