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Determination of deposition velocities of tritium on soil

In the case of airborne tritium release, a part of the tritium dispersed in the atmosphere will be deposited on a soil surface. The behaviour of radioactive HT (T= Tritium) in the environment is probably essentially the same as that of H_2. It is well know that soil can quickly oxidize atmospheric HT to tritiated water (HTO) mainly via a biological process. When HT is released, the dry deposition of HT to Soil arises from the oxidation of HT to HTO by micro-organisms in soil. HTO vapor in the atmosphere is much more harmful, due to the possibility of incorporation of tritium in the body fluids through the skin and the lungs, and subsequently of an internal exposure which lasts until the complete biological elimination of Tritium. Since the limits for intake of HT by workers is about 10, 000 times that of HTO, it is important to quantify the oxidation rate of HT in the environment for the purpose of radiation protection. The present study was carried out to obtain HT deposition velocities which are used to assess tritium doses to the general public. The deposition velocities obtained ranged from 3.4×10^{-4} m.s^{-1} to 9.8×10^{-4} m.s^{-1} .

The lowest value (3.4×10^{-4} m.s$^{-1)}$ was obtained for the soils collected from a vegetable field. For the experiments dealing with undisturbed soil, the average deposition velocity was found to be $(7.2 \pm 0.7) \times 10^{-4}$ m.s^{-1} . An average of $(7.5 \pm 2.0) \times 10^{-4}$ m.s^{-1} was obtained for the sandy soils.