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ORGANICALLY BOUND TRITIUM

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Abstract — Tritium released into the environment may be incorporated into organic matter. Organically bound tritium in that case will show retention times in organisms that are considerably longer than those of tritiated water which has significant consequences on dose estimates. This article reviews the most important processes of organically bound tritium production and transport through food networks. Metabolic reactions in plant and animal organisms with tritiated water as a reaction partner are of great importance in this respect. The most important production process, in quantitative terms, is photosynthesis in green plants. The translocation of organically bound tritium from the leaves to edible parts of crop plants should be considered in models of organically bound tritium behavior. Organically bound tritium enters the human body on several pathways, either from the primary producers (vegetable food) or at higher trophic level (animal food). Animal experiments have shown that the dose due to ingestion of organically bound tritium can be up to twice as high as a comparable intake of tritiated water in gaseous or liquid form. In the environment, organically bound tritium in plants and animals is often found to have higher specific tritium concentrations than tissue water. This is not due to some tritium enrichment effects but to the fact that no equilibrium conditions are reached under natural conditions.