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## S12

## Accumulation of Radionuclides in Aquatic Organisms

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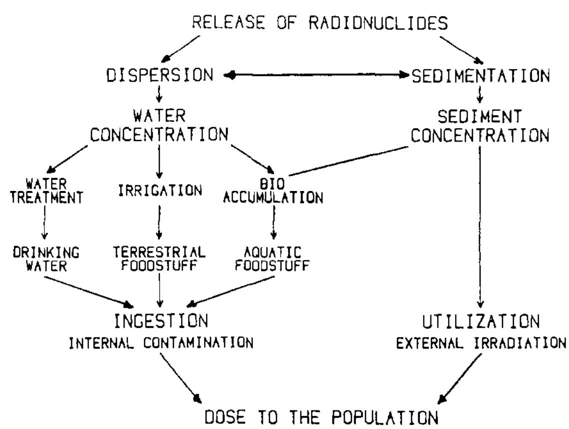
A good knowledge of the physico-chemical and biological processes involved in the transfer of radionuclides in the environment is essential for evaluating the radiological consequences of radioactive effluents released in the various phases of the nuclear fuel cycle [1]. As far as radionuclide releases to aquatic environments are concerned, the main transfer pathways may be represented schematically as follows:




Radioecological studies provided a considerable amount of information on the environmental behaviour of many radionuclides. Since critical pathways to man are generally food chains, particular emphasis was given to research on radionuclide transport and accumulation in living organisms. Bioaccumulation factors for a given radionuclide may differ by several orders of magnitude in freshwater and marine biota (plants, invertebrates, fish, waterfowl or shorebirds).

The acquired knowledge allowed the application of mathematical models for describing the transfer of the most important radionuclides through food chains and for evaluating the radiological impact of radionuclides released in normal operations [2]. Steady-state concentrations in the aquatic environment can be easily converted to equilibrium concentrations in biota and potential doses to man calculated considering the more important ingestion pathways [3].

The critical pathways are generally consumption of fish and ingestion of water when radionuclides are released to freshwater ecosystems, consumption of molluscs or crustaceans when radioactive effluents are released to marine ecosystems. Therefore, bioaccumulation factors are very important parameters in determining the dose to man.

In the case of light water nuclear power reactors discharges, most of the dose is caused by a relatively few radionuclides, such as:

– tritium (pressurized water reactors), phosphorus-32, cobalt-60, niobium-95, iodine-131, cesium-134 and cesium-137, for freshwater environments;

– manganese-54, cobalt-58, cobalt-60, zinc-65, iodine-131, and cesium-137 for marine environments.

The information collected from research on the environmental behaviour of radionuclides may be very useful for a better understanding of the processes responsible for accumulation of stable metal ions in aquatic organisms and biomagnification through food chains.

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## S13

## New Aspects of the Interaction between Polysaccharides and Metal Ions in Relation to the Mineral Nutrition of Plant Roots

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Recent discoveries emphasize the newly emerging concept that an extracellular apparatus, rich in