Elevated radioactivities in the used filters of bottled mineral-water facilities

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Groundwater that has been used as a main source of bottled mineral water contains naturally occurring radioactive materials (NORMs) through water-rock interations. Although there were many studies on the health risk via the internal radiation by drinking, the potential health risk through external radiation derived from the accumulated NORMs in the water purifying filters has not been studied yet. This study was carried out to determine the mechanisum of NORM-accumulatoin into filters and evaluate the potential risk, because the NORM-concentrated filters might affect workers's health at the bottled mineral water facilities.

Five bottled mineral-water facilities in Korea were studied. The level of Rn-222 decreased significantly after purifying processes (especially, after passing a raw-water storage tank), and surface radiation sharply increased at the first filter right after the raw-water tank. In addition, the short-lived radon progenies were detected at these first filters. These results suggested that the vaporized radon inside the water storage tank was naturally collapsed into radon progenies, and they consequently influenced the accumulation of NORMs in the first filters. Interestingly, particularly high radiation of the filter could be associated with the fouling formed through purifying processes. Although the NORM-concentrated filters seem to be not radiologically harmful to workers in the bottled mineral water facilities, the improvement of purifying processes such as translocation of raw water tanks and/or more frequent replacement of prefilters are required to reduce potential risk.