

Analysis of the Difference of Radon Concentration between Water Treatment Plant and Tap water in house

Jeong Il Seo*, Dong Han Yoo, Hee Reyoung Kim
Ulsan National Institute of Science and Technology (UNIST)
100 Banyeon-ri, Eonyang-eup, Ulju-gun, Ulsan Metropolitan City 689-798, Republic of Korea
*Corresponding author: tomatomato93@unist.ac.kr

1. Introduction

Radon exists naturally in a form of radioactive gas in the environment. More than half of radiation exposure is caused by this Radon for the public. It is one of major cause of lungs cancer with smoking because it decays into radioactive particles. Because of its importance for the health, measurements and analysis about radon is active recently. Especially, radon concentration measurement about underground water which people drink was been carried out by the environment organizations in Korea and has been hot-issued because of the high radon concentration in water source. In the present study, the difference of radon concentration among water source, water treatment plant and tap water in house is analyzed. It makes sense that the radon concentration in water treatment plant can represent the radon concentration in the tap water.

accumulation which can be used effectively for the health of the public. For it, the measurement of radon concentration of Ulsan water treatment plant and tap water in dormitory and gymnasium of Ulsan National Institute of Science and Technology (UNIST) is carried out by using radon continuous detector (model : RAD7). In case of students in UNIST, most of water intake is done by above places, So, the possibility of radon exposure from the water can be high, which can contribute to one of the factors causing annual radiation dose. Below, the comparative analysis between water treatment plant and tap water is represented and recommendations for post-management are suggested. Especially, improvement of "When radon concentration of tap water is higher than water treatment plant" is required

2.1 When radon density of water treatment plant and tap water is different.

When the radon concentration is different, there are specific causes in delivery system. Also it means that the data of environment organizations in Korea are not enough to analyze the amount of radon exposure for the public. There are two different cases below.

2.1.1 When radon density of tap water is higher than water treatment plant.

When the radon concentration of tap water is higher than water treatment plant, there are representative causes, the kind of surrounding ground and aging of delivery systems. Radon is distributed with some concentration in the Uranium based ground and granite. If there are some cracks in delivery systems by damage of aging, the radon in the ground can spread into the water in delivery systems. So it is possible to expect the location of cracked delivery system by kinds of the ground.

2.1.2 When radon density of tap water is lower than water treatment plant

When radon concentration of tap water is lower than water treatment plant, inflow of another water source with lower radon concentration is expected. It may be useful to know the additional inflow.

2.2. When radon density of water treatment plant and

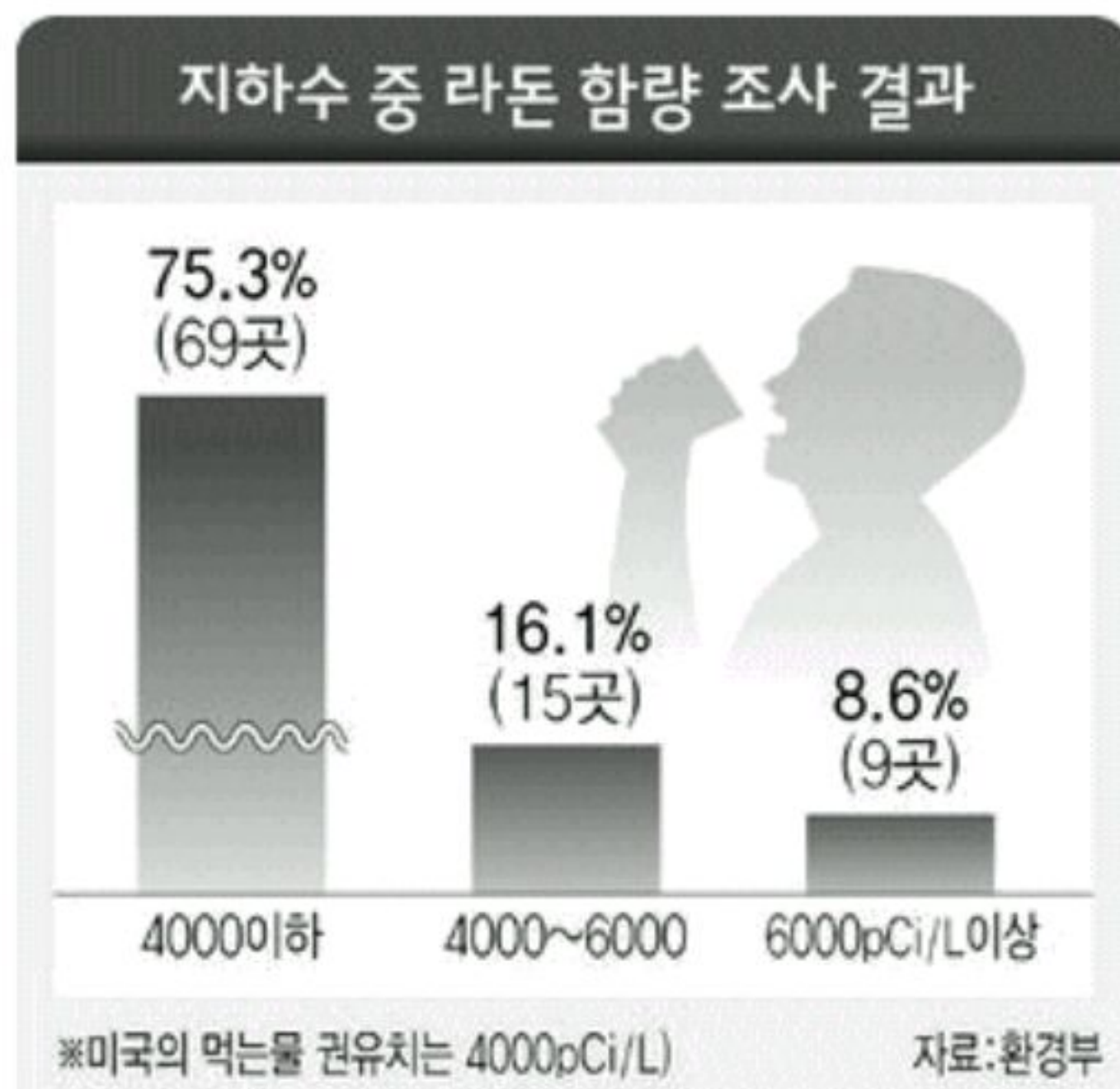


Fig. 1 Results of radon concentration in underground water (By Korea environment organization), [3]

Recommendation of drinking water in USA is 4000pCi/L
24.7% of results exceed the recommendation.

2. Methods and Results

The radon concentration in water treatment plant and tap water is measured and compared with that by environment organization in Korea for reliable data

tap water is same.

When radon concentration of water treatment plant and tap water is same, the results of Korea environment organization are reliable.

3. Advanced recommending experiments

It is recommended the additional measurements and analysis would be performed in variety places in Korea. Then, the specific effect according to surrounding ground and aging of delivery system can be investigated. Furthermore, radon concentration of drinking water such as bottled water, water in purifier and boiled water is suggested to be measured. It will be very helpful to expect annual radiation exposure for the public.

- [2] M. Jang, A study on the Evaluation of the Concentration of Indoor Radon due to Building Materials.
- [3] Measurement of Radon by Korea environment organization.



Fig. 2 Tap water manufacturing procedure
(By Google image search)

4. Conclusions

Through the above experiments, the difference of the radon concentration between water treatment plant and tap water in house is figured out. It contributes to confirm more specific basis for estimating the annual radon exposure for the public. With further experiments and analysis, it is thought that it will be used as tool to assess more qualitatively for the radon concentration in tap water. Finally, this Fundamental approach will help in making new regulations about radon.

REFERENCES

- [1] S. H. Kim, A study of Radon Concentrations in Indoor, Soil and Groundwater in Gyeongju.