

Arsenic and Heavy Metals in Edible Ferns from South Korea, North Korea, and China

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ABSTRACT

Arsenic (As) is ubiquitous in the environment and is both toxic and carcinogenic. Arsenic intake can be harmful and detrimental for animals and human, especially in the As-contaminated areas. In addition to arsenic, heavy metals such as Cadmium (Cd), Nickel (Ni), and Chromium (Cr) have been known as major pollutants. These metals are non-biodegradable and can accumulate in human organs through the food chain.

In the aspect of food safety, the object of this research is to investigate arsenic and heavy metal concentrations in edible ferns from three regions- South Korea (S), North Korea (N), and China (C). The examined fern is *Pteridium aquilinum* (고사리), which is a common table dish in these countries.

Results show that arsenic concentrations in most samples are under the recommended food safety limit (0.5 mg/Kg) except two samples, one from Chang-sun myun in South Korea and the other from Guizhou in China, which is a coal mine area. There are significant differences for the As concentration among samples from three countries ($p < 0.05$). The As concentration increases in order of $N > C > S$. In the case of Cd, there is no significant difference except one from Guizhou. The Cd concentration ranged from 0.1 to 1.26 mg/Kg. The Cd safety limit in rice is 0.2 mg/Kg and 2.0 mg/Kg in shellfish (Korean Food & Drug Administration). In the case of Ni, Co, As and Cr, the concentrations are different among three countries, but not Cd.

For most samples, As and heavy metal concentrations of edible ferns are below or slightly above the safety limits. Even though the regulations for several heavy metals in foods such as Cd, Pb, and Hg are made, more detailed standard limits for various metals are needed in South Korea.