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Article / Book Information

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論 文 要 旨

THESIS SUMMARY

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学生氏名： Student's Name	Enkhuur Munkhsuld	審査員主査： Chief Examiner	Takehiko Murayama

要旨（英文 800 語程度）

Thesis Summary（approx.800 English Words ）

Groundwater pollution is a serious issue, with various sources contributing to heavy metal contamination. Studies show that groundwater near mining areas often has high levels of heavy metals, posing health risks. Exposure to heavy metals in drinking water can have long-lasting effects, including cancer. Evaluating concentrations and conducting risk assessments is crucial to ensure groundwater safety, a vital resource. Mongolia faces similar challenges due to expanding mining, industrialization, and agriculture, underscoring the need for comprehensive monitoring and remediation. Analysis of private wells near the Erdenet mine's tailing pond revealed elevated calcium and magnesium, suggesting seepage as a likely source. Consumers relying on these wells should exercise caution, as treatment is typically absent, making them more vulnerable. The study also identified high molybdenum concentrations in wastewater seeping into the environment, a well-documented concern in mining regions. Comprehensive analyses and health risk assessments are essential to fully evaluate water quality and public health implications in mining-affected areas, as consumers obtain water from diverse sources, influencing their exposure and risk profiles. Moreover, the study observed variations in heavy metal concentrations among centralized public water wells. This was attributed to the fact that these wells draw water from three main sources, two of which are located within the Erdenet region, while the third source is situated 64 km away. To determine whether the centralized public wells in the Erdenet area exhibited higher heavy metal levels compared to those located 64 km away from the mining area, it would be important to clearly identify the specific groundwater sources for these wells. However, the study had limited information on the exact sources of these public water supplies. Moreover, human health risk assessment findings emphasize the critical need for comprehensive monitoring and remediation measures to ensure the safety of drinking water sources in mining areas. The results indicate that all sampled points exhibited As, Cd, Cr, Ni carcinogenic risk higher than the USEPA value of 1×10-6, necessitating urgent implementation of health risk management strategies. The study underscores the requirement for enhanced regulation, monitoring, and remediation of both public and private drinking water sources, as populations relying on these sources face significant risks of exposure to toxic metals through drinking water. Among the respondents, 63.3% utilized public wells, while 36.7% used private wells, with the prevalence of public well usage potentially increasing the overall risk and scope of contamination. Conversely, private well users, who are likely to consume more water per day than public well users, may face a higher individual risk of potential contamination. The regularity of water transportation was found to play an important role in both the overall daily water consumption and the specific intake of drinking water, with more frequent water transport associated with increased usage and consumption, thus raising potential health risks. Furthermore, a significant connection was observed between age and daily water intake, where older individuals showed a stronger tendency to consume higher amounts of water, potentially leading to prolonged exposure to potential health hazards associated with groundwater. The analysis also revealed that daily water intake and body weight are critical factors in evaluating human health risks related to heavy metal pollution in drinking water, with greater water consumption by individuals with lower body weights posing a higher risk of exposure to heavy metals. Notably, 18% of respondents reported consuming 4L of water daily, underscoring the importance of considering individual water consumption patterns and body weight when assessing potential health hazards. The respondents' water consumption behavior was found to be influenced by eight principal components, including hand hygiene, willingness to know, exposure duration, exposure volume, water carrying, social background, water carrying distance, age, smoking, and opinion on water quality. A greater frequency of hand washing suggests potential exposure to heavy metals through dermal contact in addition to ingestion. Given these significant health risks, concerted efforts must be made to implement strategies aimed at reducing heavy metal exposure and mitigating the associated human health impacts in the study area. Mining is a significant industry in Mongolia, playing a crucial role in the country's economy and development. By 2022, there 39 mining that are extracting gold, copper, coal and other minerals. Therefore, there is possibility to conduct continue human health risk assessment in mining areas of Mongolia.

備考 ： 論文要旨は、和文 2000 字と英文 300 語を 1 部ずつ提出するか、もしくは英文 800 語を 1 部提出してください。

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