

# Arsenic exposure through cooked rice and its associated benefit-risk from rural and urban populations of West Bengal, India: a probabilistic health approach with sensitivity analysis

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Presence of arsenic (As), a naturally occurring toxic metalloid (human carcinogen) is considered as a global concern [1]. Rice As contamination and its consumption poses a significant health exposure and risk to humans [2]. Considering cooked rice from both rural and urban populations, the present investigation emphasizes on the presence as well as the concentration of As and micronutrients. The study predominantly attempts to evaluate the potential probabilistic health risk exposure along with associated benefit-risk assessment through cooked rice (mainly cooking of As-contaminated rice using arsenic-safe cooking water) considering the three differently exposed populations of West Bengal, India. Intake of inorganic arsenic (iAs) is measured as a probable area of concern depending on health risk. The respective contribution of iAs from uncooked and cooked rice are nearly 97, 95, 100% and 92, 90, 94% from exposed, apparently control and control areas. Rice grain contributes iAs, which is being nurtured in exposed regions and transported to control regions [3]. Cancer risk analysis for the adult male, adult female and children groups through cooked rice from the exposed, apparently control, control area is higher than the recommended value i.e.  $1 \times 10^{-6}$ . Whereas,  $HQ > 1$  has been observed for all age groups from the exposed area and adult male group from the control area. Ingestion rate and concentration have been determined as influencing factor for inhabitants from rural area, whereas, ingestion rate is accountable for urban populations. Se intake ( $\mu\text{g}/\text{day}$ ) is lower for the exposed population compared to the two studied populations. Presence of micronutrients is effective in avoiding the toxic effect and potential risk through As. Benefit-risk assessment is important to assist the dietary intake and health associated with diet for controlling and prevention of disease [4]. Supply of As-safe drinking water and healthy nutritional food are highly recommended to fight against the devastating calamity of As.

[1] Upadhyay, M.K., et al. (2020). *Frontiers in Sustainable Food Systems*, 4, 53. [2] Joardar, M., et al. (2021a). *Environmental Geochemistry and Health*, 43, 3027-3053. [3] Joardar, M., et al. (2021b). *Exposure and Health*, 13, 33-50. [4] Fang, H., et al. (2021). *Frontiers in Nutrition*, 8, 694370.

