

Title of Research:

23-6-01

Development of risk assessment method based on the concept of the bioavailability with a model predicting the toxicities for difficult-to-test substances.

Principal Investigator:

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Summary of Research:

This study aims to provide information to support risk assessment of monoalkyl cation C16 (Hexadecyltrimethylammonium chloride: HTAC), a cationic surfactant designated as a priority assessment chemical substance under the Chemical Substances Control Law of Japan. It is known that the toxicity of HTAC changes depending on the water quality, and a more sophisticated risk assessment is possible by relating the water quality and the toxicity of HTAC. First, we examined water quality items that may affect the toxicity of HTAC and found that dissolved organic matter (DOC) has a significant effect, but other water qualities such as pH, hardness or salinity have almost no effect. To know the effect of DOC on the toxicity, we performed a growth inhibition test using *Raphidoceles subcapitata*. Using the test results for DOC=0 mg/L and DOC=5 mg/L, we constructed a model to predict the toxicity at various DOC concentrations. The prediction accuracy of the model was quite high, but it is necessary to verify next year whether it can properly predict the effects of DOC concentrations other than the two implemented this year. Finally, for exposure assessment, AIST-SHANEL Ver.3.0 was used to perform tertiary mesh and monthly concentration analysis of HTAC concentrations in 109 first-class water systems nationwide.

Timeline:

March, 1, 2023 -

Topics:

Oral presentation at the 2024 LRI research report workshop by JCIA (Tokyo)

Publications:

Yamamoto, J., Yamaguchi, N., Okamura, T., Sawai, A., Mano, H., Kamo, M. (2024) Analysis of Hexadecyltrimethylammonium Chloride using LC-MS/MS. July 3, 2024. 3rd Joint Conference on Environmental Chemicals

Ueda, K., Naito, W., Mano, H., Kamo, M. (accepted) Current status and issues of difficult-to-test substances such as cationic surfactants under the Chemical Substances Control Law of Japan. Japanese Journal of Environmental Toxicology (in Japanese).