OAK RIDGE NATIONAL LABORATORY
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Fluorescence Induction Data Analysis (FIDA)

Disclosure Number

200501513

Technology Summary

This application is designed to compare and analyze reference control data of healthy algae with data continuously obtained from real-time monitoring of naturally-occurring algae from sunlight-exposed primary-source drinking water to calculate a probability of healthiness. If a significant statistical deviation is detected, the application will generate an early warning. This warning will alert the drinking water facility manager or operator of the potential presence of a toxic agent in the water. As a result, the distribution of this water can be stopped until it is further analyzed by sensitive analytical chemistry methods. While the efficiency of PSII photochemistry has been used in the detection of toxic agents from fluorescence induction data, advanced analysis shows that PSII efficiency is not the optimal solution. In addition, the PSII photochemistry cannot classify different types of agents or agents with different concentrations. We have discovered that the combination of amplitude statistics and wavelet coefficient analysis, coupled with support vector machine (SVM) classification, can reach the highest accuracy for classification of different chemical antagonists at different concentration levels in freshwater drinking samples with a comparatively shorter response time. The proposed method can enrich situation awareness of possible chemical antagonists in the fresh drinking water and provide invaluable information for counter-attacks.

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