

Abstract

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Title

Identification of dominant algae producers of unexplained odours in source water

Description

It is widely known that geosmin and MIB are related to earthy and musty odours in water. These two compounds, along with their microbial producers in source water (cyanobacteria and microalgae), are regularly monitored by water utilities. However, unexplained taste and odour events continue to occur and they pose potential risks to the water industry. These events are due to unpredictable variation of cyanobacteria and microalgae populations, as well as the fact that contributions of other odour compounds (e.g., β -cyclocitral and β -ionone) and microbial producers (e.g., actinomycetes, benthic cyanobacteria and fungi) remain unexplored. Many studies have documented the presence of other taste and odour compounds in drinking water reservoirs (e.g., Warragamba and Carcoar Dams in NSW), such as β -ionone, β -cyclocitral, 2-Isobutyl-3-methoxypyrazine and 2-Isopropyl-3-methoxypyrazine, etc. These compounds can be produced by wide range of microbes other than algae, such as actinomycetes, fungi and myxobacteria.

Our analysis of historical monitoring datasets from Prospect Water Filtration Plant in Sydney reveals that various odours (e.g., fishy/fragrant/mouldy) other than musty and earthy occurred frequently, even when geosmin and MIB concentrations were below their odour threshold limit. We used different statistical methods to correlate odour descriptors and algae communities to identify the dominant odour-producing genera. These results operationalise historical monitoring data to identify the potential risk of unexplained odour events, and also help policy makers to decide on source water monitoring and management strategies.