Fishy odour problem induced by algae in source water during lower temperature period: occurrence and typical odourant identification

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Abstract:

Taste and odour in source waters is usually associated with algae. Unlike some algal species which bloom in warm and eutrophic systems and mainly cause earthy odour problem, some algal species can produce high biomass in cool water even under ice-cover, and cause strong fishy odour. However, the algal compounds responsible for fishy odour were still unclear. In this study, a comprehensive study was conducted on the occurrence and possible reasons for the fishy odour issues in the Yellow River source water during winter time. The results indicated that fishy odour episode might be attributed to the abnormal growth of some algae, such as *Dinobryon*, *Melosira*, *Cyclotella*, *Cryptomonas*, *Dinobryon*, and *Synedra*. A *Synura uvella* (Chrysophyceae) producing strong fishy odour were selected for identifying the possible fishy odourant. Volatiles from *S.uvella* were concentrated by SPME, and then analyzed by gas chromatography-olfactometry with mass spectrometry (GC-O/MS) and comprehensive two-dimensional gas chromatography with time-of-flight mass spectrometry (GC×GC-TOFMS). By using retention indices (RIs), the data from GC-O/MS were corresponded to those from GC×GC-TOFMS to identify the compounds associated with fishy odour. As a result, we conformed the compounds responsible for fishy odour as (E,Z)2,4-heptadienal, (E)-2-octenal, (E,E)2,4-Octadienal and (E,E)-2,4-Decadienal. Identification of the fishy odourants is of fundamental importance for their control or removal in source water.

Key words: Source water; fishy odourants; *Synura uvella*; GC-O/MS; GC×GC-TOFMS.