

Light effect on the growth and odour production potential of two typical MIB-producing algae

Zeyu Jia^{1,2}, Ming Su^{2,3}, Tingting Liu^{1,2}, Jianwei Yu^{1,2}, Min Yang^{2,3}

Corresponding authors & e-mails: Jianwei Yu - jwyu@rcees.ac.cn; Yang Min - yangmin@rcees.ac.cn

¹ Key Laboratory of Drinking Water Science and Technology, Research Center for Eco-Environmental Sciences, University of Chinese Academy of Sciences, Beijing, 100085, China.

² University of Chinese Academy of Sciences, Beijing 100049, People's Republic of China

³ State Key Laboratory of Environmental Aquatic Chemistry, Research Center for Eco-Environmental Sciences, University of Chinese Academy of Sciences, Beijing, 100085, China.

Abstract:

Taste and odour in source waters is usually associated with algae proliferation. Among different factors, light is a fundamental factor affecting the behaviors of algae, which is usually correlated with the water depth in reservoir. This paper investigated the effects of light intensity (2, 17, 36, 85 and 200 $\mu\text{mol photons m}^{-2} \text{s}^{-1}$) on the production of 2-methylisoborneol(2-MIB) by two cyanobacteria *Planktothrix* sp. and *Pseudanabaena* sp.. At the same time, an *on site* enclosed experiment deployed in different depth was conducted to compare with the results obtained in lab. The lab experiments indicated a different impacts of light intensity of the two strains. A relative high light intensity (85 $\mu\text{mol photons m}^{-2} \text{s}^{-1}$) favored the growth and odour producing of *Planktothrix* sp. but *Pseudanabaena* sp. grows best and produce more odour compounds under a medium light intensity(36 $\mu\text{mol photons m}^{-2} \text{s}^{-1}$). A high light intensity (200 $\mu\text{mol photons m}^{-2} \text{s}^{-1}$) has negative effects on the growth and odour producing of both strains. The maximum 2-MIB yields were obtained in low light intensity. As for the *on site* experiment, however, both strains have the maximum cell number and total 2-MIB under 1.5m depth (light intensity approximating to 80 $\mu\text{mol photons m}^{-2} \text{s}^{-1}$). The results of this study will be beneficial for understanding and managing the odour producing cyanobacteria.

Keywords: light intensity, odour producing cyanobacteria, on site experiment