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Comparative biotoxicity of N-Phenyl-1-naphthylamine and N-Phenyl-2-naphthylamine on cyanobacteria *Microcystis aeruginosa*

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Abstract: N-Phenyl-1-naphthylamine (P_1NA) and N-Phenyl-2-naphthylamine (P_2NA) are both widely used as antioxidant and plant secondary metabolites. In this study, growth, esterase, photosynthetic activity and cell membrane integrity were used as biomarkers to compare biotoxicity of P_1NA and P_2NA on *Microcystis aeruginosa*. According to the results, a dose-response relationship was observed only between P_1NA concentrations and growth inhibition. The EC_{50} (48 h) of P_1NA calculated from growth inhibition was 16.62 μM, while that of P_2NA was not detected. When the esterase and photosynthetic activity were applied to evaluate the biotoxicity, it was found that a concentration of 20 μM P_1NA, P_2NA caused reduction of esterase activity and Fv/Fm of *M. aeruginosa* to 22.2 and 3.3%, 97.5 and 92.1%, respectively, after 48 h exposure. The percentage of membrane-damaged cells was increased as P_1NA exposure concentration increased, but that was not detected