

Investigation of short-time artificial aeration on water quality parameters and phytoplankton structure: a case study “Mamloo Reservoir”

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ABSTRACT

Thermal stratification accompanied by a release of nutrients from sediment is a serious problem for the management of water quality. Water aeration and mixing technology can be widely used to control endogenous pollution and algae growth in reservoirs and lakes by water quality managers. In this research, a diffuser aeration system, was installed in a water column, in the Mamloo stratified Reservoir; and the impact of artificial aeration was brought under extensive assessment in relevance with the qualitative and biological parameters of the water, during the preliminary 6 d of aeration. The results showed that the thermal stratification was remarkably disturbed. After aeration, the amount of dissolved oxygen in the hypolimnion incremented from 0.55 to 3.46 mg/L. Nevertheless, a noteworthy correlation was not observed between the modification in the concentration of dissolved oxygen and the internal release of nutrients from the sediment in the hypolimnion. The advection generated by the circulated flow from the diffused air system can effectively transport algae between the surface and lower layers. The mixing function of diffuser can resist cyanobacteria flotation and decreased their distribution from 51,728 to 22,600 Cells/L. During the 6 d aeration, a significant factor, regarding modifications in water quality parameters and algae structure is the artificial flow generated by the diffuser.

Keywords: Thermal stratification; Nutrients; Phytoplankton structure; Artificial circulation; Reservoir

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