

Retention of photosynthetic oxygen in algal mass elevates dissolved oxygen concentration in the Lake

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The atmospheric and photosynthetic oxygen is the major sources of dissolved oxygen in water. The concentration of dissolved oxygen depends on the photosynthetic activities of the Chloroplast-bearing organisms. In case of water, mostly algae are responsible to regulate the oxygen concentration in the lake. The present study was conducted in one of the eutrophic lake, the Lower Lake, where exceptionally high concentration of dissolved oxygen was recorded at particular time and place. The particular sampling point was repeatedly investigated to know the cause of higher concentration of the dissolved oxygen. The vast difference in the readings recorded with the different methods (Winkler's & Electrochemical) confirmed that apart from the dissolved oxygen in water, the oxygen retained by the algal mass present at the site is mainly responsible for increasing of D.O. values. The analysis of algal mass further confirmed that additional input of the oxygen is due to presence of Cyanophycean algae Viz. *Microcystis aeruginosa*, *Merismopedia sp.* and also of *Clorococcum* species belonging to Class Chlorophyceae. These algal species particularly retain photosynthetic oxygen, which was released due to the use of fixatives i.e. application of Magnous sulphate and alkaline iodide in the sample. As the dissolved oxygen and biologically trapped oxygen get fixed with the action of fixative, the total value was observed to increase substantially.

During the investigation it was observed that cyanophycean algae particular *Microcystis aeruginosa* have the unique capability of retaining photosynthetic oxygen which may be in the cell or out side the cell but with in colony. The slimy layer formed with viscous fluid is retaining substantial amount of oxygen. Both the dissolved oxygen and retained oxygen appeared during the chemical analysis of the samples by Winkler's method. However the electrode method of analysis did not reflect the retained oxygen value in the reading. So the variation in the reading is directly linked with the retained oxygen values within the organism. The dissolved oxygen concentration at particular sampling station generally observed in between 2.8 to 14 mg/l through out the year except once i.e. 52 mg/l in the month of July 2000. After investigation it was concluded that the D.O. level was 11.8 mg/l and remaining part of oxygen 39.8 mg/l was due to the oxygen retained within the organism. The management aspect of such type of lake need to be planned by considering such typical phenomenon as it signifies that epilimnion is super saturated with dissolved oxygen while hypolimnion is anaerobic.