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Status of eutrophication and treatment of eutrophic water in Lake Nanhu, Wuhan, China

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Water resources, especially freshwater resources, are indispensable natural resources for human survival. China has abundant water resources, but the amount of water resources per capita is relatively scarce. Therefore, the use and protection of water resources in China needs special attention. The middle and lower reaches of the Yangtze River are one of the most abundant water resources in China, but the damage to the water environment is more serious. Among them, the problem of lake eutrophication is particularly prominent. The Lake Nanhu in Wuhan is a typical representative. Therefore, this paper takes Lake Nanhu as the research object, through five months of water quality monitoring, to understand its water quality and eutrophication status, and to explore the use of zeolite to treat eutrophic water. The pH value of the water sample showed that the South Lake water was weakly alkaline, and its pH value gradually increased from November to March. In the dissolved inorganic nitrogen content (DIN), NH_4^+-N>NO_3^--N>NO_2^--N, the change of total phosphorus during monitoring was small, and the total nitrogen and total phosphorus outside the sewage outlet were higher than other points. By using the improved scoring method and the gray system method, the eutrophication of Lake Nanhu in March was moderately eutrophic-rich and nutrient-rich. Zeolite is a commonly used water treatment material. Zeolite modified with sodium chloride or trisodium citrate has a better effect on phosphorus removal than the unmodified zeolite, and the effect of removing phosphorus by using trisodium citrate is better than that of zeolite modified with sodium chloride. Orthogonal experiments with different concentrations and dosages showed that the zeolite with 3 g of 0.01 mol/L trisodium citrate had the best phosphorus removal effect, and the removal rate was up to 31.4%. Usually, the solution after modifying the zeolite is directly discarded. In fact, the sodium salt-modified zeolite can replace the Ca^{2+} and Mg^{2+} of the hole and can be used for phosphorus removal. In this experiment, the solution after modifying the zeolite can be removed by about 10% phosphate. In the actual eutrophic lake water, 0.7 g of 0.01 mol/L sodium chloride, 0.01 mol/L trisodium citrate, 0.05 mol/L trisodium citrate, 50 ml of PO_4^{3-}concentrated 11.2779 mg/L of lake water The phosphorus removal rates were 20.08%, 45.15%, and 47.40%, respectively.