REDUCTION OF *Microcystis* POPULATION BLOOMING IN SUTAMI RESERVOIR THROUGH NUTRIENTS CONTROL AND INTERACTION WITH AEROBIC DENITRIFYING BACTERIA

Catur Retnaningdyah

ABSTRACT

The main objectives of this research were to examine the effect of nitrate, dissolved phosphate and ratio of both on the occurrence of *Microcystis* blooms. The treatments were performed in B12 medium and natural medium from Sutami reservoir. The research result was used as the basis to inhibits the growth of *Microcystis* by utilizing the aerobic denitrifying bacteria indigenous from Sutami reservoir. The laboratory research was conducted by using a factorial design with factors of nitrate concentration variation (0, 8, 16, 32, and 64 ppm) and dissolved phosphate (0; 0.2; 0.4; 0.8 and 1.6 ppm) in B-12 medium. The *in situ* research was carried out by enclosure experiment in Sutami reservoir water. *Microcystis* together with other plankton from Sutami reservoir was grew in the five variations of the ratio of nitrate to dissolved phosphate (10, 20, 40, 80, and 160). As a control, we used the water which was not added by nutrients. The next research, we determined the ability of aerobic denitrifying bacteria formulation indigenous from Sutami reservoir to inhibited the growth of *Microcystis*. Measured variable was *Microcystis* population abundance. This variable was used to calculate the rate of growth and carrying capacity of *Microcystis* which can be supported by each media treatment. The results showed that highest carrying capacity of *Microcystis* occurred in the B12 medium that contained nitrate levels between 8 ppm and 32 ppm combined with 0.4 ppm of dissolved phosphate or the ratio nitrate to dissolved phosphate between 20 and 80. The higher concentration of nitrate in B12 media may caused the higher growth rate of *Microcystis*. Increasing ratio of nitrate to dissolved phosphate in natural medium triggered increasing of *Microcystis* maximum abundance, whereas dissolved phosphate needed to optimal grow was 0.2 ppm. In the Sutami reservoir, we found six species of aerobic denitrifying bacteria having ability to reduce nitrate more than 90%. Those consortium ($3x10^8$ cells/mL) inhibited the growth of *Microcystis* in natural media. That treatment reduced *Microcystis* abundance 80-95% after incubation for 13 days in laboratory.

Keywords: *Microcystis*, aerobic denitrifying bacteria, nitrate and dissolved phosphate, Sutami reservoir